



New Economic Geography: An appraisal on the occasion of Paul Krugman's 2008 Nobel Prize in Economic Sciences [☆]

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ABSTRACT

Paul Krugman has clarified the microeconomic underpinnings of both spatial economic agglomerations and regional imbalances at national and international levels. He has achieved this with a series of remarkably original papers and books that succeed in combining imperfect competition, increasing returns, and transportation costs in new and powerful ways. Yet, not everything was brand new in New Economic Geography. To be precise, several disparate pieces of high-quality work were available in urban economics and location theory. Our purpose in this paper is to shed new light on economic geography through the lenses of these two fields of economics and regional science.

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1. Introduction

Economic geography seeks to explain the riddle of unequal spatial development. The most salient feature of the spatial economy is in effect the presence of a large variety of economic agglomerations. Hundreds of books and papers have been devoted to this topic but it was not until Paul Krugman's (1991a) seminal paper that a full-fledged general equilibrium model became available to explain why, how and when the economic activity may be agglomerated in a few places.

Although using “economic agglomeration” as a generic term is convenient at a certain level of abstraction, it must be kept in mind that this concept refers to very distinct real world situations. At one extreme of the spectrum lies the North–South divide. At the other extreme, agglomeration arises when restaurants, movie theaters, or shops selling similar products are clustered within the same neighborhood, not to say on the same street.

What distinguishes those various types of agglomeration is the *spatial scale*, or the spatial unit of reference, chosen in conducting one's research, very much as there are different levels of aggregation of economic agents. Whatever the scale of analysis retained, the emergence of economic agglomeration is naturally associated with the emergence of inequalities across locations, regions or nations.

Such inequalities are often at the origin of strong tensions between different political bodies or jurisdictions, or even social, religious or ethnic groups when they are geographically concentrated. Understanding how spatial inequalities in living standards arise is thus a fundamental challenge for economists and regional scientists.

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Yet, not everything was brand new in Krugman's New Economic Geography. To be precise, several disparate pieces of high-quality work were available in urban economics and location theory. Our purpose in this paper is to shed new light on economic geography through the lenses of these two fields of economics and regional science.

2. On the relationships between economic geography, urban economics, and location theory

How is economic geography related to other fields such as urban economics and location theory? The former aims to explain the internal structure of cities, that is, (i) how land is distributed among plants, offices, dwellings, and infrastructure, and (ii) why cities have one or several central business districts. The basic concept of urban economics is the land market, which serves to allocate both economic agents and activities across space. Alonso (1964) and Mills (1967) may

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be considered as the founders of this field. Fujita (1989) has provided what remains the best overview of the state of the art up to the 1990s.¹ More recently, urban economics has addressed a large number of new issues, ranging from the microeconomic foundations of urban agglomeration economies to the impact of neighborhood effects and other spatial externalities on the social stratification of cities (Duranton and Puga, 2004; Zenou, 2009).

The latter is concerned with the location of economic activities, with a special attention paid to the geographical distribution of firms and the geographical variations in prices and costs. This field has its roots in Hotelling's (1929) path-breaking paper "Stability in Competition". The value and importance of this contribution was brought to light in the 1980s thanks to the emergence of non-cooperative game theory. Its use exceeds the original geographical interpretation to accommodate almost any dimension that differentiates firms and consumers in a given market. To be precise, the spatial framework proposed by Hotelling may serve as a powerful metaphor for dealing with issues involving heterogeneity and diversity across agents in a host of economic, political and social domains (Rosen, 2002). Examples include the specification of products by firms competing for customers in industrial organization and the choice of a political platform by parties competing for votes in political science.

Whatever their respective merits, it is fair to say that neither urban economics nor location theory has reached the level of visibility and interest achieved by economic geography. Why is this so? Though the scope of urban economics is perhaps too narrow for general economists, the wider field of location theory is not perceived as a well-defined domain of research, probably because of its dissemination across many economic fields. In contrast, economic geography or, to use the most common terminology, New Economic Geography (henceforth, NEG) has a well-defined and yet broad objective: it is the first body of economics that seeks to provide a detailed description of spatial inequalities that emerge as the outcome of a full-fledged general equilibrium model. Such inequalities are at the heart of many contemporary debates, both between developed and developing countries and within developed countries.

To be sure, the existence of interregional inequalities has long attracted the attention of economists, especially in the area known as regional economics. For a long time, however, regional concepts, models and techniques were often a mere extension of those used at the national level, with an additional index identifying the different regions [think of interregional input–output matrices]. Despite valuable contributions made by Myrdal and Perroux in the 1950s, no one before Krugman had been able to show how regional imbalances could arise within the realm of economic theory. But why did it take so long? As shown in the next section, the answer lies in the inability of the dominant paradigm of economic theory to handle the "regional question".

3. The Spatial Impossibility Theorem

To start with, it is useful to summarize briefly what the neoclassical model has to offer regarding the spatial distribution of activities. In a frictionless world, production factors will act to remove any inequalities in earnings by moving from regions where their remunerations are lower to those where they are higher. If, as assumed in the neoclassical model, there is perfect competition and constant returns to scale, then the marginal productivity of each factor must rise in the regions of origin and fall in the regions of destination. At spatial equilibrium, the remuneration of each production factor must then be the same across regions. As a result, in a world characterized by the "death of distance", it would suffice to wait for this prediction to occur. However, this argument has a second and more far-reaching

implication: each region becomes autarkic as it produces only for its local market. Such a prediction would be very hard to sell.

The difficulty encountered by using the competitive paradigm to study the location of firms and households was definitely made clear by Starrett (1978), in a paper that deserves far more recognition than it has achieved. To motivate his result, note first that firms tend to produce in only a few places, and likewise, that households typically have a single residence. Hence it is reasonable to assume that each firm (each household) chooses a single location and engages in production (consumption) activities where it is established. However, firms and households are free to choose any location they wish in a given set of places. This set is said to be *homogeneous* when (i) the preferences of each household are independent of its location, and similarly that (ii) the set of production technologies available to a firm is independent of its location. In other words, consumers' and producers' fundamentals are not influenced by their locational choice. Within this setting, Starrett proved the following unsuspected result, which has been called the Spatial Impossibility Theorem:

Consider an Arrow–Debreu economy with a finite number of agents and locations. If space is homogeneous and transport is costly, then there is no competitive equilibrium involving transportation.

What does this mean? If economic activities are perfectly divisible, then a competitive equilibrium exists in which each location operates as a separate autarky.² For example, when households and firms are identical, all locations have the same relative prices and the same production structure. In particular, if the assumptions of the neoclassical model were true, factor mobility and interregional trade would be perfect substitutes, as shown by Mundell (1957). In retrospect, this hardly seems surprising in a world where activity can operate at arbitrarily small levels. At equilibrium, firms and households naturally disperse their activity all over the places, thus reducing transport costs to zero.

However, when economic activities are not perfectly divisible, the transport of some goods between some places becomes unavoidable. In this case, the Spatial Impossibility Theorem tells us that no competitive equilibrium exists. This is a very strong result in that it shows the impossibility of having trade once agents are free to choose their location within a featureless space. When regions are not autarkies, one should keep in mind that the price system must serve two purposes simultaneously: (i) to support trade between regions (while clearing the markets in each region), and (ii) to prevent firms and households from relocating. The Spatial Impossibility Theorem says that, in the case of a homogeneous space, it is impossible to hit two birds with one stone: the price gradients supporting trade bear wrong signals from the viewpoint of locational stability. Formally, the reason for the Spatial Impossibility Theorem lies in the non-convexity of the set of feasible allocations. This non-convexity is caused by the combination of two elements: the existences of positive transport costs and the fact that agents are not ubiquitous, but rather have distinct and specific locations in space (Fujita and Thisse, 2002). Therefore, ignoring transport costs in economic theory is far being an innocuous assumption despite "the sanguine hope that if included they would not materially affect the results" (Deardorff, 1984, p.470).

4. What are the alternative modeling strategies?

Thus, if we want to understand something about the spatial distribution of economic activity and, in particular, the formation of major economic agglomerations as well as regional specialization and spatial inequalities, then the Spatial Impossibility Theorem tells us that we must make at least one of the following three assumptions:

¹ A rich overview of more recent developments in urban economics is provided by Glaeser (2008).

² This does not mean, however, that no transactions take place within each location and that locations are identical closed economies.

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