Recent Theoretical Directions and Future Challenges in Regional Economics

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Abstract

Regional Economics has just entered in its fifties. It is a young discipline compared to other branches of the economy, yet much work has been done in this field. A vast and rich number of theoretical and methodological approaches exists nowadays to incorporate space into logical schemes, laws and models which regulate and interpret the formation of prices, demand, productive capacity, levels of output and development, growth rates, and the distribution of income in conditions of unequal regional endowments of resources. This contribution provides the state of the art in Regional Economics with the aim to highlight the scientific achievements obtained so far and the theoretical and methodological gaps which still need to be filled out. Aspects that run counter to general beliefs emerge by reading the original contributions of well-known theoreticians, and will be presented. Future challenges will emerge from a critical approach to the milestones achieved so far.

Key words: Regional Economics, Recent Theoretical Directions, Future Challenges
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1. Introduction

The aim of the paper is to present a reflection on theoretical *advances in regional economics* in order to highlight recent and new scientific directions and future challenges. The reasons behind this interest are manifold. The first reason relates to the recent increase in interests by policy makers of old as well as new territorial and spatial issues. Old issues, like regional disparities, have worsened after the historic EU enlargement of May 2004 and call for particular attention; the enlargement added 5% to the GDP of the EU and 20% to its population; as a consequence the per capita GDP has dropped by 12.5% on the day of the enlargement. New issues – like *territorial cohesion* – represent new normative principles for the European Union, quoted in official EU policy documents as a strategic principle,

compatible and strategic as other more traditional principles like the Lisbon and Gothemborg ones (Luxembourg Presidency, 2005a and 2005b): "In practical terms territorial cohesion implies: *focusing regional and national territorial development policies* on better exploiting regional potentials and territorial capital – Europe's territorial and cultural diversity; *better positioning of regions in Europe* .....facilitating their connectivity and territorial integration; and *promoting the coherence of EU policies with a territorial impact*...." (p. I; emphasis in the text). In front of the strong attention given by policy makers to territorial aspects, regional science (and within it or regional economics) is called to provide its best theoretical and methodological tools on which normative choices can rely.

The second reason is a more scientific one, and is linked to the fact that no more than a decade ago, a wide debate was launched around the idea of a possible "mid-life crisis", reached after forty years since the establishment of regional science as a discipline. That period was a useful moment of reflection, of the assessment of the path that led from there to here, a comparison of the aims achieved with those expected, and the exploration of new possibilities for the future were the main aims of the various reflections and evaluations that from different perspectives were addressed to regional science (Bailly, 1992; Bailly and Coffey, 1994; Funck, 1991; Isserman, 1993, 1995; van Geenhuizen and Nijkamp, 1996). As a result, a tendency to re-orient the discipline took place and the theoretical and methodological tools reinforced and sometimes newly developed.

The third reason is that space, highly neglected by mainstream economists since its appearance, has become the source of scientific thinking also within traditional macroeconomic, international and industrial economic disciplines. A review of theoretical achievements developed so far helps in measuring the degree of convergence and cross-fertilisation of ideas between regional economists and the mainstream economists.

The focus of this review paper is regional economics as a sub-discipline of regional science. The paper aims at providing an overview of recent developments in theoretical reflections in the field of regional economics (Section 2); exploring the new perspectives, in particular on the conceptions of growth and space, behind the theoretical advances previously described (Section 3); highlighting the role that regional economics may play in re-launching regional science as a whole (Section 4) and stressing future challenges (Section 5). Some concluding remarks are contained in Section 6.

2. Recent Theoretical Directions

2.1. Tendencies in theoretical reflections

Although regional science is a relatively young discipline, in its fifty years of existence a surprisingly large variety of theories, methods and models have been developed which provide a relatively comprehensive theoretical and methodological toolbox for spatial analysis. Regional economics is not an exception in this respect; contemporary regional economics records in fact many advances and even breakthrough achievements, which enrich and reinforce both the theoretical and empirical frameworks of spatial analysis.

A great deal of our present understanding of the fundamental interaction between space and local economic behaviours originates from the fields of location theory. Location theory gives regional economics its scientific-disciplinary identity and constitutes its theoretical-methodological core. It has typically microeconomic foundations and it adopts a traditionally static approach. It deals with the location choices of firms and households. Linked with it are a variety of metaphors, cross-fertilizations, and theoretical inputs (from macroeconomics, interregional trade theory, development theory, mathematical ecology, systems theory) which have refined the tools of regional economics and extended its range of inquiry. In microeconomic terms, location theory involves investigation into the location choices of firms and households; but it also involves analysis of disparities in the spatial distribution of activities – inquiry which enables interpretation of territorial disequilibria and hierarchies. Location theory uses the concepts of externalities and agglomeration economies to shed light on such macro-territorial phenomena as disparities in the spatial distribution of activities, thereby laying the territorial bases for dynamic approaches.

However, regional economics has a second field of research, devoted to the understanding of the reasons and sources of regional growth. Within this field, two different approaches have coexisted, that of regional growth theories and that of regional development theories.

Regional growth theories are intrinsically macroeconomic; however, they differ from the purely macroeconomic approaches of political economy in its concern with territorial features. Just as we speak of the micro-foundations of macroeconomics, so we may speak of the locational foundations of regional growth theory.

Regional development theories adopt instead a micro-territorial and micro-behavioural approach; they are called theories of development because their purpose is not to explain the aggregate growth rate of income and employment – as in the case of regional growth theories – but instead to identify all the tangible and intangible elements of the growth process. These theories form the core of regional economics, the heart of a discipline where maximum cross-fertilization between location theory and development theory permits analysis of regional development as *generative* development: the national growth rate is the sum of the growth rates achieved by individual regions – as opposed to the *competitive* development envisaged by certain uniform-abstract space theories, where regional development is nothing but the simple regional allocation of aggregate national development.

The great number of relatively new and advanced contributions in the two fields (location theory and regional development/growth theories) does not allow for a detailed review on all individual achievements made; in addition, a disaggregated analysis of all novelties would probably not be so stimulating. Our impression is that an attempt to highlight general theoretical trends will turn out to be more fruitful for a debate on present weaknesses and on possible future directions of regional economics (see also Table 1). Inevitably, the set of "tendencies" that follows is both selective and incomplete, primarily reflecting personal views and research interests.

Table 1. Main Tendencies in Theories of Regional Economics

Theories / *Tendencies in theories*	*Location theories*	*Regional growth theories*	*Regional development theories*
More realism in theoretical approaches	Endogenous bid rent functions	Endogenous growth determinants	Interpretative elements in cluster analysis
	Inter-city location models		
		A role in growth models of the complex non-linear and interactive behaviours and processes that take place in	Non-material resources as sources of regional competitiveness
	Absolute vs. differential urban rent		

	Income differences in location choices	space.	An active role in knowledge creation
	Externalities in residential location	Imperfect market conditions in growth models	
	Randomly distributed idiosyncratic tastes	Growth as a long term competitiveness issue	
	Non-uniform generalised cost of travel with respect to location	Technological progress as an endogenous factor of growth	
	Externalities in land use and social optimum in land use		
Dynamic rather than static approaches	Dynamic urbanisation economies	Evolutionary trajectories of non-linear interdependencies of complex systems	Dynamic rather than static agglomeration economies
	Dynamic locational choice decisions		

2.2. The need for more realism

By looking at the theoretical trajectories followed in regional economics, one of the major tendencies which has accompanied the theoretical development in the field is the *need for more realism* in sometimes rather abstract conceptual approaches, by relaxing most of the glaring unrealistic assumptions of the basic theoretical models, a tendency common also to urban economics (Capello and Nijkamp, 2004). This tendency is justified by the need to broaden the interpretative capacity of the theoretical toolbox in this research field by searching for theories that are better able to reflect the real world.

In the context of location theory, the area where the need of realism has strongly been felt is in land use and in location choice models, explaining the competition that derives among activities to obtain the most central location in a city. The analysis of economic behaviour in space represents the core of urban economics; extensions and refinements of the basic Von Thünen-Alonso-Muth work, in which at equilibrium a marginal reduction in rent from further decentralisation was exactly offset by a marginal increase in travel costs, defining a condition

of indifference among locations (the famous "Muth condition"), led to the birth of established a particular sub-discipline; all advanced models in this direction can be interpreted under the label "New Urban Economics", and more recently "Analytical Urban Economics" (Richardson et al., 1996). The development trajectory in this branch of urban economics has been the relaxation of the simple assumptions made in the basic models; the introduction of income differences in location choices, of randomly distributed idiosyncratic tastes, of heterogeneous urban space and of the existence of externalities in the use of land (congestion, zoning, segregation, fiscal jurisdictions) are some examples in this respect[1]. The result achieved has been a higher degree of realism in the models, at the expense of a higher level of analytical sophistication, highly criticised when giving birth to a pure "l'art pour l'art" attitude so detrimental to further acceptance and advances in location theory.

In regional growth theories, the need for more realism has been felt in the need to insert the complex non-linear and interactive behaviours and processes that take place in space into growth models and to understand regional competitiveness in terms of endogenous factors. The question of whether a region is intrinsically capable of growing as a result of endogenous forces has been a source of debate for decades; industrial specialisation, infrastructure endowment, central location, production factor endowment, or agglomeration economies have alternatively been emphasised in the academic arena as driving forces of local economic success.

The decisive step forward in this field has been the focus on economies of scale in production which, together with non-linear transportation costs, are introduced into a (quantitative) interregional growth model; the final spatial distribution of activities critically depends on initial conditions including the starting distribution of activities and the nature of the non-linearities embedded in the activity-transportation interactions, which give rise to multiple equilibria (Krugman, 1991). The additional value of Krugman's approach resides in skilfully modelling the interaction between transportation costs and economies of scale in production, although the determinants of endogenous growth have already since long been emphasised, starting from the Myrdal-Kaldor model (increasing returns, cumulative self-reinforcing growth patterns).

[1] The volume edited by Richardson et al. (1996) contains a very comprehensive set of papers on this issue.

In parallel to Krugman's efforts, in the field of endogenous determinants a great emphasis has recently been put on knowledge as a driving force to development, and, what is really new, on the endogenous self-reinforcing mechanisms of knowledge creation. Macroeconomic models of endogenous growth, where knowledge is generally embedded in human capital (Romer, 1986; Lucas, 1988), have widely dominated the academic arena in the last decade. Their main aim was to insert more realism in growth models by relaxing the unrealistic assumption that technological progress is an exogenous process in an economic system; in the new growth theories, instead, technological progress is an endogenous response of economic actors in a competitive environment. More specifically, increasing returns in factor productivity stemming from endogenous factors – such as innovation, scale economies, and learning processes – are included in a neoclassical production function, where they off-set the effect of the marginal productivity of the individual factors, which the traditional neoclassical approach assumes to be decreasing.

The identification of endogenous determinants of growth was the crucial scientific issue that explained the birth of regional development theories. Development is in fact by definition *endogenous.* It is fundamentally dependent on a concentrated organization of the territory, embedded in which is a socio-economic and cultural system whose components determine the success of the local economy: entrepreneurial ability, local production factors (labour and capital), relational skills of local actors generating cumulative knowledge-acquisition – and, moreover, a decision-making capacity which enables local economic and social actors to guide the development process, support it when undergoing change and innovation, and enrich it with the external information and knowledge required to harness it to the general process of growth, and to the social, technological and cultural transformation of the world economy. The micro-behavioural nature of these approaches allowed a deep understanding of the sources of territorial externalities, of increasing returns in the form of agglomeration economies, at the basis of industrial cluster formation.

More realism in the study of clusters and their determinants called for a better understanding of success and failures of local productive systems, hardy explained in the first theories proposed. Dynamic agglomeration economies – defined as territorial advantages that act on the capacity of firms and regions to innovate – become the centre of most recent theoretical reflections in this field, giving rise to neo-Schumpeterian approaches in regional

development. A large debate dominates the academic arena, with the aim to identify the role of space in innovative processes.

In the vast literature created in this field, the endogenous determinants of innovation are increasing returns in the form of dynamic location advantages deriving from:[2] (i) *spatial, geographical proximity* among firms, which facilitates the exchange of tacit knowledge: this characterizes reflection by economic geographers concerned to explain the concentration of innovative activities; (ii) *relational proximity* among firms, defined as interaction and cooperativeness among local agents, the source of collective learning processes and socialization to the risk of innovation (i.e. territorialized relations among subjects operating in geographical and social proximity): this was the approach taken by territorial economists in explaining the dynamic of local systems in terms of local innovative capacity; (iii) *institutional proximity* taking the form of rules, codes and norms of behaviour which facilitate cooperation among actors and therefore the socialization of knowledge and assist economic actors (individual people, firms and local institutions) to develop organizational forms which support interactive learning processes: this aspect was emphasised by more systemic approaches seeking to understand the evolution of complex systems like the innovative system.

2.3. The need for dynamic approaches

A second clear tendency in theoretical developments - typical of regional development/growth theories only - has been the attempts to move towards *dynamic approaches*. Time matters as well as space in regional science, and this also holds in regional economics. The effort to encapsulate time in spatial analyses has taken place in two different

[2] In these fields of research, see among others Anselin et al., 1997 and 2000; Audretsch and Feldman 1996; Aydalot, 1986; Camagni, 1991; Capello, 1999 and 2001; Crevoisier and Camagni, 2000; De Groot et al., 2001; Feldman, 1994; Feldman and Audretsch, 1999; Jaffe, 1989; Jaffe et al. 1993; Maier and Sedlacek, 2005; Maillat et al., 1993; Maskell and Malmberg, 1999; Rallet, 1993; Ratti at al. 1997; Bellet et al., 1999. Very recently a forecasting macroeconomic regional growth model, called MASST - has been created, considering the efficiency and quality of territorial assets and socio-economic relationships to be the driving forces behind regional competitiveness and performance. Factors like accessibility, infrastructure endowment, local innovative capacity, local urban structure and geographical position are intrinsic to the logic of the model, and have been identified as crucial variables in the economic explanation of regional success in Europe. These local factors are complemented by macroeconomic, national ones which also play an important role in the model's logic for the interpretation of regional performance, a fact justified in economic terms by the relevance of: a) wholly macroeconomic elements, namely interest rates, exchange rates, inflation rate, public expenditure; b) institutional and generalised structural factors like the efficiency of the public administration, general education level of the population, the characteristics of the labour market relations. The bottom-up, "generative" nature of regional performance is therefore fully acknowledged, and it is incorporated into the internal logic of the model in a manner that seems extremely innovative within the existing literature. Capello, 2005 and 2006.

ways, according to two different meanings of time applied in the two fields of analysis: a more traditional chronological time, and time as rhythm of innovative phenomena which occur in the territory which has been applied in regional growth models.

The introduction of a chronological time within spatial analysis is not at all a simple task, since it requires a mathematical and methodological toolbox, only recently available to regional scientists. Theories on non-linear regional dynamics – framed in the context of chaos theory, synergetics theory or predator-prey analysis - may be mentioned here (see Nijkamp and Reggiani, 1999). In growth models, until a few years ago, the large majority of experiments and applications has taken for granted the existence of linear – and thus regular – growth processes. Linear models are certainly able to generate unstable solutions, but the solutions of such models are restricted to certain regular standard types. Such models may provide approximate replications of short- and medium-run changes, but fail to encapsulate long-term developments characterised by structural shifts of an irregular nature. This limit has recently been overcome with the adoption of non-linear models, which allow for a change in the dynamics of a system generated even by small perturbations in structural forms; structural instability means the possible existence of significant qualitative changes in the behaviour of the system (i.e. in the state variables) that are closely connected with bifurcation and catastrophe phenomena that can occur if the parameter values (i.e. the control variable) are changing (Fujita and Thisse, 1996 and 2002). The application of non-linear models to the well known neoclassical and Keynesian models has shown that the deterministic and unique results achieved by the dynamic linear models are no longer guaranteed: interregional income convergence determined by the traditional neoclassical model collapses and opens the way to alternative possible trajectories, and equilibria solutions; non-linear Keynesian Myrdal-Kaldor models substitute the deterministic result of continuous growth or decline with new and opposite development trajectories, after a catastrophe phenomena occur (Miyao, 1984, 1987a and 1987b).

Such a theoretical improvement has also been useful in achieving a greater realism of these models, able to incorporate the dynamic interactions between the components of a spatial system. The latter are functionally determined by interdependencies between the behaviour of actors and distance frictions. Such spatial interactions may be stable in nature (i.e., operating under fixed external conditions) or subject to change as a result of dissipative evolutionary processes in the external world. In the latter case, model parameters become time-dependent,

so that non-linear complex dynamics may emerge (see Puu 1991; Nijkamp and Reggiani 1993; Nijkamp, 2006).

In the field of regional development, conceptually speaking a different concept of time has been developed and applied; time à la Bergson-Heidegger is interpreted as duration and a continuous process of creation, characterised by discontinuity, irreversibility, sequentiality and cumulativity. Time has thus been conceived by an important part of urban studies as the pace of learning, innovation and creation processes. Local clusters (and industrial districts) are by definition the loci where learning and cumulative learning processes take place; the identification of the sources and of the endogenous determinants of such processes, besides simple physical proximity, represents a great challenge for regional economists. Knowledge spillovers, collective learning, learning regions (or learning space) and knowledge-based regions are all theories that embrace the most advanced perspectives in this direction.[3] In these theoretical approaches, therefore, innovation has become the critical survival factor in a competitive space-economy and determines the direction and pace of regional development (Nijkamp and Abreu, 2006).

3. New Perspectives in Space and Growth

3.2. The evolution in the conceptualisation of growth: new perspectives in growth theories

The recent theoretical trends presented above were made possible thanks to new perspectives – especially in the concepts of space and growth - that allowed the overcome of some general traditional approaches limiting the interpretative power of theories and models in regional economics.

The first definition of regional growth adopts a short-term view of growth and concentrates on the exploitation of given and unused capital resources and of large labour reserves. These growth theories – of typical keynesian nature - hypothesise the existence of unused production capacity (capital stock) and large labour reserves. In these conditions, local

[3] For a literature on spatial spillovers see Anselin et al., 1997 and 2000; Audretsch and Feldman 1996; Aydalot, 1986, De Groot et al., 2001; Feldman, 1994; Feldman and Audretsch, 1999; Jaffe, 1989; Jaffe et al. 1993; Maier and Sedlacek, 2005; on collective learning Camagni, 1991; Capello, 1999 and 2001; Crevoisier and Camagni, 2000;; Maillat et al., 1993; Rallet, 1993; Ratti at al. 1997; Bellet et al., 1999; on learning regions Lundvall and

economic growth does not depend on the structure and dynamic of supply (which by definition is able to expand and respond rapidly to market requirements); rather, it is driven by growing demand for locally produced goods which exerts an income multiplier effect through increases in consumption and employment. This was the definition given to growth by the first theories of the 1950s, which presupposed a problem of unemployment.

The second definition is that of the classical (and neoclassical) economists of the eighteenth and nineteenth centuries, who interpreted the growth process in terms of productive efficiency, of the division of labour in a Smithian sense, and of production factor productivity, and hence examines the dynamics of wages, incomes, and individual well-being. Regional growth is a problem of individual well-being to be addressed in two ways: by acting upon factor productivity, thereby obtaining increases in real per capita wages and incomes, and by fostering processes of production specialization which yield advantages deriving from the purchase of goods on interregional markets at prices lower than they would be if the goods were produced internally to the region. These theories also comprise the notion of relative growth – of divergence/convergence in levels and rates of growth among regions – in that they measure the magnitude and trend of disparities among per capita incomes. Growth was viewed in this way by most of the theories developed in the 1960s. Problems of poverty, underdevelopment, and inequalities in the spatial distribution of income were the normative aspects of concern to these models.

New local growth theories neither the first nor the second definition, and instead embrace the most recent interpretation of growth, given up to the time these new theories were proposed, to regional development theories. They investigate the local conditions that enable the economic system to achieve high levels *of competitiveness* and, more crucially, to maintain those levels over time. Growth is defined as an increase in a region's real production capacity and its ability to maintain that increase, thanks to cumulative and self-reinforcing elements, of both economic and territorial nature.

Johnson, 1994; Maskell and Malmberg, 1999; on knowledge-based regions, see Malecki, 2000; Florida, 1995; Nijkamp and Stough, 2004; Simmie, 1997.

3.2. The evolution in the conceptualisation of space: new perspectives in growth and development theories

The new theoretical directions are also developed thanks to a new perspective in the conceptualisation of space, a conceptualisation that allowed to introduce increasing returns – in the form of agglomeration economies – into macroeconomic growth models. In the history of regional economics, space has been conceived in different ways. In original location theories space has performed the role of a physical barrier – or of a spatial friction – against economic activity, taking the form of the physical distance between input and output markets conceptualized by models as a generic transportation cost. For its intrinsic characteristics, in location theories space can be defined as *a physical-metric space*.[4]

Regional growth theories of the fifties and sixties used a conception of space – as *uniform-abstract*, no longer physical and continuous but abstract and discrete – entirely different from the physical-metric space of location theory. Geographic space was divided into 'regions', areas of limited physical-geographical size (largely matching administrative units) considered to be internally uniform and therefore synthesisable into a vector of aggregate characteristics of a social-economic-demographic nature: 'small countries' in the terminology of international trade but, unlike nations, characterized by marked external openness to the movement of production factors. Space was interpreted as a 'physical container' of development, a simple geographical area often associated with the administrative region by aggregate macroeconomic theories – but also with smaller local areas (simple geographic agglomerations within a region). The advantage of this conception of space is that it enables the use of macroeconomic models to interpret local growth phenomena.

In both cases, space played no part in determining the development path of a local economy. In regional growth theories the same economic logic explained the development of regions, metropolitan areas, or more generally, densely-populated industrial areas, witnessing the aspatiality of the theories.

A radical change in the conceptualization of space took place in the seventies and gave space a very different role in development. No longer a simple geographical container, space was conceived as an economic resource, as an independent production factor. It is the generator of static and dynamic advantages for firms, and a key determinant of a local production system's

competitiveness. According to regional development theories, space was a source of increasing returns, and of positive externalities taking the form of agglomeration and localization economies. Higher growth rates were achieved by local production systems where increasing returns acted upon local productive efficiency to reduce production and transaction costs, enhanced the efficiency of the production factors, and increased innovative capacity. Regional development consequently depended upon the efficiency of a concentrated territorial organization of production, not on the availability of economic resources or their more efficient spatial allocation. Space was then conceived as *a diversified-relational space*; a diversified space in which it is easy to distinguish (even internally to a region) the uneven distribution of activities. Development comes about selectively in areas where the concentrated organization of production exerts its positive effects on the parameters of static and dynamic efficiency. At the same time, space is *relational*, in that the economic and social relations which arise in an area perform crucial functions in various respects. They ensure the smoother operation of market mechanisms, more efficient and less costly production processes, the accumulation of knowledge in the local market, and a more rapid pace of innovation – all of which are factors that foster local development.[5]

Until the end of the eighties these different conceptions of space developed within regional economics without the slightest convergence between them. A theoretical impasse was achieved in those years; in the words of Edvin Von Böventer (1975), "within regional economics one could distinguish between 'pure and exact' regional theory without agglomeration economies, on the one hand, and 'applied regional theory' which is inexact but takes agglomeration factors into account, on the other hand". Von Böventer was referring, in the former case, to a rigorously economic and formalized theory of growth, one closer to mainstream economics and envisaging a uniform-abstract space. In the latter case, he had in mind a theory of development without the formal rigour of macroeconomics and predicated on a conception of space where agglomeration economies drive local development.

The advances in more advanced mathematical tools for analysis of the qualitative behaviour of dynamic non-linear systems (bifurcation, catastrophe, and chaos theory) together with the

[4] For a thorough discussion on the different conceptualisations of space, see Capello, 2007.

[5] An interpretation of the space-economy as an interdependent complex set of economic relationships – at different geographic scale levels and with a variety of time dimensions involved – can be found in the first law of geography formulated by Tobler (1970) who stipulates that everything in space is related to everything else, but near things are more related than distant things. See Nijkamp, 2006.

advent of formalized economic models which abandoned the hypotheses of constant returns and perfect competition, made it possible to incorporate agglomeration economies – stylized in the form of increasing returns – into elegant models of a strictly macroeconomic nature.

The aim to incorporate agglomeration economies – in the form of increasing returns – into elegant models of a strictly macroeconomic nature, was made possible by the advances in more advanced mathematical tools for analysis of the qualitative behaviour of dynamic non-linear systems (bifurcation, catastrophe, and chaos theory) together with the advent of formalized economic models which abandoned the hypotheses of constant returns and perfect competition. These new theoretical advances required a new conceptualisation of space, that of a *diversified-stylised space*. Space is in these new theories of local growth a diversified space, since the existence of polarities in space is envisaged where development takes place, diversifying the level and rate of income growth even among areas of the same region. However, it is a stylised space, since polarities are treated as points devoid of any territorial dimension. This approach moves away from the concept of a *uniform-abstract space* of growth theories developed in the fifties and sixties; uniform, in that supply conditions (factor endowment, sectoral and productive structure) and demand conditions (consumer tastes and preferences) are identical everywhere in the region; abstract, since simplifying assumptions are inserted as to cope with place-specific conditions (see Capello, 2007).

In order to enhance the role of space in innovative activities, regional development theories change their perspective of space as a pure generator of static advantages, and focus their attention on the role of space in the creation of knowledge and, therefore, of dynamic agglomeration advantages.

In most recent regional development theory space becomes a “cognitive space”, a space where the ability to manage information in order to identify and solve problems, or, more precisely in the economic sphere, the ability to transform information and inventions into innovation and productivity increases depend also on local co-operative or market interaction. Space reduces uncertainty, information asymmetries (and therefore mutual suspect among partners) and probability of opportunistic behaviour under the threat of social sanctioning (Camagni, 1991 and 2004), all elements that are confirmed by many regional economics schools (Bellet et al., 1999; Rallet and Torre, 1995; Cappellin, 2003a) thanks to a cognitive proximity: shared behavioural codes, common culture, mutual trust and sense of belonging

explain process of knowledge creation and of collective learning processes.[6] In fact, especially in contexts characterised by a plurality of agents – like industrial districts and productive clusters - knowledge evolution "is not the result of individual efforts in R&D within single firms, but rather the combination of complementary capacities and of widespread interactive learning processes, which involve many 'customers' and 'suppliers' along a well-defined filière or supply chain" (Cappellin, 2003b, p. 307).

Abstract space becomes in these approaches a real territory, a relational space where functional and hierachical, economic and social interactions take place and are embedded into geographical space, and give rise to cooperative learning processes are locally developed, nourished by spatial proximity ("atmosphere" effects), network relations (long-distance, selective relationships), interaction, creativity and recombination capability (Camagni and Capello, 2006).

4. Regional Economics and its Relevance in Re-launching Regional Science

The theoretical development in Regional Economics, and in general in Regional Science, has not always been a smooth and constant process. During the nineties a wide debate was launched around the idea of a possible "mid-life crisis", reached after forty years since the establishment of regional science as a discipline; the assessment of the path that led from there to here, a comparison of the aims achieved with those expected, and the exploration of new possibilities for the future were the main aims of the various reflections and evaluations that from different perspectives were addressed to regional science (Bailly, 1992; Bailly and Coffey, 1994; Cuadrado-Roura, 1998; Funck, 1991; Isserman, 1993, 1995; van Geenhuizen and Nijkamp, 1996).

The debate on the difficulties encountered by the development of regional science was useful to identify two sources of problems: the lack of relevance on practical problems, on the one side, and the loss of interdisciplinarity, on the other. The first was signalled as the result of the tendency of that period to develop descriptive or analytical tools and models, which "had the sweet and intoxicating flavour of l'art pour l'art" (Bolton and Jensen, 1995, p. 137). The

[6] A collective learning process of this kind was first hypothesized by the GREMI group (Camagni, 1991; Perrin, 1995) and subsequently widely adopted as a sound theoretical concept for the interpretation of knowledge-based development and innovation (Keeble and Wilkinson, 1999 and 2000; Capello 1999; Cappellin, 2003b).

second source of malaise was related to the somewhat ironic recognition that, despite openness and breadth – in terms of disciplines, methods and objects of analysis – were the major goals to which the field aspired in its early days, in the nineties the major weakness of regional science was its narrowness of perspective (Bailly and Coffey, 1994).

Regional science, and regional economics within it, has certainly recovered from the "crisis", at the point that made scientists now speak about normal transition phenomena reflecting a sound dynamics of the discipline, about normal upswings and downswings of a 'scientific product life cycle', which characterise science in general (Quingley, 2001; Capello and Nijkamp, 2004).

Signs of "good health" of Regional Economics are contained in thorough debates that have filled out scientific journals. Among them, two are of prominent interest, because of their direct linkage with normative aspects. Two examples in this respect are, on the one side, the convergence debate, and on the other, the regional competitiveness debate.

The convergence debate has never been so up-to-date given the enlargement of the EU to new member states. From the theoretical point of view, decisive advances have been made in this field, and the traditional distinction, indeed a dichotomy - often drawn in regional economics textbooks - between theories of convergence and divergence: that is, between theories which examine the reasons for diminishing disparities between rich and backward regions, and theories which, on the contrary, explain the persistence of those disparities.

Ranged on the convergence side are theories originating within the neoclassical paradigm and which interpret (in their initial formulation) development as a process tending to equilibrium because of market forces. In equilibrium, not only is there an optimum allocation of resources but also an equal distribution of the production factors in space which guarantees, at least tendentially, the same level of development among regions.

On the divergence side stand theories of Keynesian origin which, by introducing positive and negative feedback mechanisms and the cumulative attraction and repulsion of productive resources respectively in a country's rich and poor areas, envisage not only the persistence but also the worsening of disparities among regions.

In general, a kind of prejudice has accompanied the distinction between divergence and convergence theories in the history of regional economics. In the sixties, Borts and Stein produced a model (the famous two regions - two sectors model) in which they demonstrate that if two regions start from the same level, and one grows more than the other for external shocks, there is a tendency for regional growth rates to *diverge*. The reason for this is as follows: the income generated in the region exporting the manufacturing good differs from disposable income in an amount that equals the remuneration of the capital borrowed externally. Internal saving, calculated as a share of disposable income, will therefore never be enough to finance local production. The shortage of capital guarantees high remuneration of this production factor, and this stimulates a constant inflows of capital from outside. As a result, the region's growth rate is persistently higher than that of other regions. The flow of workers into the exporter region alters the capital/labour ratio and thus attenuates the divergence in growth rates.

In recent years, more refined mathematical and modelling tools have demonstrated that the same theories are able to explain both divergence and convergence. By introducing, for example, scale economies and agglomeration economies into a production function – obviously more complex than that of the 1960s model – the neoclassical model successfully simulates a series of behaviours and tendencies, both continuous and 'catastrophic', very distant from the mechanicism and univocity of the convergence predictions of the original neoclassical model. In the same way, the divergence yielded by Keynesian models (*à la* Myrdal and Kaldor in particular) is called into question if the model's dynamic properties are analysed: according to the parameter values of the dynamic equations describing the model's economic logic, the local system either converges on a constant growth rate or explosively or implosively diverges from it.

It is therefore possible to conclude that there are no longer grounds for any dichotomy to be drawn between theories of convergence and divergence, between optimistic theories and pessimistic ones. However, the problem in and of itself is still very much present, and it is much more complex than was believed in the past. The neoclassical model, elegant in its formulation and consistent in its economic logic, has been frequently criticised as unsuited (in its original formulation) to interpretation of constant and persistent regional disparities. The Keynesian model, in its turn, has been faulted for being unable to foresee territorial limits to

the evolution of the cumulative process, although these limits have substantial effects on territorial development paths. But if the 'theories of divergence/convergence' dichotomy is abandoned, the explanatory capacity of each theory can be recovered, to produce a broad array of conceptual tools with which to interpret the complex processes of territorial development.

The conflicting predictions of the neoclassical and endogenous growth models have generated intense scrutiny and a plethora of empirical studies, as well as new and more sophisticated methodological approaches to the measurement of regional disparities. In this field still much has to be done.

A second up-to-date debate directly embrases the issue of enhancing *competitiveness of territories in a globalised economy*.[7] This debate centers around two main interrelated issues. The first issue deals with the definition of regional competitiveness, which is seen as an elusive concept, since it has been defined in different ways; (i) as an increase in the export-base of the region, focusing on export performance (Storper, 1997; European Commission, 1999; Rowthorn, 1999); (ii) as an increase in factor productivity (Krugman, 1998; Porter and Ketels, 2003).[8] The two definitions seem even contradictory. The former requires an increase in the ratio between the general level of import prices and the level of export prices expressed in a common currency; competitiveness in fact increases when the denominator is reduced (due to a devaluation or a reduction in export prices) and tends to generate growth in exports (in volume) and employment. The latter is based on the opposite relationship (export prices on import prices), i.e. the *terms-of-trade* since the basic idea that increasing the efficiency of the export sector means being able to import the same amount of goods employing a lower quantity of local resources (it is mainly the case of process innovation), or to import more with equal utilization of local resources. In this case a reduction of export prices, and therefore an increase in competitiveness, result in a reduction of welfare (see Camagni, 2002).

It has been suggested that: "The conflicting situation can be resolved by turning to a different measure of competitiveness: if it is true that "it is better to sell with prices rising rather than falling" and that the problem consists in dealing with the expected fall in demand in a

[7] It has been underlined that economists and experts everywhere have elevated "competitiveness" to the status of a natural law of the modern capitalist economy. See Kitson et al, 2005, pp. 1.
[8] See Kitson et al., 2005.

situation of rising prices, the answer, both conceptual and operative, is of increasing the attractiveness of local products by taking action on innovation, thereby breaking the static context, both conceptual and operative, of price competition. We thus come up against a concept of *non-price competitiveness*" (Camagni, 2002).

A related issue, launched by the provocative argument put forward by the eminent economist Paul Krugman, is whether regions compete on the basis of comparative or absolute advantages, an important debate carried out in the last half-decade which was started considering the case of nations, but recently enlarged to regional and territorial entities.[9] As Camagni states, "the question at stake is not at all abstract and removed from present issues concerning spatial development: from the answer to it derives the economic rationale for development policies at the local level, addressed to enhancing competitiveness and attractiveness of territories, their capability of meeting the demand of both citizens and firms in terms of wellbeing and general efficiency". (Camagni, 2002).

The debate has been rather inconclusive, probably due to the wide differentiation in scientific backgrounds, logics and languages of the participants (international economists, business administration experts, regional scientists) which led to develop different positions, never really compared, and to mix up the different territorial levels of analysis, as if the same economic "laws" could apply equally for cities, regions and nations[10].

Starting exactly from this latter point, recently a scientific reply has been proposed by Camagni, based on sound theoretical foundations (Camagni, 2002). According to the author, regions differ from countries in that they compete on the basis of an absolute advantage, since the adjustment processes which restore equilibrium in international trade, and at the operation of the principle of comparative advantages in the presence of exogenous shocks do not work in the same way at national and regional level. The starting-point is the observation that, although the Ricardo model yields the result that trade is always in the interest of a country, it actually occurs only if there are absolute advantages in commerce between economic actors which compare the (absolute) prices of a good in the two countries, given a certain exchange

[9] This last part of the debate was hosted by the *International Regional Science Review*, n. 1-2, 1996 and by *Urban Studies*, n. 5-6, 1999. Krugman has recently collected his interventions on the subject in Krugman, 1998. See also among others, Cheshire and Gordon, 1995; Boschma, 2004; Steinle, 1992; Storper, 1997.

rate. In the higher-productivity country, wages are necessarily higher than in the less efficient country, where factor remunerations are defined on the basis of lower levels of productivity and overall output. It is logically likely that productivity gaps will be on average perfectly offset by wage gaps (calculated in the same currency) – which demonstrates that comparative advantages are also absolute advantages.

5. Future Challenges

My own impression on the future of regional economics (and regional science in general) is optimistic. After a period of reflection, regional science shows clear signs of recovery, such as a deep interest in practical problems, and the recognition that an "art pour l'art" approach is detrimental to further acceptance and advances in this field. Some theoretical challenges are still in front of regional scientists, and have to be faced. Among them,

A first challenge is proposed by the an attempt to obtain advantages by a future convergence in different theoretical approaches, a convergence only partially obtained by the new regional growth theories.

A wide variety of approaches exist in regional economics in terms of space and a certain convergence has come about between the large groups of theories. Diversified-relational space theories, in particular those of (endogenous) local development, merge together ideas put forward by the theories of development and of location. Diversified-stylized space theories (in particular new economic geography) amalgamate growth and location theories (Figure 1).

New growth theories make a commendable effort to include space in strictly economic models. Also to be commended is the implicit merging in its theoretical structure of the various conceptions of space put forward over the years: the merging, that is, of the physical-metric space represented by transport costs with the diversified space which assumes the hypothesis of the existence of certain territorial polarities where growth cumulates. However, the new economic geography is still unable to combine the economic laws and mechanisms

[10] The editors of the *Urban Studies* issue affirm: "It will be clear that the authors contributing to this Review broadly believe that cities and other places compete with one another. (…) The consequences for national economies remain uncertain" (Lever and Turok, 1999, p. 792).

that explain growth with territorial factors springing from the intrinsic relationality present at local level. An approach that did so would represent the maximum of cross-fertilization among location theory, development theory and macroeconomic growth theory; a synthesis which would bring out the territorial micro-foundations of macroeconomic growth models (Figure 1) (Capello, 2007).

Still needed, therefore, is a convincing 'model' which comprises the micro-territorial, micro-behavioural and intangible elements of the development process. Required for this purpose is definition of patterns, indicators, and analytical solutions to be incorporated into formalized models necessarily more abstract and synthetic in terms of their explanatory variables; variables besides the cost of transport, which annuls the territory's role in the development process. A move in this direction is the quantitative sociology that embraces the paradigm of methodological individualism and seeks to 'measure' the social capital of local communities. It is obviously necessary to bring out territorial specificities within a macroeconomic model. Or in other words, it is necessary to demonstrate the territorial micro-foundations of macroeconomic growth models.

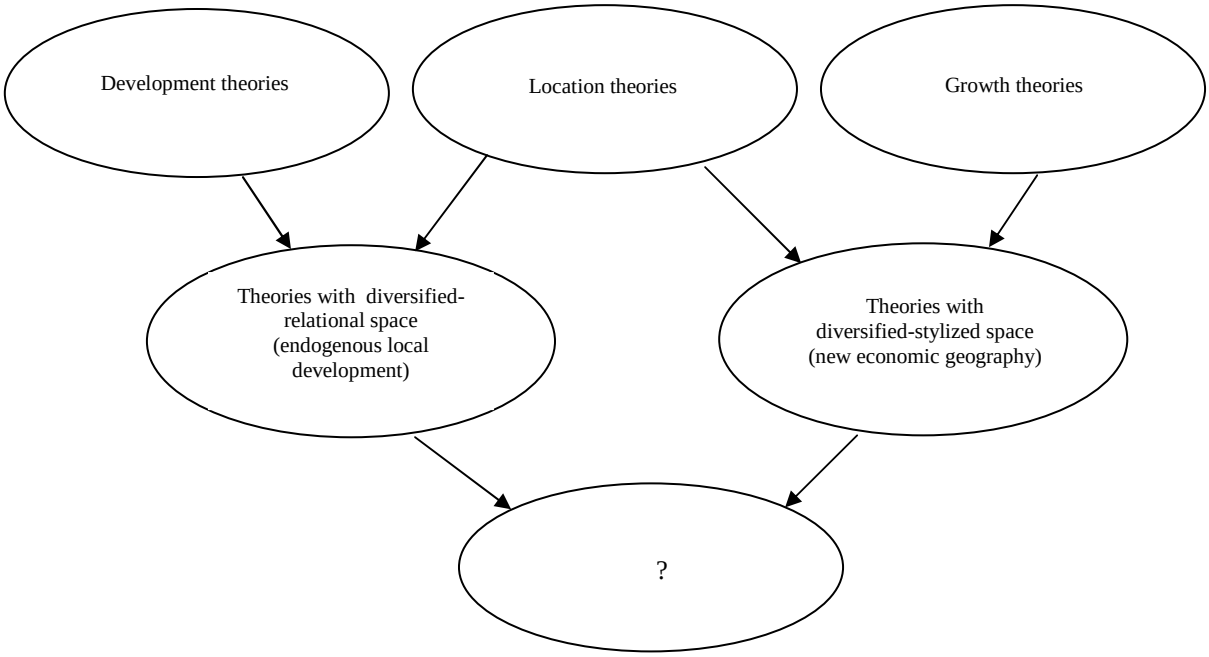

Figure 1. Convergence among theoretical approaches

Source: Capello, 2007

Another challenge in front of regional scientists is the exploitation deriving from cross-fertilisation of interdisciplinary approaches, a limit already underlined a decade ago, during the reflections on the health of regional science. Since the time this problem has been underlined (Bailly and Coffey, 1994), hardly any signs of recovery can be identified, and we feel that the situation has become even more problematic. This pessimistic interpretation is based on some clear tendencies encountered in some recent theoretical developments, where some wide fields of unexplored interdisciplinarity still exist and no tendency to fill them seems to show up.

Some examples are useful in this respect. The theory on "social capital" developed by quantitative sociology is an example in this respect: the concept could take advantage from and provide advantage to all reflections on local synergies and milieu effects developed by regional and urban economists, and by the strategic planning studies in the field of urban planning. The reflections in the field of knowledge spillovers developed by industrial economists could take advantage from the concepts of collective learning and relational proximity of regional scientists, in which the endogenous spatial development patterns of knowledge are not left to simple probabilistic contacts, but explained through territorial processes (Camagni and Capello, 2002). Last but not least, the theoretical reflections characterising the "new economic geography" seem to be the result of a skilful effort of a group of mainstream economists, driven however by a somehow unexplainable attitude to deny the importance of well known spatial concepts (i.e. technological spatial externalities), or to (re-) invent important spatial concepts (i.e. cumulative self-reinforcing processes of growth; transportation costs vs. agglomeration economies in location choices). The inevitable consequence of such attitude is to mix the important and undeniable steps forward made by the "new economic geography" school with already well-known knowledge in the field of regional science.

Some risks of disciplinary barriers and of closeness to interdisciplinary views on strategic problems are still there. They are the result of a regional scientists' narrow perspective, as mentioned by Bailly and Coffey (1994), but also on some idiosyncratic approaches of mainstream disciplines towards a clearly multidisciplinary science like regional science. Especially in the case of economics, we hope that after the (re-)discovered interest by mainstream economists of space, and of spatial phenomena, the attitude towards regional science changes in favour of a more cooperative attitude and pronounced interest.

Related to the interdisciplinary challenge, a last important remark is worth mentioning. Interdisciplinary approach should lead scientists to explore new frontiers and achieve new interpretative analytical frameworks. The tendency shown in this respect is a different one, more inclined to exploit passively the new ideas suggested by complementary disciplines. A case in this respect that is worth mentioning is the enthusiastic way in which regional scientists accepted the spatial spillover theory as a theory adding a new interpretation to the explanation of the role of space as a knowledge transition. Instead, a critical approach to this theory, instead, shows that under certain respects this theory has made some steps backwards in the interpretation of space in spatial knowledge creation.

A case in this respect that is worth mentioning is the enthusiastic way in which regional scientists interpreted and accepted the spatial spillover theory as a new interpretation of the role of space as a knowledge creation and diffusion. Instead, a critical approach to this theory shows that under certain respects some steps backwards in the interpretation of space in spatial knowledge creation have been made, especially in the way space is conceived and treated in the analysis. Space is purely geographical, a physical distance among actors, a pure physical container of spillover effects which come about – according to the epidemiological logic adopted – simply as a result of physical contact among actors. Important consequences ensue from this interpretation of space. Firstly, this view is unable to explain the processes by which knowledge spreads at local level, given that it only envisages the probability of contact among potential innovators as the source of spatial diffusion. Secondly, it concerns itself only with the diffusion of innovation, not with the processes of knowledge creation. It thus imposes the same limitations as did Hägerstrand's pioneering model in regard to the spatial diffusion of innovation: the diffusion of knowledge means adoption, and adoption means more innovation and better performance. Thus ignored, however, is the most crucial aspect of the innovation process: how people (or the context) actually learn. This is the aspect of overriding interest not only for scholars but also, and especially, for policy-makers, should they wish to explore the possibilities of normative action to promote local development.

6. Conclusions

In the globalisation process of the economy, local factors and local specificities are fundamental elements upon which the competitiveness of countries depend and therefore represent important areas to where practitioners and policy markers require a sophisticated and advanced toolbox to intervene.

Regional economics has been subject to wide and creative advances in theoretical contributions. Some main tendencies in the development trajectories of the discipline have been stressed in this review, and in particular the attempt to introduce more realism into the theoretical approaches, combining rigorous theoretical reflections with an understanding of place realism.

Regional economics has undoubtedly suffered from the "crisis" of regional science. By regarding this "crisis" as a transition phenomenon, it is also evident in our perspective that in these days regional economics is in front of a cross-road: is has the opportunity to convert the trend by encouraging regional science to reduce the unfortunate and unproductive divergence between theoretical approaches and practices.

Spatial development has in fact been put in the last few years vigorously in the agenda of policy makers who foresee economic competitiveness as highly dependent on an efficient territorial system of regions and cities. At the European level, the concept of territorial sustainability has come to the fore, meaning the normative aim of complementing economic equity aims with social, environmental and territorial ones.

At the same time, regional scientists suggest in their scientific agenda problems that have a strong practical contour: convergence problems, on the one side, and endogenous determinants of regional growth (like knowledge creation), on the other. These two themes have both a practical interest and a need for a multidisciplinary approach, providing regional scientists with all prerequisites to identify new pathways. Whether this happens, is a matter of willingness to grasp the opportunities that are provided in this period, and to reply to the plea of policy-makers for a more locally oriented understanding of real world.

Clearly, some research challenges faced and opportunities offered are not yet grasped. We still envisage the tendency to develop some research themes with a strong disciplinary focus, while neglecting a cooperative attitude and a cross-fertilisation of ideas among scientists of different disciplines. Our impression is that serious efforts should be made in this respect in order to take advantages of all synergies brought about by a cooperative attitude.

References

Anselin L., Varga A. and Acs Z. (1997), "Local Geographic Spillovers between University Research and High Technology Innovations", *Journal of Urban Economics*, vol. 42, pp. 422-448

Anselin L., Varga A. and Acs Z. (2000), "Geographic and Sectoral Characteristics of Academic Knowledge Externalities", *Papers in Regional Science*, vol. 79, n. 4, pp. 435-443

Audretsch D. and Feldman, M. (1996), "R&D Spillovers and the Geography of Innovation and Production", *American Economic Review*, vol. 86, 3, 630-640

Aydalot Ph. (eds.) (1986), *Milieux Innovateurs en Europe*, GREMI, Paris

Bailly A. (1992), "Representation et Analyse des Territoires: une Epistemologie de la Science Regionale", in Derycke P. H. (ed.), *Espace et dynamique territoriale*, Economica, Paris

Bailly H. and Coffey W. (1994), "Regional Science in Crisis: a Plea for a More Open and Relevant Approach", *Papers in Regional Science*, vol 73, n. 1, pp.3-14

Bellet M., Colletis G. and Lung Y. (1993), Introduction au Numéro Spécial sur Economie et Proximité, *Revue d'Economie Régionale et Urbaine*, n. 3, pp. 357-361

Bolton R. and Jensen R. C. (1995), "Regional Science and Regional Practice", *International Regional Science Review*, vol. 18, n. 2, pp. 133-145

Boschma R. (2004), "The Competitiveness of regions fromAn Evolutionary Perspective", *Regional Studies*, vol. 38, no. 9, pp. 307-318

Camagni R. (1991), "Local Milieu, Uncertainty and Innovation Networks: Towards a New Dynamic Theory of Economic Space", in Camagni R. (ed.), *Innovation Networks: Spatial Perspectives*, Belhaven-Pinter, London, pp. 121-144

Camagni R. (2002), "On the Concept of Territorial Competitiveness: Sound or Misleading?", *Urban Studies*, vol. 39, n. 13, pp. 2395-2411

Camagni R. and Capello R. (2002), "Apprendimento Collettivo, Innovazione e Contesto Locale", in Camagni R. and Capello R. (eds.), *Apprendimento Collettivo e Competitività Territoriale*, Franco Angeli, Milano, pp. 11-26

Camagni R. and Capello R. (2006), " Knowledge-based Economy and Knowledge Creation: the Role of Space", in Fratesi U. and Senn L. (eds.), *The Economics of Interconnected Territories*, Springer Verlag, Berlin, forthcoming

Capello R. (1999), "Spatial Transfer of Knowledge in High-technology Milieux: Learning vs. Collective Learning Processes", *Regional Studies*, Vol. 33, n. 4, pp. 353-365

Capello R. (2001), "Urban Innovation and Collective Learning. Theory and Evidence from Five Metropolitan Cities in Europe", in Fischer M.M. and J. Froehlich (eds.), *Knowledge, Complexity and Innovation Systems*, Springer, Berlin, Heidelberg, New York, pp. 181-208

Capello R. (2005), "A Territorial Model for the Measurement of Regional Growth in the New Europe: the MASST Model", paper presented at the ERSA Conference, held in Amsterdam, 22-28 August

Capello R. (2006), "Local Patterns of Growth in a Global Perspective: a Territorial Scenario for an Integrated Europe", paper presented at the international Uddevalla Symposium, held at George Mason University, Fairfax, Virginia, 15-17 June 2006

Capello R. (2007), *Regional Economics*, Routledge, London, forthcoming

Capello R. and Nijkamp P. (2004), "The Theoretical and Methodological Toolbox of Urban Economics: From and Towards Where?", in Capello R. and Nijkamp P. (eds.), *Urban Dynamics and Growth: Advances in Urban Economics*, Elsevier, Amsterdam, pp. 1-30

Cappellin R. (2003a), "Networks and Technological Change in Regional Clusters", in Bröcker J., Dohse D. and Soltwedel R. (eds.), *Innovation Clusters in Interregional Competition*, Springer, Berlin, pp. 53-78

Cappellin R. (2003b), "Territorial Knowledge Management: Towards a Metrics of the Cognitive Dimension of Agglomeration Economies", *International Journal of Technology Management*, vol. 26, n. 2-4, pp. 303-325

Cheshire P. and Gordon I. (eds.) (1995), *Territorial Competition in an Integrating Europe*, Avebury, Aldershot

Crevoisier O. and Camagni R. (ads.) (2000), *Les Milieux Urbains: Innovation, Systèmes de Production et Ancrage*, EDES, Neuchâtel

Cuadrado-Roura J. (1998), "Regional Science, Quo Vadis?. A European Perspective, Challenges and Proposals", Presidential Address, ERSA Conference, Vienna, Spanish vers. "Regional Science, Quo Vadis?. Una Perspective Europea. Nuevos Retos y Propuestas"; AECR, Bol.7, 1999, pp.16-27

De Groot H., Nijkamp P. and Acs Z. (2001), "Knowledge Spill-overs, Innovation and Regional Development", special issue, *Papers in Regional Science*, vol. 80, n. 3

European Commission (1999), *Sixth Periodic Report on the Social and Economic Situation of Regions in the EU*, European Commission, Brussels

Feldman M. (1994), *The Geography of Innovation*, Kluver Academic, Boston

Feldman M. and Audretsch D. (1999), "Innovation in Cities: Science-based Diversity, Specialisation and Localised Competition", *European Economic Review*, Vol. 43, pp. 409-429

Florida R. (2003), "Towards the Learning Region", *Futures*, vol. 27, n. 5, pp. 527-536

Fujita M. and Thisse J.-F. (1996), "Economics of Agglomeration", *Journal of the Japanese and International Economies*, vol. 10, pp. 339-378

Fujita M. and Thisse J.-F. (2002), *Economics of Agglomeration: Cities, Industrial Location and Regional Growth*, Cambridge University Press, Cambridge

Funck R. (1991), "Regional Science in Transition", *Papers in Regional Science*, vol. 70, pp. 1-8

Geenhuizen van M. and Nijkamp P. (1996), "Progress in Regional Science: a European Perspective", *International Regional Science Review*, vol. 19, n. 3, pp. 223-246

Kitson M., Martin R. and Tyler P. (2005), "The Regional Competitiveness Debate", mimeo available from the authors

Isserman A. M. (1993), "Lost in Space? On the History, Status and Future of Regional Science", *Review of Regional Studies*, vol. 23, pp. 1-50

Isserman A. M. (1995), "The History, Status and Future of Regional Science: an American Perspective", *International Regional Science Review*, vol. 17, n. 3, pp. 249-296

Jaffe A. (1989), "Real Effects of Academic Research", *American Economic Review*, vol. 79, pp. 957-970

Jaffe A., Trajtenberg M. and Henderson R. (1993), "Geographic Localisation of Knowledge Spillovers as Evidenced by Patent Citations", *Quarterly Journal of Economics*, vol. 63, pp. 577-598

Keeble D. and Wilkinson F. (1999), "Collective Learning and Knowledge Development in the Evolution of Regional Clusters of High-Technology SMS in Europe", *Regional Studies*, vol. 33, pp. 295-303

Keeble D. and Wilkinson F. (2000), *High Technology Clusters, Networking and Collective Learning in Europe*, Aldershot, Ashgate

Krugman P. (1991), *Geography and Trade*, MIT Press, Cambridge, Mass.

Krugman P. (1998), *Pop internationalism*, MIT Press, Cambridge Mass.

Lever W.F., Turok I. (1999), "Competitive cities: introduction to the review", *Urban Studies*, Vol. 36, n. 5-6, pp. 791-93

Lucas R. (1988), "On the Mechanics of Economic Development", *Journal of Monetary Economics*, vol. 22, pp. 3-42

Lundvall B.A. and Johnson B. (1994), "The Learning Economy", *Journal of Industry Studies*, n. 1, pp. 23-42

Luxembourg Presidency (2005a), "Conclusion of the Informal EU Ministerial Meeting on Territorial Cohesion", 20-21 may, http://www.eu2005.lu/en/actualites/documents_travail /2005/05/20regio/Min_DOC_2_MinConcl_fin.pdf

Luxembourg Presidency (2005b), "Scoping Document and Summary of Political Messages for an Assessment of the Territorial State and Perspectives of the European Union. Towards a Stronger European Territorial Cohesion in the Light of the Lisbon and Gothembourg Ambitions", may

http://www.eu2005.lu/en/actualites/documents_travail/2005/05/20regio/Min_DOC_1_fin.pdf

Maier G. and Sedlacek S. (eds.) (2005), *Spillovers and Innovations – Space, Environment and the Economy*, Springer Verlag, Wien

Maillat D., Quévit M. and Senn L. (eds.) (1993), *Réseaux d'Innovation et Milieux Innovateurs: un Pari pour le Développement Régional*, EDES, Neuchâtel

Malecki E. (2000), "Creating and Sustaining Competitiveness", Bryson J. R., Daniels P. W., Henry N. and Pollard J. (eds.), *Knowledge, Space, Economy*, Routledge, London, pp. 103-119

Maskell P. and Malmberg A. (1999), "Localised Learning and Industrial Competitiveness", *Cambridge Journal of Economics*, 23, pp. 167-185

Miyao T. (1984), "Dynamic Models of Urban Growth and Decay: a Survey and Extensions", paper presented to the second World Conference of Arts and Sciences, Rotterdam, 4-15 June

Miyao T. (1987a), "Dynamic Urban Models", in Mills E. (ed.), *Urban Economics; Handbook of Regional and Urban Economics*, North-Holland, Amsterdam, vol. 2, pp. 877-925

Miyao T. (1987b), "Urban Growth and Dynamics", in Mills E. (ed.), *Urban Economics. Handbook of Regional and Urban Economics*, North-Holland, Amsterdam, pp. 1-41

Nikamp P. (2006), "Ceteris Paribus: Spatial Complexity and Spatial Equilibrium. An Interpretative Perspective", mimeo available from the author

Nijkamp P. and Abreu M. (2006), "Regional Development Theory", mimeo available from the authors

Nijkamp P. and Reggiani A. (eds.) (1993) , *Nonlinear Evolution of Spatial Economic Systems*, Springer-Verlag, Berlin

Nijkamp P. and Reggiani A. (1999), *The Economics of Complex Spatial Systems*, Elsevier, Amsterdam

Nijkamp P. and Stough R. (eds.) (2004), *Entrepreneurship and Regional Economic Development*, Edward Elgar, Cheltenham

Perrin J.-C. (1995), "Apprentissage Collectif, Territoire et Milieu Innovateur: un Nouveau Paradigme pour le Développement", in Ferrão J. (ed.), *Políticas de Inovação e Desenvolvimento Regional et Local*, Edição do Instituto de Ciencias Sociais de Universidade de Lisboa, republished in Camagni R. and Maillat D. (2006), *Milieux Innovateurs*, Economica-Anthropos, Paris, pp. 99-128

Porter M. and Ketels S. (2003), *UK Competitiveness: Moving to the Next Stage*, DTI Economics Paper 3, Department of Trade and Industry, London

Puu T. (1991), *Non-linear Economic Dynamics*, Springer-Verlag, Berlin

Quingley J. M. (2001), "The Reinessance in Regional Research", *The Annals of Rgeional Science*, vol. 35, pp. 167-178

Rallet A. (1993), "Choix de Proximité et Processus d'Innovation Technologique", *Revue d'Economie Régionale et Urbaine*, n. 3, pp. 365-386

Rallet A. and Torre A. (eds.) (1995), *Economie Industrielle et Economie Spatiale*, Economica, Paris

Ratti R., Bramanti A. and Gordon R. (eds.) (1997), *The Dynamics of Innovative Regions*, Ashgate, Aldershot

RERU (1999), *Le paradigme de Milieu Innovateur dans l'économie contemporaine*, *Revue d'Economie Régionale et Urbaine*, Special Issue, n. 3

Richardson H., Button K., Nijkamp P. (with H. Park) (eds.) (1996), *Analytical Urban Economics*, Edward Elgar, Cheltenham

Romer P. (1986), "Increasing Returns and Long-Run Growth", *Journal of Political Economy*, vol. 94, n. 5, pp. 1002-1037

Rowthorn R. E. (1999), *The Political Economy of Full Employment in Modern Britain*, The Kalecki Memorial Lecture, Oxford

Simmie J. (ed.) (1997), *Innovation, Networks and Learning Regions*, Jessica Kingsley, London

Steinle W. J. (1992), "Regional Competitiveness and the Single Market", *Regional Studies*, vol. 26, no. 4, pp. 307-318

Storper M. (1997), *The regional World: Territorial Development in a Global Economy*, Guildford Press, New York

Tobler W. (1970), "A Computer Movie Simulating Urban Growth in the Detroit Regions", *Economic Geography*, vol. 46, n. 2, pp. 234-240

von Böventer E. (1975), "Regional Growth Theory", *Urban Studies*, vol. 12, pp. 1-29