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Location, Regional Growth and Local Development Theories

The paper provides a survey of the rich number of theories and models developed by regional economics over the last fifty years. The paper moves from location theory, to regional growth and local development, up to the most recent local growth theories, giving emphasis to the role in which space is conceived in the different approaches, and showing how regional economics moves from "space" to "territory" when space is included as an economic resource and as an independent production factor, a generator of static and dynamic advantages for the firms situated within it.

1. Space in economic theories

Space influences the way an economic system works. It is a source of economic advantages (or disadvantages) such as high (or low) endowments of production factors. It also generates geographical advantages, like the easy (or difficult) accessibility of an area, and a high (or low) endowment of raw materials. Space is also the source of advantages springing from the cumulative nature of productive processes in space: in particular, spatial proximity generates economies that reduce production costs (e.g. the transportation costs of activities operating in closely concentrated filières) and, in more modern terms, transaction costs (e.g. the costs of market transactions due to information gathering). These considerations highlight the need to supersede the purely allocative approach typical of a static interpretation of economic phenomena with a dynamic, indeed evolutionary, approach which ties allocative decisions to processes of development. The geographic distribution of resources and potentials for development is only minimally determined by exogenous factors (raw materials, natural advantages). To a much larger extent, it results from past and recent historical factors: human capital, social fixed capital, the fertility of the land (due to the work of man), and accessibility (measured as the weighted distance from the main centres of production and consumption).

Regional economics is the branch of economics which incorporates the dimension 'space' into analysis of the working of the market. It does so by including space in logical schemes, laws and models which regulate and interpret the for-

mation 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. Furthermore, regional economics moves from "space" to "territory" as the main focus of analysis when local growth models include space as an economic resource and as an independent production factor, a generator of static and dynamic advantages for the firms situated within it – or, in other words, an element of fundamental importance in determining the competitiveness of a local production system.

It may seem somewhat trivial to emphasize the importance of space for economic activity. And yet, only recently has it been given due consideration by economic theory. Indeed, in the history of economics, analysts have devoted most of their attention and effort to determine the quantities of resources to be used for various purposes; they have concerned themselves with where those resources and activities are located or where they will be located only in the recent past. Analytical precedence and priority has thus been given to the temporal dimension over the spatial one.

Two large groups of theories make up regional economics:

- location theory, the oldest branch of regional economics, first developed in the early 1900s, which deals with the economic mechanisms that distribute activities in space;
- regional growth (and development) theory, which focuses on spatial aspects of economic growth and the territorial distribution of income.

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 (Section 2).

Regional growth theory is instead intrinsically macroeconomic. However, it differs 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 (Section 3).

Numerous cross-fertilizations have taken place between these two branches of regional economics, and they have brought the traditional notions of space on each side – physical-metric for location theory, uniform-abstract for regional

growth theory – closer together. The recent conception of space used in local development theories can be defined as diversified-relational: this is the bridge and the point of maximum cross-fertilization between the two traditional branches of regional economics. It yields an authentic theory of regional development based on the intrinsic relationalities present in local areas (Section 4). These three conceptions of space are still today separate, however, and their integration has only been partly accomplished by the more modern notion of diversified-stylized space used by recent theories of local growth, that conceive the concentration of productive activities around particular 'poles' of development, but in which these poles are points or abstract dichotomies in which neither physical-geographical features (e.g. morphology, physical size) nor territorial ones (e.g. the local-level system of economic and social relations) play a role (Section 5).

This work aim at presenting an overview of the different theories – summarized in Table 1 – that over the last fifty years have enriched the vast number of contribution dealing with location choices and with regional growth and local development theories, by emphasizing the different conceptual approaches used for space and growth. For the latter, the paradigm shifts from demand oriented regional growth models to supply oriented ones; from exogenous to endogenous local development approaches will be emphasized, all based on a specific definition of space. The paper ends with some reflections on future research directions (Section 6).

2. Location theories

Location theory seeks to explain the distribution of activities in space, the aim being to identify the factors that influence the location of individual activities, the allocation of different portions of territory among different types of production, the dividing of a spatial market among producers, and the functional distribution of activities in space. These various phenomena are analyzed by removing any geographical (physical) feature that might explain the territorial concentration of activities,[1] so that location choices are interpreted by considering only the great economic forces that drive location processes: transportation costs, which diffuse activities in space, and agglomeration economies, which instead cause activities to concentrate. By balancing these two opposing forces, these models are able to account for the existence of agglomerations of economic activities even on the hypothesis of perfectly uniform space.

Location models differ according to hypotheses on the spatial structure of demand and supply which reflect the aims that the models pursue. There are models whose aim is to interpret the location choices of firms, on the assumption of punctiform final and raw materials markets with given locations. Choice of loca-

[1] Geographical (physical) features are removed from models and theories by assuming the existence of a homogeneous plain with equal fertility of land (Von Thünen, 1826) or uniform infrastructural endowment (Alonso, 1964b; Palander, 1935; Hoover, 1948; Christaller, 1933; Lösch, 1954).

tion is determined in this case by an endeavour to minimize transportation costs between alternative locations and under the influence of agglomeration economies (theories of minimum-cost location). Here the obligatory reference is to the models developed by Alfred Weber and Melvin Greenhut. There are then models which seek to identify the market areas of firms, that is, the division of a spatial market among producers. In this case, the models hypothesize a demand evenly distributed across the territory which determines the location choices of firms, these being assumed to be punctiform. Locational equilibrium is determined by a logic of profit maximization whereby each producer controls its own market area (theories of profit-maximizing location); the reference here being to the market area models developed by, for example, August Lösch and Harold Hotelling (Hotelling, 1929; Lösch, 1954) (Table 1).

Other theories exist in location theories that reverse these hypotheses on the spatial structure of demand and supply. The production site assumes a spatial dimension and extends across a territory, while the consumption site (the market) is punctiform. This reversal of assumptions about the territorial structure of production and the market is not a purely academic exercise. Rather, it is entailed by the problem that these models set out to solve, for they abandon the endeavour to identify the market areas of each producer and address an issue which has not yet been mentioned: how to define a 'production area', meaning by this the physical space (the land) occupied by an individual economic activity.

The first model analysing the spatial distribution of alternative production activities was developed in the early nineteenth century by Johann von Thünen. Only in the 1960s did pioneering studies by Walter Isard, Martin Beckmann and Lowdon Wingo prepare the ground for Alonso's formulation of von Thünen's historical model applied to an urban context (Isard, 1956, Beckmann, 1969 and Wingo, 1961). The model of the monocentric city soon became a free-standing school of thought within location theory, where it was labelled 'new urban economics'. This corpus of theories endeavoured to develop general equilibrium location models in which the main interest is no longer decisions by individual firms or households. Instead, the main areas of inquiry become definition of the size and density of cities, and identification of the particular pattern of land costs at differing distances from the city that guarantees achievement of a location equilibrium for all individuals and firms in the city.[2]

In these theories, location choices are dictated by a specific principle of spatial organization of activity: namely 'accessibility', and in particular accessibility to a market or a 'centre'. For firms, high accessibility means that they have easy access to broad and diversified markets for final goods and production factors, to information, and to the hubs of international infrastructures. For people, accessibility to a 'central business district' and therefore to jobs, means that their commuting costs are minimal, while at the same time they enjoy easy access to a wide range

[2] See Beckmann, 1969; Montesano, 1972; Solow, 1972; Mirrlees, 1972; Mills, 1972; Anas and Dendrinos, 1976; Richardson, 1977, Fujita, 1989.

Table 1. A schematic representation of location theory and regional growth and local development theories.

Theories / *Features*	*Location theories*	*Regional growth theories*	*Local development theories*	*Local growth theories*
Space	Physical-metric	Uniform- abstract	Diversified-relational	Diversified-stylized
Aim of the theories	Identification of market areas (demand extended on space; supply punctiform) Identification of production areas (demand punctiform; supply extended on space)	Identification of regional growth determinants, where growth is intended as: - Employment increase - Individual well-being	Identification of local development determinants, where development is intended as territorial competitiveness	Identification of local growth determinants, where growth is intended as territorial competitiveness
Nature of the theories	Quantitative and qualitative	Quantitative Constant returns to growth	Qualitative Increasing returns to growth	Quantitative Increasing returns to growth
Years of conception	1940s	1950s and 1060s	Middle 1970s onward	1990s onward
Main theories and authors	Industrial location choice theories (Weber, 1929; Hoover, 1933; Lösch, 1954) Allocation of land among producers and residents: industrial and residential location choice theories (von Thünen, 1826; Alonso, 1960; Fujita, 1989) Urban hierarchy (Christaller, 1933; Lösch, 1954)	Keynesian regional growth theories (North, 1955) Neoclassical regional growth theories (Borts and Stein, 1960)	Exogenous determinants of territorial competitiveness: The growth pole theory (Perroux, 1955); the role of multinationals on regional development (Lipietz, 1980; Blomstrom and Kokko, 1988) innovation diffusion (Hägerstrand, 1952) Endogenous determinants of territorial competitiveness: Industrial district theories (Becattini, 1979) Milieux innovateurs (Camagni, 1991; Maillat et al., 1993) Learning region (Lundvall, 1992)	Cumulative causation model (Myrdal, 1955 and Kaldor, 1970 as pioneering theories) New economic geography (Krugman, 1991) Endogenous growth model (Lucas, 1988; Romer, 1986)

of recreational services restricted to specific locations (e.g. theatres, museums, libraries) and proximity to specific services (e.g. universities), without having to pay the cost of long-distance travel.

High demand for accessibility to central areas triggers competition between industrial and residential activities for locations closer to the market, or, more generally, closer to the hypothetical central business district (the city centre).

All the location choice models of this kind have an important feature in common: the cost of land, or land rent. Assuming the existence of a single central business district, owing to high demand for central locations with their minimum transportation costs, land closer to the centre costs more; a condition accentuated by the total rigidity, at least in the short-to-medium period, of the urban land supply. These models resolve the competition among activities on the basis of a strict economic principle: firms able to locate in more central areas are those able to pay higher rents for those areas.

The location theories discussed above analyze the location choices of individual firms or people. They disregard, however, the existence of other activities or individuals and of dichotomous location alternatives: urban or non-urban areas, central or peripheral ones, areas with high or low concentrations of activities. When they consider the existence of several activities, they rule out the possibility that these might locate in alternative urban centres. And when they deal with several cities, they reach the somewhat paradoxical conclusion that the existence of urban systems apparently in equilibrium entailed that those cities must all be of the same size. Only thus could indifference to alternative locations be guaranteed because the levels of profit and utility were the same in all the cities.

Thus far, therefore, the new urban economic theories are unable to explain the location choices of several firms and households among alternative urban centres and why in reality there exist numerous cities, of different sizes and performing different functions, which depend partly or wholly on larger cities for higher-quality services and activities. In other words, they are unable to explain why an urban hierarchy exists.

The explanation of the existence of urban systems made up of cities of different sizes is due to the school of the "central place theory". The founders of this school of thought were the geographer Walter Christaller and the economist August Lösch. These were the first to formulate models able to explain the urban hierarchy, and in particular:

- the size and frequency of urban centres at every level in the hierarchy, and therefore the market area of each of them;
- the distance between a particular city and those at the levels immediately below or above it, and therefore the geographical distribution of all the urban centres.

These models put forward a more complex and general theory of location and the structure of the underlying economic relations able to account for the existence of diverse territorial agglomerations within a framework of general spatial equilibrium. The principal contributions to development of this theory have been made by Walter Christaller and August Lösch (Christaller, 1933; Lösch, 1954).

3. Regional growth theories

In the 1950s and 1960s (when regional economics was still in its infancy) some theories were conceptualized with the aim to investigate the economic determinants of development and the mechanisms that enable a system to grow and achieve higher rates of output, greater levels of per capita income, lower unemployment rates, and higher levels of wealth. We shall see that these models interpret development by using a synthetic indicator: the growth of a region's output or per capita income. Although this approach has the indubitable advantage of making analytical modelling of the growth path possible, it requires the assumption of a uniform-abstract space wherein supply conditions (factor endowment, sectoral and productive structure) and demand conditions (consumer tastes and preferences) are everywhere identical and can be expressed with a vector of aggregate socio-economic-demographic characteristics. We may accordingly call the theories examined in this section theories of regional growth. There are numerous factors which may trigger a growth process: among them increased demand for locally produced goods; greater local production capacity; a more abundant endowment (quantitative and qualitative) of local resources and production factors; and a larger amount of savings available for investments in infrastructures and technologies intended to increase the efficiency of production processes.

3.1 Demand and regional growth

The first and oldest regional theories and models conceive growth as resulting from greater demand for locally-produced goods and which adopt the typically Keynesian notion that development consists in the growth of output, income and employment. According to this approach, greater demand for a locally-produced good does not confine its positive effects to employment and the incomes of those employed in the sector producing that good. Because of interdependencies in production and consumption, greater demand also generates increases in employment and income in activities upstream from the expanding sector, and in service activities supplied to the local population as a whole. In the end, therefore, increased demand for a local good gives rise to higher income and employment in the entire area, as suggested by the *export-led model* (North, 1955).

These models therefore envisage demand as the engine of growth; a hypothesis quite acceptable to regional economies. Regions are in fact small geographical entities where it is rarely the case that all necessary goods are produced locally; and, conversely, where those goods that are produced frequently exceed local demand for them and are sold on domestic or even international markets (consider the number of cars manufactured in Turin or Detroit: an amount certainly excessive to the needs of the city's residents!).

Demand is often external in these models, in fact, and stems from interest in a local good expressed on the world market. Hence, the growth of a region depends on the extent to which its productive structure specializes in goods demanded by

consumers world-wide. There are numerous local economic systems in the world whose products are sold internationally: the textiles of Prato (near Florence, in Italy), the glassware of Murano (near Venice, in Italy), the cars of Turin, Detroit or Munich, the olive oil of Greek and Italian regions, the wines of areas in France and Italy, to mention only some. Expansion in demand for the goods produced in these areas determines whether or not the entire territory will grow. As shown by the export-base model (the best-known in this family of theories), increased exports of a good generate greater local production, with positive effects on income and local employment and – via interdependencies in production and consumption – on employment and income in activities upstream and downstream from the production of that good. Considering that consumption usually grows with income, any additional expenditure will be transformed into income, the growth of which will in its turn augment expenditure, in a circular process characterized by increasingly smaller income increments.

Reasoning in terms of demand-driven development has a number of consequences. Firstly, an approach of this kind can only interpret a short-term process of growth, because it implicitly assumes the competitiveness of current production and the economic system; an assumption which can only be sustained in the short period.

Secondly, development is associated with the pursuit of higher levels of employment and income: no consideration is made of either individual well-being or the competitiveness of the local production system. The latter aspect is perhaps the most problematic, in that analysis centred on the demand components assumes the existence of unused capacity (capital stock) and large reserves of labour on which the system can draw to meet increasing demand: in other words, the competitiveness of the local system is taken for granted. Yet this is an assumption that can only hold for the short period. To return to the example of the Detroit (or Turin) car industry, it is true that local income and employment depend on world demand for cars. In the short period, therefore, it is possible to hypothesise that Turin's or Detroit's productive capacity will be able to satisfy increasing demand. But in the long period, the area's development will depend on the car industry's ability to maintain its position on the world market, and to compete on the basis of the quality and innovativeness of its products.

Given the assumption of surplus in production resources, Keynesian theories should be used with caution when they are employed in interpretation of a long-period growth path – and especially when they are used to devise measures to support a local long-period dynamic. By contrast, when these theories are applied to the specific problem of high unemployment in the presence of given productive capacity, they have two evident merits: the simplicity and rigour of their economic logic, and the ease with which they can be applied to concrete situations. When Keynesian theories shed their short-period perspective and assume a long-term, multi-period one – as exemplified by the Harrod-Domar model – they are able to abandon strictly demand-related aspects and give due importance to supply elements (the availability of savings and capital formation) in the interpretation of growth processes (Domar, 1957; Harrod, 1939).

3.2 Factor endowment and regional growth

Another group of theories focus exclusively on supply components to explain long-period regional dynamics. These theories do not only view exports as the engine of development but take a step further by identifying the factors responsible for the greater export capacity, and therefore the competitiveness, of a local economic system. If an economic system is able to export – or in other words, if it is able to gain a role in the international division of labour – it must enjoy some form of advantage: it must be able to produce goods at lower prices, supply higher-quality products, and place new goods on the market. An economic system can fulfill these various requirements if it has more efficient productive processes, a complex and advanced local industrial system, modern production services and infrastructures, good quality resources, and advanced production technologies – and also if its area comprises broad, diversified and advanced knowledge developed by complex cultural, social and economic processes.

There are therefore numerous sources of territorial competitiveness; and not surprisingly very different approaches have been taken to their analysis. In this section we present theories that draw their theoretical framework from the classical and neoclassical theories of growth and international trade and that concentrate on *factor endowment* as the source of territorial competitiveness. Although they differ in certain of their basic assumptions, these theories comprise a broad corpus of strictly neoclassical models which adopt diverse hypotheses on the mobility of goods and production factors in their treatment of growth from a resource-based perspective. Imbalances in interregional factor endowments, and differences in levels of factor productivity, account for the advantage enjoyed by a local system in its relations with the rest of the world. These are the elements which underlie the growth path and which condition its timing and the form that it takes.

According to these theories, it is trade in goods or factors that explains the adjustment of the relative prices of goods and factors, increased productive capacity, and the achievement of full employment. For theories which assume the perfect mobility of production factors among regions (neoclassical growth models; Borts and Stein 1960; 1964), differing remunerations of the production factors reallocate resources in space, and thus generate a higher rate of growth – according to typically neoclassical reasoning.[3] For theories which instead conceive goods as mobile (theories of interregional trade; Ricardo, 1971, original edition, 1817; Heckscher,

[3] Two important theoretical notions should be borne in mind if this reasoning is to be properly understood. Firstly, in a neoclassical world, factor productivity is governed by the law of decreasing marginal returns: a larger quantity of factors entails lower factor productivity. Secondly, according to the neoclassical theory, the production factors can only be remunerated at their marginal productivity: the firm pays the additional factor exactly for the value of the good which the additional factor is able to produce, thus maximizing its profit. On this view, a region with a large endowment of a particular factor can only expect low productivity by, and therefore low remuneration of, that factor.

1919), differing levels of factor productivity give the region a comparative advantage in the production of a particular good, which it is able to export owing to price differential. Moreover, it is in the region's interest to resort to the external market for the purchase of those goods that it produces at a lower level of productivity than other goods. These imported goods are sold on the external market at prices that are more competitive than they would be if the goods were produced internally to the region.

It should be noted that the concept of 'growth' is used here with a meaning other than that given to it by the theories discussed in the previous section. The reason for this difference in the meaning of growth is the fact that these models have different policy concerns: not high unemployment – to be reduced by increased demand for local goods – but problems of poverty, underdevelopment, and inequalities in the distribution of income. Growth is consequently no longer interpreted as an increase in employment and short-term income; rather it is conceived as individual well-being (and its interregional convergence), which is achieved either through increases in factor productivity, and consequently in wage levels and per capita income (neoclassical macroeconomic models), or through specialization processes which generate interregional trade, and consequently advantages deriving from the purchases of goods offered on the external market at prices lower than they would be if the goods were produced internally.

These theories have a number of distinctive features which should be borne in mind. The first group of them – classical and neoclassical with factor mobility – are distinctive in that they make reference to a concept of 'relative growth', the purpose being to identify and explain paths of convergence or divergence in the levels and rates of output growth. In this respect, neoclassical models of factor mobility are still today erroneously viewed as only able to explain a tendency of local economies towards convergence. But the modern versions of these theories show that, if increasing returns are introduced into the neoclassical production function, behaviours and tendencies are produced which differ greatly from the original model's mechanistic and univocal result of re-equilibrium in income levels among regions. Moreover, after modification of the original model by its authors to comprise two sectors, it is able to explain divergent trends in income levels if an initial equilibrium condition is assumed (Capello, 2007).

The distinctive feature of the second group of theories – classical and neoclassical, on interregional trade – is that they employ the concept of relative advantage, or comparative advantage, first formulated by Ricardo in his classical model of international trade and on the basis of which it was possible to identify a region's specialization. Among all the goods that can be offered on the external market, the region exports those that it produces at relatively lower production costs. This difference in production costs is due to the differing relative productivities of the factors used to manufacture the goods. This statement essentially means the following: even if a region produces all goods at higher prices, so that it is generally more inefficient in its production processes than any other region in the country, it may nevertheless be relatively less inefficient

in producing one particular good. The region will thus be able to obtain a role for itself in the international division of labour by specializing in production of the good in which it is relatively more efficient. As we shall see, this argument has major normative implications, for it asserts that there is always an automatic mechanism guaranteeing the existence of some specialization, regardless of productive efficiency, and therefore that economic policy measures to foster development are unnecessary. The significance of this assertion is so far-reaching that it requires total guarantee of its truthfulness, although this truthfulness is undermined by the ease with which economic mechanisms operating at national level are automatically expected to apply at regional and local level as well (Camagni, 2002).

4. Local development theories: the components of territorial competitiveness

4.1 Exogenous sources of territorial competitiveness

Whilst the theories discussed in previous sections use the term 'space' to denote territorial areas assumed to be internally homogeneous and uniform, the theories now considered conceive 'space' as diversified. This change of perspective allows economic activities and production factors, demand and sectoral structure, to be treated as spatially heterogeneous within a region, so that territorial relations are cast in new light.

This new conception of space enables identification of highly distinct polarities in a territory. Activities, resources, economic and market relations structure themselves around these polarities to generate a cumulative process of territorial agglomeration and a virtuous circle of development. This conception of space restores one of the inspiring principles of location theories – that of agglomeration economies as the source of local development – to theories of regional development. It is evident that thus severed is any connection with geographical space, abstract or administrative. A more complex conception of space takes over, one based on the economic and social relations that arise in a territorial area. Whence derives the expression diversified-relational space.

When space is conceived as "diversified-relational", theories radically change in their nature. A macroeconomic and macro-territorial approach gives way to a micro-territorial and micro-behavioural one. Abandoned is the notion of a region as a portion of a national system acting and reacting economically as a single, internally homogeneous system. Its place is taken by individual economic actors (large or small, public or private, multinational or local) whose behaviour is studied in terms of location choices, productive and innovative capacity, competitiveness, and relations with the local system and the rest of the world.

The qualitative nature of theories – only in recent years superseded thanks to the more advanced and sophisticated modelling techniques (Dixit and Stiglitz, 1970; Krugman, 1991) – led in the mid-1970s to the distinction in the literature 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" drawn by Edwin Von Böventer.[4]

The theories that conceive space as diversified resemble those discussed above in that they conceive development as a process generated and sustained by supply-side elements. But they embrace a conception of development which has little to do with that of the theories previously examined. They abandon the short-run view of growth as a simple increase in income and employment, and also that of individual well-being, and assume a longer-term perspective. They identify all the tangible and intangible elements in a local area which determine its long-term competitiveness and enable it to maintain that competitiveness over time.

Theories of local development therefore seek to identify the factors which render the costs and prices of production processes lower than they are elsewhere. These factors are (i) elements exogenous to the local context, which originate externally to the area and are transferred into it either fortuitously or deliberately, and (ii) endogenous elements which arise and develop within the area and enable it to initiate a process of self-propelling development.

Exogenous elements comprise the following: the fortuitous local presence of a dominant firm or a multinational company; the diffusion in the area of an innovation produced elsewhere; or the installation of new infrastructures decided by external authorities. Although these elements have nothing to do with local features and productive capacities, once they are present in an area they may catalyze new economic activities and development. Endogenous elements are entrepreneurial ability and local resources for production (labour and capital); and in particular the decision-making capacity of local economic and social actors able to control the development process, support it during phases of transformation and innovation, and enrich it with external knowledge and information. All these are factors strengthened and enhanced by a concentrated territorial organization which generates local processes of knowledge-acquisition and learning; networks of economic and social relations which support more efficient and less costly transactions;[5] and advantages of economic and physical proximity among economic actors.

The assumption of diversified space entails definitive abandonment of the notion that regional development consists solely in the allocation of resources among regions. Instead, regional development must be conceived as stemming from local productive capacity, competitiveness, and innovativeness. According to the logic of competitive development, the growth of one region can only be to the detri-

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[4] See von Böventer, 1975, p. 3. When von Böventer refers to "'pure and exact' regional theory without agglomeration economies", he means the theories presented in section 3 of this paper; when he refers to "'applied regional theory' which is inexact but takes agglomeration factors into account", he means theories expounded in more qualitative form in section 4.

[5] 'Transaction costs' are the costs which arise from the exchange of information and documents relative to commercial transactions, for which reason they are also called 'costs of market use'. See Williamson, 1975.

ment of the growth of another region, in a zero sum game.[6] Regional development theories adopt a notion of generative development whereby the national growth rate is the sum of the growth rates achieved by individual regions. National economic development may well increase because of growth achieved by a particular territorial area, and this growth may also come about – in the presence of increasing returns – with the same resources.

Endogenous sources of competitiveness: agglomeration economies

In all conceptualization presented above, space has performed two distinct roles in models and theories: (i) 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; (ii) that of 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. In both cases, space plays no part in determining the development path of a local economy. The same economic logic explains the development of regions, metropolitan areas, or more generally, densely-populated industrial areas. The export-base theory can be applied just as well to a region as to a country, with no change in the logic of its underlying reasoning.

In the middle of the 1970s, a radical change in the conceptualization of space gives it a very different role in development. No longer a simple geographical container, space is 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 the theories examined in this section, space is a source of increasing returns, and of positive externalities taking the form of agglomeration and localization economies. Higher growth rates are achieved by local production systems where increasing returns act upon local productive efficiency to reduce production and transaction costs, enhance the efficiency of the production factors, and increase innovative capacity. Regional development consequently depends upon the efficiency of a concentrated territorial organization of production, not on the availability of economic resources or their more efficient spatial allocation.

This new conception of space has several implications. Space can only be 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 mar-

[6] To be stressed is that the view of development adopted by other neoclassical models, like the Heckscher-Ohlin model, is one of generative development, not of competitive development. On the distinction between competitive and generative development see Richardson, 1973 and 1978.

ket 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.

Secondly, on adopting this new notion of space it is no longer possible to treat development as exogenous in origin. Development is now 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 endogenous development theories accordingly endeavour to identify the genetic local conditions which determine the competitiveness of a local production system and ensure its persistence over time. They seek out the local factors which enable areas, and the firms located in them, to produce goods demanded internationally with an (absolute) competitive advantage, to maintain that advantage over time by innovating, and to attract new resources from outside.

Theories of local endogenous development divide into two broad strands. On the one hand neo-Marshallian inquiry, which views local growth as resulting from externalities acting upon the static efficiency of firms, has been expanding and consolidating for years. On the other, the neo-Schumpeterian literature, which has arisen more recently, interprets development as resulting from the impact of local externalities on the innovative capacity of firms.

The logical leap of interpreting space as an active factor in development forcefully imposed itself upon the history of economic thought in the early 1970s, when unprecedented patterns of local development in Italy surprised theoreticians by resisting explanation based on conventional models. During the early 1970s, the sudden and rapid growth achieved by certain Italian regions – those of the North-East and the Centre in particular – when the country's industrialized areas were showing evident signs of economic crisis, could be explained neither by a neoclassical paradigm of interregional mobility of production factors (which greatly decreased in those years), nor by a paradigm centred on large firm efficiency (à la Perroux), nor by a Keynesian paradigm of development driven by external demand.

Numerous neo-Marshallian theorists around the world pursued very similar lines of theoretical inquiry during the 1970s and 1980s (still today there is no lack of theory on the matter): Walter Stöhr developed the concept of 'bottom-up development', Enrico Ciciotti and Reinhart Wettmann that of 'indigenous potential', Bengt Johannison of 'local context', Bernardo Secchi and Gioacchino Garofoli of 'system areas', and Claude Courlet-Bernard Pecqueur and Bernard Ganne of 'lo-

calized industrial system'.[7] But the first systematic theory of endogenous development was produced in Italy by Giacomo Becattini with his seminal study on the 'Marshallian industrial district' published in the mid-1970s.[8] The theory of the industrial district – which originated in the work of the great neoclassical economist Alfred Marshall[9] – was the first to conceptualize external economies (of agglomeration) as sources of territorial competitiveness. It did so with a model in which the economic aspects of development are reinforced by a socio-cultural system which fuels increasing returns and self-reinforcing mechanisms of development.

These neo-Marshallian studies, in which space generates and develops mechanisms of productive efficiency, bred theories which identified the territory as the generator of dynamic external economies - that is, all those advantages which favour not only the productive efficiency of firms but also their innovative efficiency. In the neo-Schumpeterian strand of analysis on local development, space reduces the uncertainty associated with every innovative process.

Finally, when space is viewed as generating advantages for firms, and therefore as an active component in the development process, scholars of local development shift their attention to the role of the urban space (the city) as the place where agglomeration economies are generated – be these localization or urbanization economies – and therefore as the place where the economic development of the entire region is rooted and structured. Hence, as the models of Christaller and Lösch show, the existence of an advanced and efficient city, and of an urban system organized into a network of vertical and horizontal relationships reflecting an efficient division of labour, may determine the success and development of a region.

The qualitative nature of these theories is an aspect to which orthodox economists have often objected. On the contrary, we argue that these theories have enriched economic analysis by identifying the intangible elements (knowledge, learning, relationality, social capital) which come together to form local competitiveness. Far from being of scant economic significance, these elements should be valued and appreciated for their contribution to knowledge on local development processes.

5. Local growth theories

The previous theories are of qualitative nature. This peculiarity was in some cases due to an explicit methodological choice; in others to the difficulty of includ-

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[7] See Ciciotti and Wettmann, 1981; Johannisson and Spilling, 1983; Stöhr and Tödtling, 1977; Stöhr, 1990; Secchi, 1974; Garofoli, 1981; Courlet and Pecqueur, 1992; Ganne, 1992. See Vásquez-Barquero, 2002, for a well-structured survey of theories of endogenous development.

[8] Becattini set out his main ideas in a study published in 1975 (see Becattini, 1975) and then developed them in a subsequent study of 1979 (see Becattini, 1979; English translation, 1989). There followed a series of works in which Becattini expanded and deepened the concept of the 'Marshallian industrial district'. Recent volumes containing seminal works on the issue are Becattini, 2004.

[9] See Marshall, 1920. For detailed analysis of the links between Marshall's work and the theory of industrial districts see Bellandi 1989.

ing increasing returns in the form of agglomeration economies in an analytical model. In mathematical terms, the hypothesis of scale economies entails that the relations among the variables which determine development cannot be based on linear equations: necessary instead are higher-level equations which inevitably require a descriptive mathematical language more complex than that of linear systems. In economic terms, the existence of increasing returns (at the individual firm level) requires abandonment of the perfect competition hypothesis, and the contrary assumption of imperfect competition: a notion which was never formalized prior to the 1970s.[10]

In the 1980s, major progress was achieved in the fields of both non-linear mathematical models and of economic modelling in conditions of imperfect competition. This opened the way for new theories on local economic growth. Thanks to the advent (i) of mathematical approaches to study of the qualitative behaviour of non-linear dynamic systems (bifurcation, catastrophe, and chaos theory) and (ii) in economics, of Avinash Dixit and Joseph Stiglitz's formalized model of imperfect competition, increasing returns became the decisive factor in development, not only for qualitative theories but for analytical theories and models as well.[11]

Recent theories of local growth use advanced mathematical tools and draw on recent economic analytical models. We refer here to the "new economic geography school" (Krugman, 1991; Krugman and Venables, 1996) and to the endogenous growth theories (Romer 1986, 1987, 1990; Lucas, 1988; Barro, 1990; Rebelo, 1991; Grossman and Helpman, 1991; Aghion and Howitt, 1992).

These theories are of particular importance for local development theory because they take analysis beyond Edwin Von Böventer's already-mentioned distinction 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.

The first innovative feature of these more formalized theories is that they enable elegant growth models of a strictly economic nature to include agglomeration economies, in the form of increasing returns, as determinants of local development. They then demonstrate that these phenomena can be treated using the traditional tools of economic theory (optimizing choices for firms and individuals). They have thus induced orthodox economists to (re-)discover the spatial dimen-

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[10] The increasing returns hypothesis entails that firms have surplus productive capacity to exploit when the market expands. In other words, as the market expands, firms are able to increase their output, moving along the decreasing cost curve and obtaining increasing returns. Perfect competition instead hypothesises that firms produce in conditions of minimum average cost.

[11] Dixit and Stiglitz produced the first formalized model of imperfect competition *à la* Chamberlin. All the models which introduce increasing returns into growth paths are based on Dixit and Stiglitz's original formulation. See Dixit and Stiglitz, 1977. For surveys of the literature on non-linear dynamic models applied to the dynamic of territorial systems see, among others, Barentsen and Nijkamp, 1989; Nijkamp and Reggiani, 1988, 1992 and 1993; Lung, 1987; Reggiani, 2000; Wilson, 1981.

sion of economic phenomena, and it is to this aspect that they owe large part of their continuing success.

The second innovative feature of these approaches is their ability to escape the mechanicism of the formalized models which preceded them and to introduce elements of uncertainty into both growth trajectories and the final equilibrium towards which the development path tends. Real phenomena accompanying development trajectories – synergy and positive cumulativeness (agglomeration economies) as well as negative feedbacks (congestion or saturation in growth processes) – are incorporated into the logic of the models through the non-linearity of growth relations. This makes possible multiple equilibria associated with diverse initial conditions, with diverse values of the variables and parameters of the structural relations of development, and with convergent or divergent, explosive or implosive, stable or unstable, growth paths.

These models generate a growth path which recalls that of the theories surveyed in the previous section: once again, this is a path of cumulative, endogenous and largely selective growth. The models now described envisage a diversified space, in fact. That is to say, they assume the existence of sharp polarities where development takes place and cumulates due to increasing returns in the form of learning processes, scale economies (at the area or firm level), and localization and urbanization economies which engender a virtuous circle of cumulative development. Moreover, because increasing returns are included in the structural relations that characterize the dynamic behaviour of the local system (or of the individual firms located in it), they are produced by the workings themselves of the local economic system, and they mark out an endogenous growth path.

These theories are all more similar to those of endogenous local development in that they pursue the same goal of identifying the elements which determine long-period competitiveness, and the conditions under which an area can acquire and maintain a role in the international division of labour. The increasing returns hypothesis, in fact, entails the assumption that when the market expands, either production increases with resources remaining equal, or cost decreases with production remaining equal. In other words, it entails the assumption that associated with increases in production are ever greater savings of resources, and therefore increasingly greater rises in productivity, with positive and growing effects on local competitiveness. These effects are expressed differently by each theory: in terms of a greater capacity to capture larger shares of world demand by the theory of cumulative circular development; of greater capacity to attract external capital in search of good financial and productive opportunities by the most recent models of the "new economic geography"; and of greater capacity to (re-)create over time the conditions for constant economic growth of productive resources by the theory of endogenous growth.

However, also to be emphasized are the marked differences and discontinuities between these theories and the endogenous development theories discussed previously. The first of these differences/discontinuities concerns the formalized, macroeconomic and aggregate nature of the local growth theories, which stand in sharp contrast to the micro-territorial and micro-behavioural approach taken by

the regional development theories. Owing to their aggregate macroeconomic nature, these theories aim to explain the growth rate of aggregate income interpreted as a synthetic indicator for the various aspects of development. Unlike those seen in the previous section, these theories do not seek to provide a qualitative interpretation of all the tangible and intangible elements, economic or otherwise, which characterize the dynamic of local economic systems. Once again, therefore, the dynamic path of a local economy is interpreted by growth theories. But there are two major differences between these and the growth theories of the 1950s and 1960s: (i) returns are no longer constant but increasing, and (ii) the conception of growth assumed is a dynamic and long-term one: theories seek to define the elements with which the competitiveness conditions of a local system can be maintained and recreated, rather than to highlight the mechanisms that increase long-term employment and production, or individual well-being and per capita income, as in previous theories.

A second difference with respect to local endogenous development theories resides in the treatment of space, which now becomes diversified and stylized. These approaches envisage the existence of polarities in space where development takes place, diversifying the level and rate of income growth even among areas of the same region. However, although diversified, space is now stylized into points devoid of any territorial dimension. Localized technological externalities do not exist in this space; nor does a set of tangible and intangible factors which may act upon firms' productivity and innovative capacity because of proximity and reduced transaction costs; nor a system of economic and social relations constituting the relational or social capital of a certain geographical space. Yet all these are elements able to differentiate spatial elements on the basis of strictly territorial aspects. These approaches thus reprise the simple – somewhat banal – view of space as the simple container of development, and they therefore necessarily abandon the more interesting and intriguing interpretation of space as an additional resource and as an independent factor in development.

These considerations introduce the third discontinuity with respect to local endogenous development theories: increasing returns no longer take the form of specific advantages involuntarily generated by individual firms. According to these, increasing returns are economies of scale or of learning stylized in systems of equations which explain the structure and dynamic of a local system through non-linear relations which give rise to multiplicative effects in the aggregate growth rate.

Whilst these are the main features of the most recent theories of regional growth, two groups of theories can be envisaged: first of all models which assume the existence of increasing returns (at the firm or area level) to interpret development as resulting from a cumulative process of demand/supply growth, and models which conceive growth as resulting from increasing returns on production resources, in a production function of neoclassical derivation; for these theories, growth depends exclusively on supply elements.

The first group of theories are rooted in a model, formulated at the end of the 1950s and then formalized in the 1970s by Nicholas Kaldor, which already con-

ceived the existence of increasing returns intrinsic to the structural relations that characterize a local economy's aggregate growth. In this model, economies of scale are assumed to be external to firms, taking the form of learning economies – or learning-by-doing economies à la Arrow. The rich and dynamic advanced economies, with their high growth rates, also display (in these models) greater rates of productivity growth which generate a cumulative circle of growth. Reasoning on the basis of increasing returns at territorial level, the model is able to formalize these returns on the assumption of perfect competition.[12]

Myrdal's and Kaldor's idea of giving increasing returns a key role in local development was taken up by a school of thought which developed in the 1990s under the guidance of the well-known economist Paul Krugman. Exploiting the formalization of the imperfect competition model, Krugman and his followers produced elegant economic growth models which incorporated the location choices of firms. These were made to depend on three economic factors – transport costs, increasing returns, and migratory flows – which determine, according to the values that they assume, the existence of agglomerative phenomena (what Krugman calls 'geographic concentration') or diffusion processes. When the concentration of productive activities prevails in an area, the conditions for cumulative local growth are generated.

The origin of the second group of theories – called 'models or theories of endogenous growth' – is Robert Solow's well-known model developed in the 1960s. On the assumption that the only reproducible factor (capital) is characterized by decreasing marginal returns, Solow demonstrated that the economy is bound to register nil per capita output growth in the long period unless the existence of technical progress is exogenously assumed. By so doing, however, Solow identified the engine of economic growth as an exogenous factor linked to the progress of knowledge.

However, the assumption that increases in factor productivity stem from endogenous factors – such as innovation, scale economies, and learning processes – requires the removal of perfect competition and constant returns from the theoretical framework, and the inclusion in their stead of increasing returns or imperfect markets. This shift requires complex modelling based on the only recently-developed theoretical and analytical tools.

6. The challenge for the future

Some theoretical challenges are still in front of regional scientists, and have to be faced. 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.

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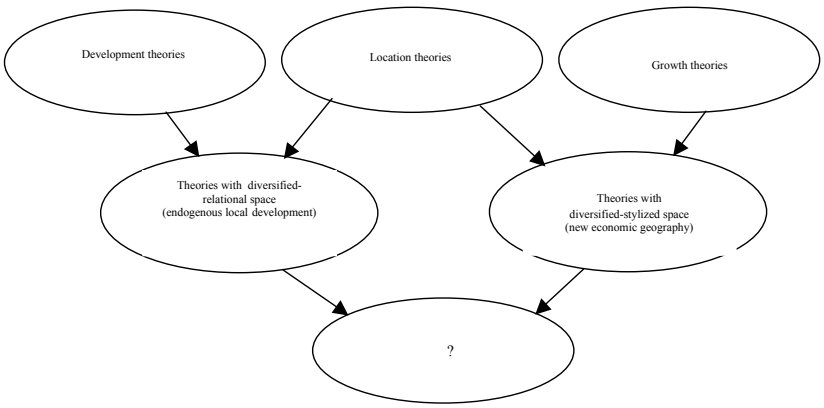
[12] Some seminal ideas in Myrdal's theory had already been propounded by Young. See Young, 1928.

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 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 sometimes 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.

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