

# **An historical test of industrial relocation - The formation of the Portuguese Core Industrial Region (1890-1950s) <sup>1</sup>**

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## Introduction

Economists and economic historians have long discussed the role of geographical aspects on industrial activities. The Portuguese historical experience analyzed here, from 1890-1950s, is particularly interesting, as the national rail network was completed at the beginning of this period. The decades 1860s through 1890 were marked by the huge investment effort to build it. Both private capital and government subsidies were required for the project. At the same time the government was also making a great effort to build a road network and improve ports.

These infrastructures were regarded as public goods necessary to stimulate growth and industrialization. As public deficits resulting from these high public expenditures were financed through the issuing of public debt bonds in domestic and foreign markets, the service of the public debt led to a partial government bankruptcy in 1892. The idea that economic growth fostered by the use of these collective infra-structures would result in new tax revenues sufficient to pay the public debt interest and capital, did not occur. Following the bankruptcy, no further foreign loans were granted in the financial markets, which explains the small number of rail lines built thereafter.

Road transport infrastructures, too, have seen little improvement until very recently. Even after the public budget equilibrium was achieved in the late 1920s, the only improvement through investment during the twentieth century was to pave the available roads, in response to the new

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technologies of the time and the requirements imposed by growth in automobile traffic in the 1930s and 1940s, under the Salazar government.<sup>4</sup>

So, by looking at the changes in industrial location between 1890 and the 1950s, we will be able to see how the railways and roads built at the beginning of the period influenced the location choices of firms throughout the country thereafter. The newly achieved geographical profile of the industrial network would support the acceleration of the path of modern economic growth in Portugal, in the following decades.<sup>5</sup> At the same time, the exercise may reveal something about the interaction of firms' location choices with the development of a new network of transport services, given the unchanged transport infrastructures.

Section 2 will frame the theoretical aspects that support the inquiry performed in this paper, along with other factors and variables that have been considered as relevant explanations for *delocalization*. Section 3 presents the historical sources for data and Section 4 describes what changes occurred in industry location. Section 5 explores the model used, whose estimations are commented on in Section 6. Conclusions are drawn at the end.

### 1. The theoretical framework

The interest of social scientists in the location of cities is more than a century old. It originated with Cantillon and continues to the present day. Von Thünen's theory of spatial patterning of land uses, which dates from 1826<sup>6</sup>, constituted the base of the 'location theory' that would be developed later on, through the works of Weber (1909), Christaller (1933), and Lösch (1939). Weber's theory

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<sup>4</sup> *Relatórios*, several issues. Vieira, 1980.

<sup>5</sup> Amaral, 2003.

<sup>6</sup> "Der Isolierte Staat (The Isolated State)"

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aimed to explain industrial location as a decision regarding the minimization of transport costs in terms of both suppliers and markets. Christaller studied the location and relationships among cities in southern Germany and believed that there were systematic patterns. A regional city and its manufacturing factories would supply a crown of satellite cities that stocked the manufacturing goods in warehouses for distribution locally and to retail distributors in its own crown of towns. In this way, cities form a hierarchy of nested market areas. Lösch demonstrated that producers would cluster into hexagonal market areas.

Even though Lösch's work had been the inspiration for two separate disciplines, 'regional science' and 'economic geography',<sup>7</sup> his wish for the creation of a new structured field of 'spatial economics' was not achieved. In fact, for many years economists showed something less than consistent interest in the subject.

More recently, in the 1990s, when mainstream economists rediscovered increasing returns and markets characterized by imperfect competition, new theoretical approaches were made available. This new movement has come to be known as 'New Economic Geography', an expression introduced by Krugman to designate a "style of economic analysis which tries to explain the spatial structure of the economy using certain technical tricks to produce models in which there are increasing returns and markets characterized by imperfect competition" (Krugman, 1998, p. 7).

The idea that increasing returns to scale promote spatial agglomeration is not new, however. Urban and regional economics, which fit into the 'regional science',<sup>8</sup> had long recognized this relationship (Hanson, 2001)<sup>9</sup>. In fact, the existence of what is now called agglomeration economies (local external economies) was already acknowledged by Marshall (1890). He was the first to advance

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<sup>7</sup> See Martin, 1999, for further details on the difference between these disciplines.

<sup>8</sup> Developed by authors such as Isard, in the 50s, and Alonso.

<sup>9</sup> Quigley, 1998, and Brakman, Garretsen, Marrewijk, 2001, for a survey of the literature.

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the three, now classical, reasons why firms cluster – specialized labor market pooling, increased provision of non-traded input specific to an industry (economies of scale in the some particular infrastructure or benefits from the greater availability and efficiency of local services), information and technological spillovers (also referred to as pure external economies).

Thus, the novelty of the ‘New Economic Geography’ lies in the integration of these spatial issues into general equilibrium models<sup>10</sup>. Important non-convexities have blocked substantial progress for many years. The New Economic Geography has swept away most of these difficulties by reconsidering agglomeration economies under the combined modeling of increasing returns and imperfect competition.

It is a fact that economic activities are concentrated in areas of high population density. As people concentrate where employment opportunities are, it is then necessary to study location choices of firms in order to understand the location of cities. It is in this context that scale economies in production become so important in understanding the creation and growth of cities: “Without scale economies, there is no role for the city at all”<sup>11</sup>. Apart from the external scale economies, internal scale economies also cause firms to concentrate their production in one or few places, preferably near their demand. Of course, not all demand is concentrated in a single place, and the distance to suppliers is also important. So, transport costs play a decisive role in this story. In fact, for “the prolific and often controversial Krugman”<sup>12</sup> the industrial cluster’s location is determined by the interaction between agglomeration economies and transport costs (Krugman, 1991) - when transport costs are high they will act as a dispersion force, and when they are low they will reinforce agglomeration economies.

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<sup>10</sup> See Krugman’s chapter “Where is the ‘New Economic Geography?’” in The Oxford Handbook of Economic Geography”.

<sup>11</sup> Quigley, 1998, p 130.

<sup>12</sup> Boddy, 1999, p. 811.

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Furthermore, if transport costs were to decline “the economy would spontaneously organize itself into a core-periphery geography (...) with manufacturing concentrating in a ‘core’ while the ‘periphery’ is relegated to primary production” (Krugman, 1998, p. 12, p. 14). Once established, this regional pattern is sustained by a ‘lock-in’ or path dependence. According to Martin (1999) this is an application of ‘economics of qwerly’ to industrial location. There is a cumulative process by which firms tend to cluster where markets are larger and markets tend to be where firms are working. Which region turns into the core and which into the periphery is determined by an historical accident that makes a region benefit from better access to both demand and suppliers. It is a neat way to deal with the fact that the models of this ‘New Economic Theory’ are indeterminate regarding the places where industry clusters, that is, there could be multiple equilibrium solutions.

Krugman suggests that there are also ‘self-reinforcing advantages of market access via transportation networks - “a location that for whatever reason has a concentration of production will tend to become ‘central’ in terms of the transport network, which will reinforce its advantage as a production location, and so on” (Krugman, 1998, p. 19). This process can then be used to explain why one or two regions can turn into the main or the two main poles of a country. Mori and Nishikimi (2002) elaborate on this issue and show that economies of transport density can be the primary source of industrial location. They define economies of transport density as a mechanism of circular causation: frequent transport services in a given link will attract users, which in turn, will stimulate the supply of these services. According to these authors, it is the size and spatial distribution of demand for manufactured goods that determine the structure of the transport network. A transport hub will develop where regions are relatively close to one another. Otherwise the scale of density economies is limited by the size of transport demand. U-shaped relationships between the decrease in transport costs and spatial agglomeration are also available.<sup>13</sup>

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<sup>13</sup> Krugman; Venables, 1995.

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Rosenthal and Strange (2003) prefer to use natural advantages such as natural harbors, coal availability and climate as well as economic variables such as fiscal policies or wage rates to explain the birth of new establishments.

It is within this Economics' theoretical framework that we will try to explain the changes that occurred in the location profile of Portuguese industrial activities from the end of the nineteenth century to the middle of the twentieth century<sup>14</sup>.

As for Economic History, it is only fair to say that geographical or local aspects have always deserved the attention of historians, as time and space are the two coordinates of any historical fact.<sup>15</sup> Pollard (1981) studies the location of European industry and concludes that modern industry was attracted to regions having long experience in traditional industry. In fact, the available nineteenth-century European historical experience shows that industrialization occurred mainly in regions that combined the so-called *domestic system* supplying industry with intermediate goods, or in regions where there was a long tradition in manufacturing production. In Mathias, 1969, Pollard, 1981 and Cameron, 1993, the local resources were pointed out as a main determinant for industrialization. Not only energy sources such as coal or water, but also raw materials' availability attracted industrial activities. Among resources, the location of human resources, in particular, deserved a special attention, as it was considered not only from a quantitative point of view but also from a qualitative perspective. In Cameron (1993), literacy and education in general have been elected as proxies for the human resources' quality and also as two pivotal elements in explaining successful locations for industry.

The support of financial institutions such as banking and insurance, as well as the role of some institutional aspects such as the enforcement of contracts, are two additional factors that can be found

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<sup>14</sup> See also Figueiredo and Woodward, 2000, for the 1980s-1990s in Portugal, and Hanson, 2001, for a survey on recent empirical work on the geographic concentration of economic activity.

<sup>15</sup> Landes, 1993.

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in the literature as possible explanations for some successful industrialization experiences – North (1996) and Cameron (1967). We will consider these too in our regional analysis.

For historians it is impossible to ignore the importance of markets and the ease of access to them. We all know that medieval towns grew on river banks or as sea port cities. Most of the European cities are crossed by rivers, the same as we find elsewhere, throughout the world. A port city on the sea or a navigable river had easier contacts with foodstuff suppliers or raw material producers (Pounds, 1988). Cheaper transports and lower information costs have also been identified as relevant factors in explaining the successful location of industry, in studying the historical geography of Europe.

Historical studies have also paid attention to the lags between decreasing transport costs and industry location. For economic historians this is a decisive aspect. Not only is time a permanent issue in historical explorations, but also industrialization was preceded by a long period, of about half a century, during which national economies gathered a set of economic, social and institutional aspects as pre-conditions for a successful industrialization.<sup>16</sup> Time lags may be used in empirical tests to allow for the impact of such pre-conditions on regional industry location.

## 2. Main sources

During the second half of the nineteenth century worries about the knowledge of economic indicators led investigators to collect data on industry. The Ministry of Public Works of Portugal made available a survey on industrial units working in the country in 1890, showing industry and industrial labor force distribution by *Concelhos*. According to the Administrative Code, Portugal is divided into smaller administrative regions called *concelhos*, which were grouped into 17 major administrative regions, the *distritos*.<sup>17</sup> Administrative changes from 1890 to the 1950s did not affect territorial

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<sup>16</sup> Rostow, 1960.

<sup>17</sup> M.O.P.C.I., 1890.

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boundaries of *Concelhos*. (The main administrative changes that occurred in the country are described in Appendix 1. There was also the division of the district of Lisbon into two, with the inclusion of *Concelhos* south of Lisbon in the newly-created district of Setúbal). Most of the available information was collected by the government. The creation of Statistical Offices for this purpose is an indication of how important this information was considered to be. By the middle of the twentieth century, a new industrial survey brought insight into the new distribution throughout the territory. This paper uses the regional variation in the number of industrial units in the period between 1890 and 1957, which reveals the changes in the location of industry and the industrial labor force in Portugal at the level of the *Concelhos*.

As civil society also felt the need for information on practical matters of everyday life, particularly in economic activities, the publication of an annual Commercial Compendium, *Anuário Commercial*, was undertaken and began to appear regularly in the 1880s. The first issues were rather poor, but with time it turned into an excellent source of information on the main features of Portuguese *Concelhos*. It provided news on selected aspects of commerce that were considered relevant for travellers, merchants, tourists or people in general. The *Anuário* provides the profile of each *concelho* including information on the distance to the administrative regional capital (*sede de distrito*), the presence of a railway station in that regional capital or the distance to the nearest railway station. It provides details on population, posts, saying if it was possible to send letters, postal packets, and/or postal orders. It is also possible to learn about the presence or absence of Courts, military regiments, banks or banking agents, insurance companies or their agents, local newspapers, schools, and professors teaching in the administrative center of the *Concelho*. Finally, cultural organizations are also referred to, including theaters, and any other cultural institutions.