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# REGIONAL ECONOMICS

SECOND EDITION

ROBERTA CAPELLO

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# Regional Economics

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- the concept of territorial capital;
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Roberta Capello

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**In memory of my brother Edoardo and my father Andrea,  
two eminent professors in Engineering**

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# Preface to the second edition

Regional economics is the branch of economics that incorporates the dimension ‘space’ into analysis of the workings of the market. It does so by including space in logical schemes, laws and models that 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. The path that this discipline has followed since its foundation is remarkable, and the last ten years are no exception. They have registered an interesting evolution in the rich toolbox of theories and models used by the discipline to insert the spatial dimension into the functioning of the market.

Stimulated by the pace of the changes to which the discipline is required to respond, and by colleagues who have kindly asked for an updated version of the textbook, I have decided to work on a second edition of the work published for the first time in Italian in 2004.

At that time, I decided to make an effort to ensure that the textbook was not a collection of the various approaches that exist in regional economics, but rather was organized in a way that expressed the evolution of economic thought in the discipline by concentrating on changes in the concept of space within the various theories: from the traditional location theory to the theory of local development, the latter divided between theories based on a uniform space (and constant returns) and theories based on diversified space (and increasing returns). The latter approaches represent the core of regional economics based on increasing returns and agglomeration economies. Their important feature is that they are able to merge location theories with local development theories. It is the formalization of increasing returns within elegant macroeconomic models that constitute their most advanced element of novelty.

On considering the evolution of the past ten years, I immediately realized that the theoretical advances did not require further parts to be added to the textbook: no theories have been formulated using a new concept of space, and the conception of growth used is still the one that interprets it as competitiveness.

However, especially as regards local and regional development theories, the past decade has seen the development of interesting new theories, which can be synthesized into three main lines of inquiry.

First, the theory of local development has been enriched by a systematization and analysis of the local elements on which regional competitiveness relies. A synthesis concept – labelled ‘territorial capital’ – has been identified. Its purpose is not the mere classification of the endogenous and exogenous, tangible and intangible, public and private assets highlighted by all theories, but rather to raise awareness of the different

economic nature of these elements, which influences their laws of accumulation and depreciation. Moreover, the new reflections engendered by the new concept stress the importance of the co-existence of different elements if a new trajectory of cumulative development is to begin. Thus reiterated in modern terms is the importance of an 'equilibrated development' no longer between tangible elements, but between intangible ones, between knowledge and relational capital, between creativity and cognitive capital. It is the interaction and the synergies among these 'soft' elements that determine increases in the dynamic efficiency of local areas.

The summary of an area's success factors reminds us that local assets have been identified by very different scientific approaches. The traditional approach – defined as functional, positivist and cognitivist – interprets the reality on the bases of a deterministic, cause-effect, logic of individual actions. Another approach has recently been developed. Known as the relational approach, it suggests analysing more complex, inter-subjective relationships based on how economic agents perceive the reality, react to external stimuli, and are capable of synergic and co-operative behaviours. This new approach maintains that local competitiveness arises from trust and a sense of belonging more than pure resource availability; from creativity more than the pure presence of qualified labour; from relationality more than pure accessibility; from local identity more than elements like the quality of the environment and the efficiency of the economic system.

The second direction followed by the new theoretical reflections of the past decade centres on the concept of proximity in the creation of new knowledge. Until ten years ago, scholars were aware that physical proximity should be combined with a relational and social proximity in order to interpret local development patterns. The French proximity school had already addressed the challenge raised by the '*milieu innovateur*' and 'local district' theories, and re-launched the idea of extending geographical proximity to include an 'organized proximity'. However, at the international level (especially in the English-speaking countries) the idea that geographical proximity should be enlarged to other concepts of proximity did not find acceptance. In the past decade, studies on the different types of proximity, from institutional to cognitive, have clearly been taken into consideration by local development theories, and they have obtained broad consensus also thanks to rigorous quantitative empirical analyses supporting the theoretical approaches.

On analysing the current literature, there is an evident dilemma in modern theories in their attempts to supersede pure physical proximity – and therefore move towards an a-spatial paradigm where co-operation among individuals not necessarily located in the same area explains the sources of dynamic advantages of local areas – and the local and geographical anchoring in which the sources of cognitive and institutional proximities are sought.

I believe that the '*milieu innovateur*' theory is still the only theory that finds a way out of this impasse; in fact, it remains the only theory able to merge local advantages – in the form of relational capital and collective learning processes – and the long-distance co-operation able to overcome the decreasing returns that characterize pure local knowledge.

In regard to all these concepts of proximity, no attempt has been made to provide a synthesis of what has been said and what can still be said. Instead, fundamental for understanding the real interpretative capacity of these theories is to consider what relation exists among the different concepts of proximity: do they represent the same

phenomenon from a different perspective or are they different elements that complement each other in the explanation of knowledge exchange? Moreover, the question spontaneously arises as to whether it still makes sense to speak about proximity in its traditional meaning: does geographical proximity still play a role in the exchange of knowledge?

This textbook suggests some answers to these questions. In particular, I am convinced that there are complementarities among the different concepts of proximity. As in the balance of development theory, so the balance of different complementary productive resources (transport infrastructure, skilled jobs, productive capital, managerial, entrepreneurial and technological competences) is interpreted as the best strategy for long-run regional development. I am convinced that the presence of, and interaction among, different forms of proximity is the best means to support cumulative innovative processes in the long run.

It is no coincidence that it is precisely in these years that the concept of proximity among actors for the exchange of knowledge has aroused particular interest. As happened for innovation in the 1970s and 1980s, in the past two decades knowledge has been interpreted as the strategic asset upon which regional competitiveness depends; knowledge, and in particular its creation and diffusion mechanisms, has become an increasingly important area of inquiry in regional economics. In particular, the determinants of local learning processes, the role played by space as a source of new knowledge, the effects of proximity as channels for knowledge transmission, are increasingly analysed in an evolutionary approach to regional economics. The latter interprets territory as the source of both uncertainty reduction associated with innovation, and of lock-in mechanisms in specific technological trajectories and innovative paradigms. The recent hermeneutic approach views territory as the source of symbols, emotions and collective identity at the basis of local creativity and knowledge creation.<sup>1</sup>

The third direction followed by theoretical reflections over the past ten years is, from my personal perspective, a rather important one, since it responds to the challenge with which I terminated the first edition of this textbook: the creation of a formalized macroeconomic regional growth model that comprises, together with the traditional macroeconomic elements, modern territorial ones able to interpret regional specificities and regional development trajectories relatively autonomous with respect to those of the nation. Especially these years of crisis, which have reaffirmed with clear evidence the importance of macroeconomic conditions in the explanation of regional growth trajectories – public debt, supranational restrictions on the deficits of single countries, the advantages and disadvantages of a common currency, exchange rates – have raised the challenge of finding a way to merge the two traditionally separated driving forces of growth. In the last chapter of this edition, I present a recent model developed by the Politecnico of Milan that takes up this challenge. The model is labelled MASST, an acronym that contains all the dimensions – macroeconomic, sectoral, social and territorial – that must be considered to interpret regional growth trajectories. The conceptual step forward taken by the model does not reside in a new theory, but rather in the integration of existing theories into a logical framework where macroeconomic and territorial elements find a role. The internal logic of the model, in fact, is an elegant merger of two approaches: the Keynesian theories of effective demand; and the theory of endogenous growth, based on supply elements, as regards the regional differential.

Despite the interesting novelties of the model, there is space for further conceptual reflections. Whilst the MASST model has managed to insert a diversified-relational

space into a macroeconomic growth model, still required is a definition of the role of the territorial micro-foundations of growth through study of the location behaviours of firms and individuals. Some young colleague has the task of taking up this challenge.

As regards regional growth models, no particular new idea has come to the fore in the past ten years. The New Economic Geography models of the 1990s and the neo-classical growth models in general have proved to be elegant, and in certain respects useful, restylings of issues already treated. But they are still impenetrable to the evolution of local development theories by which they could instead be inspired to abandon the limiting neoclassical approach of pecuniary externalities, and take technological externalities from the local context into account in their micro-founded macroeconomic growth models.

The revision of a textbook is an opportunity to revise, deepen and rewrite parts of it. This edition is no exception. The neoclassical general spatial equilibrium models have been revised in order to use their mathematical formulations more as an aid to understanding their elegant and refined economic logic than as a barrier to their interpretation. On the basis of remarks and questions by my students over the past ten years, I have revised and rewritten part of Chapter 2, trying to strike the right balance between formal modelling and economic logic.

I have also enlarged on some issues that were too briefly treated in the first edition. Among these issues, I have given more space to the agglomeration economies concept, which has important implications for the normative consequences of regional policy. The presence of cities able to maximize static efficiency, to generate and exploit agglomeration economies, and to grow along cumulative self-reinforcing trajectories is of extreme importance for regional dynamics. The European Union has always been aware of the trade-off between policies to support weak areas (equity principle) and policies able to achieve higher resources to redistribute to weak areas through the exploitation of the efficiency of strong areas (in general large city regions) (efficiency principle). In this version of the textbook, I provide the theoretical tools to reply to such a question.

Also a revision requires, as I have discovered, a huge intellectual effort, which I have managed to face thanks to the co-operation of many colleagues and friends. First of all, my primary source of inspiration has been the regional and urban economics group at the Politecnico of Milan, the scientific school to which I belong. Roberto Camagni – with whom I have shared thirty constructive, enthusiastic and intense years of work – has also on this occasion devoted time to meetings and discussion on the new edition, and read the new parts with interest and dedication. With Roberto, over the past ten years, I have developed scientific ideas and contributions that are included in this edition: for instance, the reflections on dynamic agglomeration economies, the MASST model and regional innovation patterns. Moreover, I have been greatly helped by the young, constructive and dynamic research group that over time has arisen around Roberto and myself: Andrea Caragliu, Ugo Fratesi, Camilla Lenzi and Giovanni Perucca have developed important research fields together with Roberto and myself. They have sometimes had to cope with stressful research schedules, but they have always maintained scientific rigour and enriched common work with creativity, competence and dedication.<sup>2</sup>

The second source of inspiration is the international and national scientific community to which I belong. The international (RSAI), European (ERSA) and national

regional science associations (the Italian one AISRe *in primis*) are a constant source of innovation and inspiration thanks to the presence of exceptional colleagues. After many years, I still have a particular regard for Peter Nijkamp, my mentor together with Roberto Camagni; I am indebted to him for his guidance through the first ten years of my career.

Over the past ten years my scientific activity has been enriched by new experiences. My presidency of the Regional Science Association International enabled me to make a modest contribution to developing regional science in areas, like South America, where it was not yet recognized as a discipline; to meet colleagues all over the world; to discover the richness and variety of problems, issues, themes, methods and, last but not least, persons that exist in every country. My co-ordination of research projects for ESPON and DGRegio obliged me to use theoretical approaches for the solution of practical problems and for the proposal of new policy directions. The editorship of two journals – *Papers in Regional Science* and *Italian Journal of Regional Science* – has provided me with a constant overview on all theoretical and methodological novelties of these years. Last, but not least, the co-ordination of the master's course Management of Built Environment at the Politecnico of Milan has obliged me to pay particular attention to the treatment of issues and themes for academic purposes.

As with the first edition, also in this case I have constantly tried to keep the book's final aim clearly in mind: that of providing students with a tool to understand in depth the economic laws that govern regional growth and development patterns, and the theories with which to forecast these patterns. I hope that I have achieved this goal.

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14 May 2015

## Notes

- 1 For a hermeneutic approach to knowledge creation, see Cusinato and Philippopoulos-Mihalopoulos (2015).
- 2 Together with Andrea Caragliu, we developed the reflections on dynamic agglomeration economies. With Andrea Caragliu and Ugo Fratesi we developed the MASST model. Together with Camilla Lenzi, we developed the regional innovation growth patterns. With Giovanni Perucca we developed solid indicators and robust empirical analyses on the concept of territorial capital.

# Symbols

An attempt has been made to keep the symbols for variables unchanged throughout all the chapters of this book, and particular effort has been made not to attribute different meanings to the same symbol. However, this has not always been possible when traditional symbols from micro- and macroeconomics are applied: it sometimes happens, in fact, that the same symbol is used with different meanings in the two branches of economics. To avert confusion, there follows a list of the symbols used in the book and their meanings.

- $\tau$  = Unit transport cost
- $\pi$  = Unit profit/productivity
- $\Pi$  = Total profit
- A = Technical progress/intermediate purchases and sales/producers
- B = Producer
- C = Total costs/consumption/producer
- c = Average and marginal propensity to consume/average cost
- d = Distance from the centre
- D = Demand for a good/cumulated number of adopters
- e = Net migration balance/export growth rate
- E = Employment
- G = Public expenditure
- h = Growth rate of human capital
- H = Human capital
- I = Investments
- i = Interest rates
- i,j = Sectors or industries
- k = Growth rate of physical capital/nesting coefficients
- K = Physical capital
- l = Growth rate of labour
- L = Labour
- m = Propensity to import/growth rate of imports
- M = Import/raw materials
- n = Natural growth rate of population/number of firms/nation or country
- p = Unit price of a good
- P = Population/prices

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- q = Size of the house
- R = Total revenue/public transfers
- r = Land rent/region
- s = Average and marginal propensity to save/share of urban land occupied by productive activities/share of patents in disaggregated technological classes (e.g. five-digit classes)
- S = Supply of a good/savings/share of patents in aggregated technological classes (e.g. two-digit classes)
- t = Time/income tax rate
- T = Land/fiscal revenues
- u = Utility of a good for a consumer
- v = Investment accelerator coefficient
- w = Unit wage
- x = Quantity of a good
- X = Exports
- Y = Total income/total production
- y = Income growth rate
- z = Set of goods/share of employees in a firm

# Introduction

## 1 Economics and space

Economic activity arises, grows and develops in space. Firms, and economic actors in general, choose their locations in the same way as they choose their production factors and their technology. Productive resources are distributed unevenly in space: they are frequently concentrated in specific places (regions or cities) while they are entirely or partly non-existent in others. Quantitative and qualitative imbalances in the geographical distribution of resources and economic activities generate different factor remunerations, different levels of wealth and well-being, and different degrees of control over local development. The problem of factor allocation – which economists have conventionally treated as being the efficient allocation of the factors among various types of production – is more complex than this, in fact; and it is so because the spatial dimension is of crucial importance.

Space influences the workings of an economic system. 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).

Already evident is an aspect that informs the entire treatment of this book: regional economics is *not* the study of the economy at the level of administrative regions, as is often superficially and erroneously believed. Regional economics is the branch of economics that incorporates the dimension ‘space’ into analysis of the workings of the market. It does so by including space in logical schemes, laws and models that 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

## 2 Introduction

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 banal to emphasise 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 determining 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.

There are several reasons for this belated consideration of space by economists. First, as often pointed out by the founder himself of regional economics, Walter Isard,<sup>1</sup> it has been due to the decisive influence of the neoclassical school, which has conceived the temporal analysis of economic development as crucial and neglected the variable 'space' as a consequence – often in order to simplify the treatment. As Alfred Marshall wrote: 'The difficulties of the problem depend chiefly on variations in the area of space, and the period of time over which the market in question extends; the influence of time being more fundamental than that of space' (*Principles of Economics*, 1920, 8th edition, vol. V, chap. 15, section 1).

Second, the treatment of the variable 'space' in economic analysis – especially if it is included in a dynamic approach – complicates the logical framework. The analytical tools until recently available to economists could not handle temporal and spatial dynamics simultaneously. Nor were they able to cope with the non-linearity of spatial phenomena like agglomeration or proximity economies. Finally, introduction of the variable 'space' required the discarding of the simplifying hypotheses (always dear to economists) of constant returns and perfect competition. According to the logic of a spatial market divided among producers, firms do not compete with all other firms, but only with those closest to them. Spatial distance is thus a barrier to entry which imposes a system of monopolistic competition – which too has only recently been formalized in analytical growth models.<sup>2</sup>

Regional economics therefore seeks to answer the following fundamental questions. What economic logic explains the location choices of firms and households in space? What economic logic explains the configuration of large territorial systems (e.g. city systems)? Why are certain areas – regions, cities, individual territories – more developed than others?

Answers to these questions have been put forward by the two large groups of theories that make up regional economics:

- 1 *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;
- 2 *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

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