Ensaios:

Market Potential and Welfare in the Iberian Peninsula in the 1990s

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1. Introduction

The economic geographer Harris (1954) was the first to link the concepts of centre-periphery with market potential. The so-called "market potential" methodology of Harris (1954) aims to identify the regions with higher and lower economic potential, i.e.: the economic centres and peripheries. In this sense, economic periphery refers not only to a geographical position, but to an economic backwardness in relation to a more developed economic centre.

Harris' (1954) market potential framework was first applied to the European Union by Keeble et al. (1988). This study showed that back in the 80's, the European economic centre was located in the intercession of West Germany, Northern France, South-East England and Northern Italy; while the European periphery was mostly located in the South of Europe, and in particular in Portugal, Spain and Greece.

Some recent studies, however, showed that while Spain has started to approach the European economic centre, Portugal, in spite of some convergence in terms of GDP per capita, continued to be in the European periphery (see Bröcker, 1998 and Combes and Overman, 2004).

Even thought considerable attention has been devoted to the Portuguese and the Spanish market potential country ranking at the European level, we are not aware of any centrality study of Portuguese and Spanish regions at the Iberian level. We believe this is an important issue given the ongoing economic integration of the Iberian market.

The purpose of this study is then two fold: (1) to identify the regional centres and peripheries in the Iberian Peninsula and (2) to uncover some of the effects of an Iberian market totally integrated.

2. Centre and Periphery in the Iberian Peninsula

In this section we first present an empirical model of market potential; after we show the results for our benchmark case, a segmented Iberian market; we conclude by showing the results of a policy scenario simulation with an Iberian market totally integrated.

2.1. The Market Potential Empirical Model

The market potential empirical model is based on Krugman's (1991) monopolistic competition "new" economic geography model. The model consists of two factors of production: labour (L) and capital (K); two sectors: the traditional sector that produces a homogeneous good and an industrial sector that produces a set of differentiated goods under monopolistic competition; and n regions (with r = 1, 2,…n) which can belong to different countries (in our case just Portugal and Spain).

In region r, the wage rate is w_r, the price of capital is z_r, and the price of the differentiated good is q_r. The share of labour, of capital and of differentiated goods in production are respectively α, β and γ.

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We assume a very simple technology. The industrial sector is a standard monopolistic competition model, where manufacturing firms use the homogenous good (of the traditional sector) as the only input to produce a differentiated good subject to increasing returns to scale. In turn, the traditional sector produces the homogenous good under perfect competition and constant returns to scale using as inputs labour, capital and the composite differentiated good of the industrial sector. The price of the homogenous good (p_r) is adjusted for regional technological differences (μ_r).

Both the homogenous and the differentiated goods are traded, but the traditional good is freely traded, while the industrial good is subject to iceberg trade costs (τ_{rs}). In particular if a region r belongs to a country k, and region s to country l (with $k \neq l$), the mark-up factor representing trade costs is:

$$\tau_{rs} = \exp(\eta g_{rs})\delta_{kl} \qquad (1)$$

Where g_{rs} denotes the geographic distance between two regions, η measures the costs by unit of distance in percentage of the value of the good, and $\delta_{kl} - 1 \geq 0$ the trade costs of exporting a good from country k to country l. With this last parameter we want to capture all impediments to trade that arise in international trade[1].

In the benchmark case we then assume that trade costs between two regions belonging to the same country ($k = l$) equal $\delta_{kl} = 1$, while for trade costs between two regions belonging to different countries ($k \neq l$) we have $\delta_{kl} > 1$. Besides the benchmark case we also simulate a counter-factual case with an Iberian market totally integrated, i.e.: with $\delta_{kl} = 1$ for trade between all regions.

From the model above it is possible to derive a market potential index and a welfare index. For a given region r, the market potential index (F_r) depends on the demand and the supply potential function of that region (p_r / q_r) as well as the regional technology parameter (μ_r):

$$F_r = \left(\frac{p_r}{\mu_r q_r} \right)^{\frac{1}{1-\gamma}} \qquad (2)$$

Accordingly, regions with better technology, higher demand and higher industrial supply are considered to be economic centres. Note that then F_r also measures the economic performance of a region since it gives us the real rate of return on factors of production.

In turn for the same region r, the welfare index (U_r) depends on total regional GDP (y_r) weighted by the regional price index (q_r):

$$U_r = \frac{y_r}{q_r} \qquad (3)$$

Thus, regions with higher regional GDP and lower price index have higher welfare.

[1] For example, not long time ago, firms in Portugal could not buy electricity in Spain and *vice-versa*.

We calibrate μ_r such that observed regional GDP (y_r) is equal to the model regional GDP (Y_r). In other words, μ_r is found by solving an equilibrium system of equations from our model. Basically, we take data for the model main parameters (elasticity of substitution σ, and η, α, β, γ, $\delta_{k,l}$,) and variables (regional employment, regional GDP and regional distances) and with this information we calibrate μ_r .

In the empirical application of the model above, we consider the twenty NUTS 2 regions of continental Portugal and Spain[2]. The data used is total regional employment (L), inter-regional distances (g) and regional GDP (y). All data refers back to 1994. With the exception of inter-regional distances, all other data was taken from EUROSTAT's REGIO database. The inter-regional distance data was compiled from the CD-ROM "Route 66 Europe". We have opted to measure g_{rs} as the shortest road distance in kilometres between the main cities of each NUTS 2 region.

We repeat the calibration process above to compute a policy scenario simulation. Policy scenarios are interesting because it allows us to compute variations in regional welfare. To do this we compare the regional welfare index (from equation (2)) obtained in the benchmark reference case (U_r^R) with the regional welfare index obtained in the simulation scenario (U_r^C):

$$REV_r = \frac{U_r^C}{U_r^R} - 1 \qquad (4)$$

Where REV_r is the Hicks measure of relative equivalent variation in region r.

2.2. Results from the Benchmark Case

Figures 1 and 2 illustrate the results of the market potential index for the NUTS 2 regions of Portugal and Spain for the benchmark case (i.e.: with $\delta_{kl} = 1$ for regions belonging to the same country and $\delta_{kl} > 1$ for regions belonging to different countries)[3].

The market potential index in the Iberian Peninsula varies between a minimum of 0.60 in Algarve and a maximum of 1.44 in Madrid. Besides the global maximum in Madrid, there are two other market potential peaks in Cataluña (1.34) and Pais Vasco (1.32). Furthermore, there are two new economic centres emerging: Comunidad Valenciana and Andalucia.

Consider now Spain and Portugal separately. Galicia is the Spanish region with the lowest market potential, and Madrid with the highest. In turn, Lisboa e Vale do Tejo is the Portuguese region with the highest market potential, and Algarve with the lowest. Note however that Lisboa e Vale do Tejo, in spite of being the Portuguese region that scores best in the market potential index, performs only marginally better than the least central Spanish region (0.87 of Lisboa e Vale do Tejo against 0.85 of Galicia).

[2] For more detailed information on the NUTS 2 regions of Portugal and Spain see EUROSTAT (1996). The insular regions are not included to maintain spatial continuity in the geographical unit of analysis.

[3] In figure 1 lines link locations with the same market potential, while arrows indicate regions with higher market potential. A market potential of one means that a region has the average market potential of the Iberian Peninsula; a market potential above one means a higher market potential than the average; and a market potential below one means a lower market potential than the average. Therefore, regions with higher market potential are centres while regions with lower market potential are peripheries.

In turn welfare varies from a maximum of 1.57 in Madrid to a minimum of 0.55 in Alentejo. Looking at the two countries separately, the region with the lowest welfare in Spain is Extremadura (0.73) and the region with the highest welfare is Madrid. In Portugal, the region with the highest welfare is Lisboa e Vale do Tejo (1.07) and the region with the lowest welfare is Alentejo.

We can also observe that in terms of ranking, results on welfare are similar to the market potential results, showing a direct correlation between market potential and welfare (see figure 2). There is however an important exception: the region of Lisboa e Vale do Tejo. In fact while Lisboa e Vale do Tejo is in the fifteenth place in the market potential index, it ranks eighth in the welfare index.

Our results then indicate that the Iberian Peninsula has a centre-periphery pattern with most Spanish regions closer to the centre while most Portuguese regions closer to the periphery.

Figure 1. Market Potential and Welfare in the Iberian Peninsula

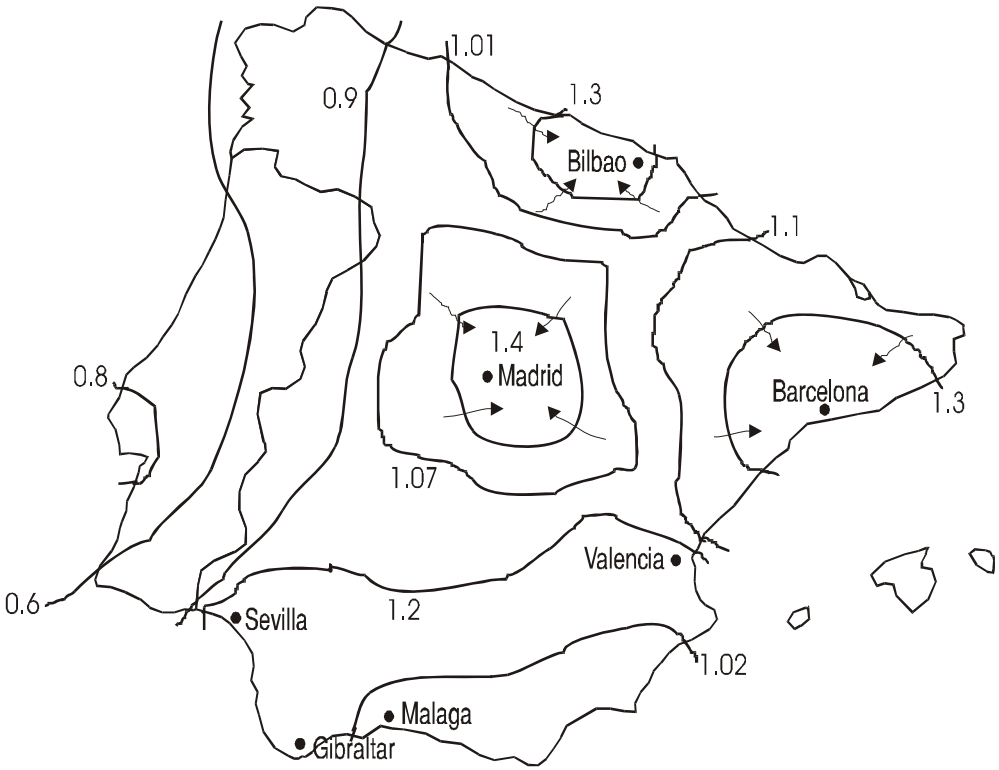
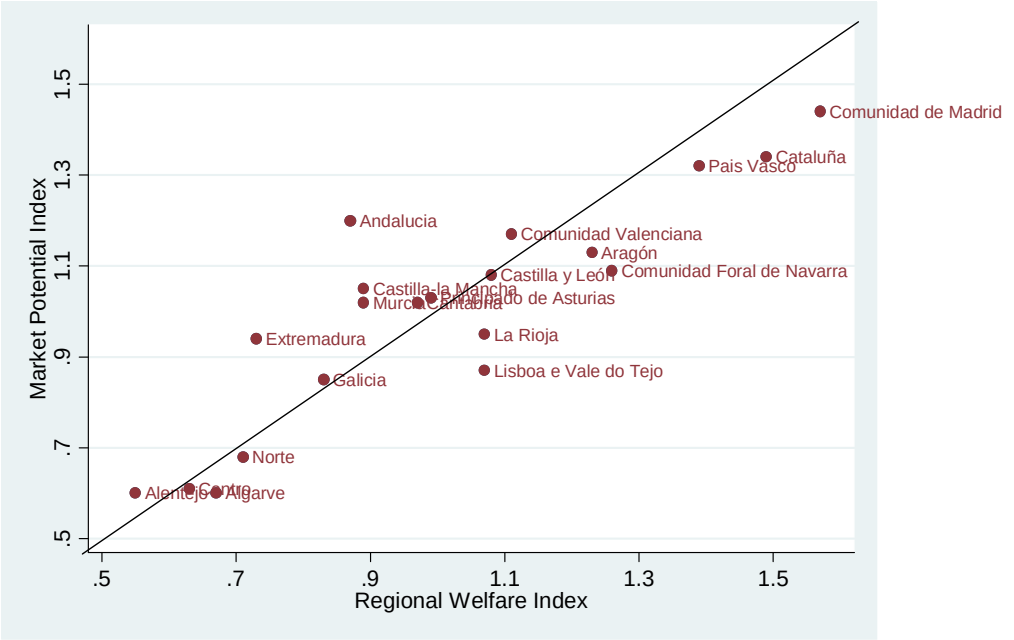


Figure 2. Market Potential versus Regional Welfare



2.3. Iberian Market Integrated

We have also computed the effects of an Iberian market totally integrated. In terms of our model that means that when goods cross the border they do not incur in any extra cost besides the ones associated with distance (i.e.: $\delta_{kl} = 1$ for all regions). We believe that this is a very important scenario, since the Portuguese and the Spanish economies continue in an on-going process of economic integration.

The first thing to note is that under a scenario of an Iberian market totally integrated, the centre-periphery ranking in the Iberian Peninsula would not change, i.e.: the Spanish regions would continue to be more central than the Portuguese ones (see figure 3)[4]. The same thing happens to the regional welfare ranking (see figure 4)[5].

Even thought there are no changes in the market potential and in the welfare rankings, there are some losers and winners from the process of closer Iberian economic integration (see figure 4). However, the majority of the regions gain from a scenario of complete integration (twelve regions gain, while eight loose). Amongst the regions that gain more are the most peripheral regions of Portugal and Spain. In fact, the top three regions in terms of winners are La Rioja (0.16), Alentejo (0.13) and Algarve (0.09). On the contrary, amongst the losers are the most developed regions of each country: Madrid (-0.09), Cataluña (-0.08), Pais Vasco (-0.07), Lisboa e Vale do Tejo (-0.09) and Norte (-0.08). As we can see, however, the losses are very small.

[4] In figure 3, market potential index 1 and 2 stand respectively for market potential "today" and in an Iberian market totally integrated.

[5] In figure 4, regional welfare index 1 and 2 stand respectively for regional welfare "today" and in an Iberian market totally integrated.

Figure 3. Market Potential "today" versus Market Potential in an Iberian market totally integrated

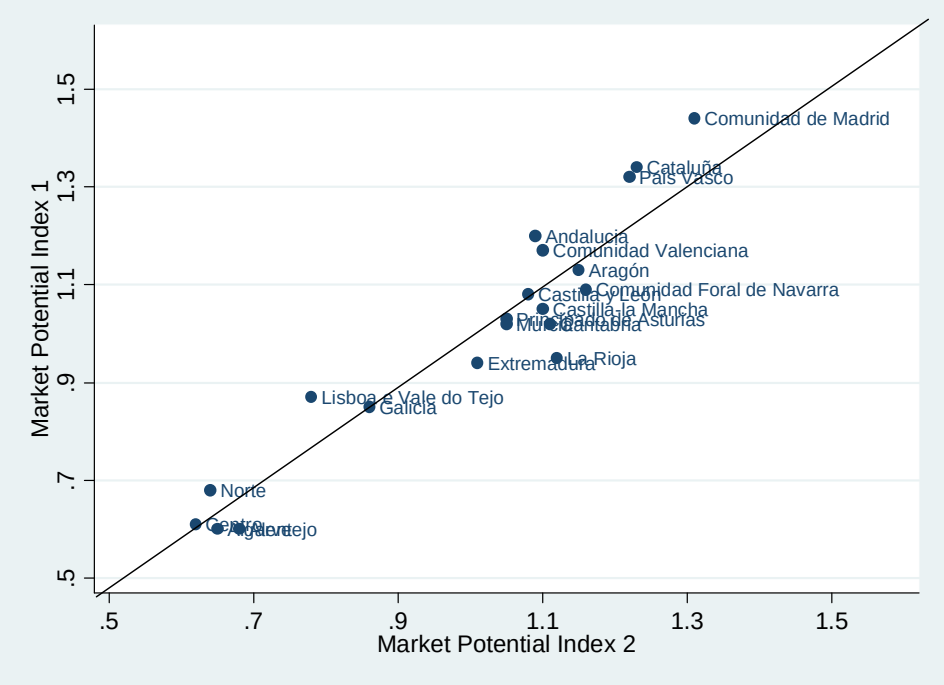
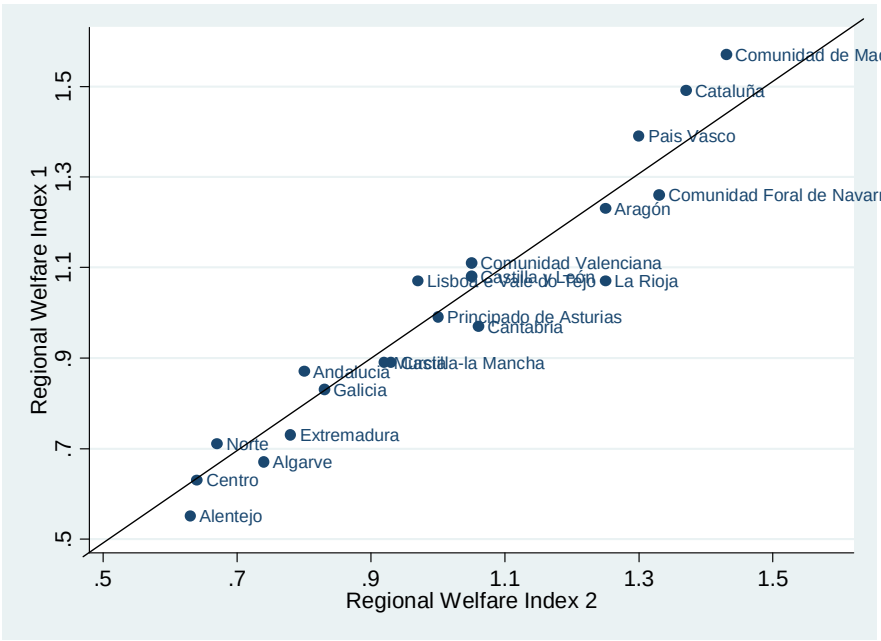


Figure 4. Regional Welfare "today" versus Regional Welfare in an Iberian market totally integrated



3. Discussion

In terms of market potential and welfare, the following picture emerges in the Iberian Peninsula: 1) regions in the Iberian Peninsula present a centre-periphery pattern; 2) the Portuguese regions appear as more peripheral than the Spanish regions; 3) the Portuguese regions have lower economic welfare than the Spanish ones.

In turn, in an Iberian market totally integrated: 1) the majority of regions gain, especially the most peripheral ones; 2) the more central regions of each country may loose, but the losses are very small.

Furthermore, the economic centres in the Iberian Peninsula are geographically equidistant between them. There is Madrid in the Centre, Pais Vasco in the North, Cataluña in the East and Valencia and Sevilla in the South. However in the West of the Iberian Peninsula (exactly where Lisboa e Vale do Tejo is located) there is no economic centre with Iberian projection[6]. According to the "new" economic geography literature this might indicate that there is some room for the emergence of a new Iberian economic centre in Lisboa e Vale do Tejo.

Finally, since our work is silent in terms of the best policies available to tackle the periphery problems of the Portuguese regions, we strongly encourage further work on these issues.

4. References

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[6] Obviously, Lisboa e Vale do Tejo is an economic centre at the Portuguese spatial level, but according to our results it is not a centre at the Iberian level.