DOCUMENTS DE TREBALL DE LA FACULTAT DE CIÈNCIES ECONÒMIQUES I EMPRESARIALS UNIVERSITAT DE BARCELONA

Col.lecció d'Economia

Were Spanish migrants attracted by industrial agglomerations? An analysis for the interwar years in the light of the new economic geography*

Jordi Pons*, Javier Silvestre^, Daniel A. Tirado* and Elisenda Paluzie*[+]

* Universitat de Barcelona

^ Universidad de Zaragoza

[+] CERAS, ENPC

Corresponding author:

Daniel A. Tirado
Departament d'Història i Institucions Econòmiques
Av Diagonal 690
08034 Barcelona
email: datirado@ub.edu

* This paper has been presented in the CEPR workshop "Integration and technological change: challenges for European regions" in Paris, June 2004, the REFI Conference in Paris, June 2004, the *VII Encuentro de Economía Aplicada*, Vigo, June 2004, the II Barcelona Workshop in Economic Geography, July 2004 and the EEA conference, Madrid, August 2004. We thank seminar participants for valuable comments as well as Joan Ramon Rosés. Financial support from the *Ministerio de Ciencia y Tecnología*, through research projects BEC2002-00423 and SEC2002-03212 is gratefully acknowledged. Elisenda Paluzie thanks the European Union-CEPR RTN "The Economic Geography of Europe: Measurement, Testing and Policy Simulations" for a post-doc scholarship in CERAS, Paris.

Abstract:

In this paper we examine whether access to markets had a significant influence on migration choices of Spanish internal migrants in the inter-war years. We perform a structural contrast of a New Economic Geography model that focus on the forward linkage that links workers location choice with the geography of industrial production, one of the centripetal forces that drive agglomeration in the NEG models. The results highlight the presence of this forward linkage in the Spanish economy of the inter-war period. That is, we prove the existence of a direct relation between workers' localization decisions and the market potential of the host regions. In addition, the direct estimation of the values associated with key parameters in the NEG model allows us to simulate the migratory flows derived from different scenarios of the relative size of regions and the distances between them. We show that in Spain the power of attraction of the agglomerations grew as they increased in size, but the high elasticity estimated for the migration costs reduced the intensity of the migratory flows. This could help to explain the apparently low intensity of internal migrations in Spain until its upsurge during the 1920s. This also explains the geography of migrations in Spain during this period, which hardly affected the regions furthest from the large industrial agglomerations (i.e., regions such as Andalusia, Estremadura and Castile-La Mancha) but had an intense effect on the provinces nearest to the principal centres of industrial development.

Resum:

En aquest treball examinem si l'accés als mercats tingué una influència significativa en les eleccions migratòries dels emigrants interns espanyols en el període d'entreguerres. Realitzem un contrast estructural d'un model de la Nova Geografia Econòmica que es centra en el enllaç cap endavant que lliga les decisions migratòries dels treballadors amb la geografia de la producció industrial, una de les forces centrípetes que porten a l'aglomeració en els models NGE. Els nostres resultats destaquen la presència d'aquest enllaç en l'economia espanyola d'entreguerres. A més, l'estimació directa dels valors associats amb paràmetres clau en el model de NGE ens permet simular els fluxos migratoris que es deriven de diferents escenaris de dimensió relativa de les regions i de distàncies entre elles. Mostrem que el poder d'atracció de les aglomeracions augmentava amb la seva dimensió, però l'elevada elasticitat dels costos de migració reduïa la intensitat dels fluxos. Això ens ajudaria a explicar la baixa intensitat de les migracions internes a Espanya fins al salt que es dóna en la dècada dels 20. També explicaria la geografia de les migracions durant el període: les regions més allunyades de les grans aglomeracions industrials com ara Andalusia, Extremadura i Castella-La Manxa es veieren molt poc afectades però en canvi l'emigració fou intensa en aquelles regions més properes als principals centres de desenvolupament industrial.

Keywords: migrations, industrial agglomerations, market potential
JEL classifications: N63, N64, N93, F14, F15

1. Introduction

One of the most salient features of Spanish industrial economy on the eve of the Civil War (1936-1939) was its high geographical concentration. Provinces such as Barcelona concentrated almost 20% of the industrial workforce and produced more than 25% of Spanish industrial output in 1930. The seven more industrialized provinces out of a total of fifty provinces (Barcelona, Madrid, Biscay, Guipuzkoa, Asturias, Valencia and Saragossa) concentrated around 50% of the economically active industrial population.

In the last years, some studies have tried to analyze the determinants of this high concentration linking it to the process of integration of the Spanish market (Tirado et al. (2002) or Rosés (2003)). Increasing returns would have acted as an agglomerative force giving rise to a degree of regional industrial specialization higher than what purely factor endowment differences would have predicted. I.e. the existence of some initial comparative advantages would have been reinforced in a Hirschman-type cumulative causation process where scale economies interacted with the reduction on internal trade costs and favored the genesis of large industrial agglomerations.

The new economic geography literature has focused on the analysis of the mechanisms that govern these cumulative causation processes. The pattern of industrial geography would be in these models the result of the interaction of agglomeration and dispersion forces. In Krugman's (1991) seminal paper the centripetal forces are two: a backward linkage or demand externality (in the presence of transport costs and scale economies, regions with good access to markets are the preferred location for firms) and a forward linkage or cost externality (workers are attracted to large manufacturing areas because consumption incurs lower transportation costs and so the cost of living is lower in these areas).

Within this framework, the objective of this paper is to examine whether access to markets had a significant influence on migration choices of Spanish internal migrants in the interwar years through the estimation of the core equation in Crozet's (2003) new economic geography model that relates labour migrations to the geography of production through real wage differentials.

The exercise has a double interest. On the one hand, we perform a structural contrast of a NEG model in the spirit of Hanson (1998) that focuses on the forward linkage that links workers location choice with the geography of industrial production. Previous empirical historical work in the subject lacked sufficiently solid theoretical foundations and estimated reduced forms that were not derived structurally from a model (see Kim, 1995 or Tirado et al., 2002 for an example of this kind of approach) or was centered in the tests of the existence of the backward linkage (or home market effect) that explains firm locations choice by the importance of market access (Rosés, 2003 or Wolf, 2003).

On the other, our case study could shed new light in an important debate in Spanish economic history, that of the apparently low intensity of the interregional migration process in the first wave of industrialization during the 19th century. In fact, the increasing geographical concentration of industry was not accompanied by a high geographical mobility of the working force. The upsurge of internal migrations started relatively late (in the 1920s), and the majority of migrants did not come from the poorest regions in the South of the country (Andalusia, Estremadure and Castile-La Mancha). In this respect, the paper adds a new explanatory element to the ones traditionally employed by historians: the relationship between the migration dynamics and the special geographical structure of industry and its changes along the process of Spanish economic development.

With this purpose, the paper is organized as follows. First, we present the empirical evidence on market integration, geographical concentration of the industry and internal migrations in Spain during the period that goes from the middle of the 19th century (the beginning of modern growth) to the Civil war. Second, we specify an explanatory model of the interregional migratory fluxes that is derived structurally from a new economic geography model. Third, we explain the data used and the results obtained in the estimation of our empirical specification. Fourth, we use the estimated model to evaluate the main determinants of the migratory fluxes and to discuss its changes during the industrialization process. And finally, we conclude.

2. Market integration, industrial geography and migratory movements: Spain, 1856-1929

As is broadly accepted, modern economic growth began in Spain in the second half of the 19th century. So, along the years comprised between 1850 and 1936, the Spanish economy covered a long period in its process of economic development; a period that was dominated, like in the majority of European countries, by the increase in the share of industry in production. The particularly hard road to industrialization was accompanied by the domestic integration in the markets of goods and factors that favored the productive specialization of Spanish regions.

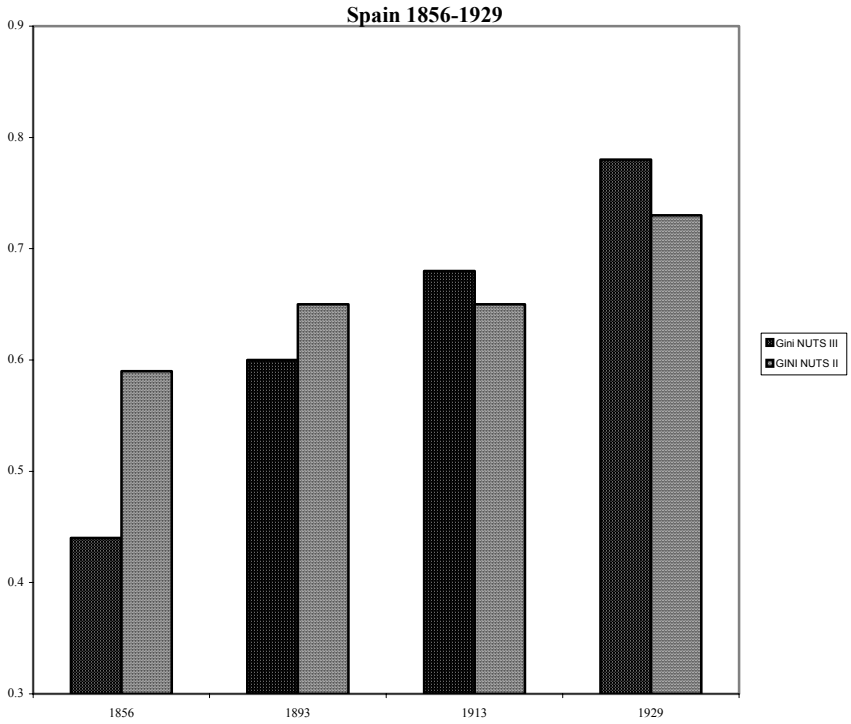
Even though domestic market integration has been dated back to the 18th century or the first half of the 19th century, a reduction in internal transport costs that could represent a real progress in market integration was not achieved until the construction of the railway network during the second half of the 19th century. The construction of this large transportation infrastructure was characterized by some distinctive features. The first was the intensity in the construction process. It took off with the 1855 Railway Act, by the end of the 1860s the main internal connections were already established and in mid-1890s the whole railway network had been finished. During Primo de Rivera's Dictatorship (1923-1930), there was a second impulse in railway's investment. However, in this case, most of the investment was devoted to the renovation of the fixed and mobile materials and not to an enlargement of the network (Herranz, 2001). The market integration process was reinforced by the impulse in capital market's integration with the unification of the monetary system (1869) and the expansion of the branches of the Central Bank, the *Banco de España*, since the first years of the Monarchic Restoration (1874).

So, the integration of both the goods and factor markets was a matter of fact by the end of the 19th century. This process has already been analyzed in different works that show the convergence along this period in the prices of commodities (GEHR, 1985, Barquín, 1997), labour (Rosés and Sánchez-Alonso, 2004, Silvestre, 2004) or capitals (Castañeda and Tafunell, 1993) between Spanish provinces.

The unification of the Spanish market coincided in time with a radical transformation of Spanish regional production distribution. Figure 1 gives some evidence on this process through the analysis of the aggregate levels in the geographical concentration of the industry during this period, measured through a synthetic indicator, the Gini location

coefficient. There was a substantial increase in the geographical concentration of Spanish industry. As we can observe in Table 1, these changes not only occurred at the aggregate level but also in almost all the industrial sectors in which we can disaggregate industrial production. As far as a specific location of agglomerations is concerned, Barcelona became the main industrial agglomeration in Spain. Catalonia´s share in Spanish industrial output grew from 25% in 1856 to 35% in 1893.

Figure 1
Gini indexes of geographical concentration of industry
Spain 1856-1929



Source.- Paluzie et al. (2004)

Table 1
Gini indexes of geographical concentration by sector

NUTSIII	1856	1893	1907	1913	1929
Alimentary	0.34	0.43	0.45	0.55	0.65
Textiles Leather	0.73	0.87	0.88	0.91	0.94
Metallurgy	0.71	0.79	0.78	0.83	0.89
Chemistry	0.61	0.66	0.69	0.73	0.87
Paper	0.76	0.70	0.69	0.75	0.85
Glass and Ceramics	0.48	0.54	0.58	0.66	0.78
Wood	0.86	0.72	0.67	0.67	0.65

Source.- Paluzie et al. (2004).

Tirado et al. (2002) tried to analyze the determinants of the industrial specialization of Spanish provinces and its changes along the period 1856-1893. In the line of Kim (1995), these authors regressed different explanatory variables proxying for industrial characteristics that could influence industrial location, on the industrial intensity indices by provinces. Their analysis showed the importance of two kind of variables. On the one hand, the relative endowment variables, specially human capital. On the other, those variables linked to the existence of scale economies, captured through average firm size and the market potential of each province. Finally, the comparative analysis of the determinants in industrial specialization in two points of time, 1856 and 1893, showed that, as economic integration progressed, the explanatory power of the scale economies variables was increased. This analysis was the first to interpret the evolution of Spanish industrial geography during the 19th century in the light of the new economic geography, but had the limitation of estimating an empirical specification that was not derived structurally from a NEG model.

This paper tries to look deeply into this topic, but analyzing the next step in Spanish economic development, the first third of the XXth century, and using a test more grounded in the theory. During these years, the integration of the domestic markets was reinforced. As far as the geographical concentration of industries is concerned it is worth noting that it continued to follow an increasing tendency (Figure 1 and Table 1). However, the location of the main productive centers began to show signs of important changes. Catalonia's weight in Spanish industry, aside from some exceptional situations like WWI or the first years of the 2nd Republic, reached a standstill at the end of the 19th century.[1] As for the province of Barcelona, 1913 and 1929 data show that its weight in Spanish industry stabilized: in 1913, this province's contribution to Spanish industrial production was 27,63%; in 1929 it was 28,55%. Its relative growth, quite remarkable during the period 1856-1893, had stopped. On the contrary, a new group of territories began moving forward in Spanish industrial structure. Among them, the Basque provinces of Guipuzkoa and Biscay, Saragossa, Valencia and Madrid, the capital city of the Spanish state, stand out (Betrán, 1999).

[1] In this respect, historians have documented the transitory expansion of several sectors in Catalonia due to the extraordinary demand from countries engaged in WWI. This would be the case of sectors like leather tanning and wool textiles. As for the growth in Catalonia's weight during the first years of the Republic, Palafox (1992) attributes it to the crisis in the sector of basic goods and the change in expectations generated by the new regime but not to a progress in the production of the sectors located in Catalonia.

Despite the growth in productive specialization and the progress of integration in the markets of goods and factors, the process did not imply the arising of high migratory movements between Spanish regions until the 1920s. In this sense, as Boyer and Hatton (1997) state for the case of the labor market, wage convergence is, in fact, possible in the absence of mobility on the part of the labor factor if the demand and supply of labour tend towards equality. This seems to have been the Spanish case during the period 1860-1920, a period where a reduction in regional wage differences coexisted with the low mobility of the labor factor (Rosés and Sánchez-Alonso, 2004). See Table 2

Table 2
Permanent internal migrations, 1877-1930

	Migrations	**Share of total population (%)**
1877-1887	369424	2.2
1888-1900	428253	2.0
1901-1910	565830	2.9
1911-1920	583123	2.8
1921-1930	968581	4.3

Source.- Silvestre (2004)

This lag in the growth of internal migrations in Spain could be explained, in principle, by the late industrialization of the country. Economic historians have shown that European mass emigration during the half century or so prior to World War I was positively correlated to industrialization and structural change (Hatton and Williamson, 1994, 1998, O´Rourke and Williamson, 1999, Chiswick and Hatton, 2003). Similarly, despite the problems related to definition and measurement, internal migrations in many northern and central European countries would have probably increased during the nineteenth century (Baines, 1994).[2] In the case of England and Wales, Boyer (1997) and Boyer and Hatton (1997) show that rates of internal migration were high during the second half of the nineteenth century.[3]

[2] Following the long-run evolution of internal emigration, an inverted U-shaped pattern has also been suggested. See Baines (1994) for references to different countries.
[3] Boyer (1997) and Boyer and Hatton (1997) demonstrate that internal migrants were driven by economic forces –wage and expected income gaps and costs of moving and job search-.

The long-term evolution of internal migrations in Spain was similar to other Southern European countries such as Italy, characterized by their late industrialization experiences. After showing a slow rising trend, the Italian rate of internal migration increased sharply during the 1920s, due in part to the fall in overseas emigration provoked by the disruption of the international labor market (Treves, 1976, Sori, 1979).[4] In the Spanish case, despite the fact that the slow but continous growth in internal migrations could have started in the middle of the 19th century, towards the end of the century the majority of Spanish migrants emigrated overseas, mainly to Argentina, Brazil, Cuba and Uruguay (Sánchez-Alonso, 2000a, 2000b). Nevertheless, the pull of internal destinations increased over time until it peaked in the 1920s, precisely when overseas emigration had lost its force.

Two main groups of interpretations of previous low migration rates have been proposed (Silvestre, 2004). On the one hand, supply-based explanations have stressed the backwardness of agriculture and its limitations to release labor. On the other, in line with Sicsic´s (1992) analysis of the French case, demand-based explanations have focused on the lack of pull from the industrial and urban centres.

But in any case, an interesting phenomena in the Spanish case is the fact that migration rates were extremely low in the poorest and backward regions in the South such as Andalusia, Castile-La Mancha and Estremadure. So the origin of Spanish emigrants at the end of the 19th century and beginning of the 20th century was basically the Northern half of the country with the sole exception of some Mediterranean coastal regions. As for inmigration this was concentrated in two provinces, Madrid and Barcelona. By 1930, the provinces of Madrid and Barcelona accounted for 45.97 per cent of the total stock of 2,189,450 *Born in Another Province*, with Seville, 4.36 per cent, and Biscay, 4.29 per cent, the other two large centres of attraction, lagging far behind. The fifth destination in terms of importance was Valencia, 3.07 per cent, and thereafter the pull of each destination gradually fell away (Silvestre, 2004).

---

[4] Italian internal migrations continued rising at high rates during the 1930s, despite restrictive migratory policies (Treves, 1976).

[6] Some works for England and Wales used the existing stock at a given date rather than the flows (a choice that we could also have made here since Spanish censuses record the aggregate stock of *Born of Another Province* population since 1877). However, as Boyer and Hatton (1997) indicate, this method aims to explain the accumulation of migrants in a given location on the basis of the value of specific independent variables at a given moment in time and, therefore, the result may be biased.

Summarizing, Spanish industry increased its geographical concentration along the process of integration of the internal markets of goods and factors. However, this increasing concentration was not accompanied, at least until the 1920's by high internal migration rates. Besides, the origins and destinations of migration flows seem to have an interesting geographical distribution. We turn next to the presentation of a NEG theoretical model that links these two elements: the genesis of industrial agglomerations and workers location decisions.

3. The model

We consider a NEG regional framework developed by Crozet (2004) that combines Helpman (1998) and Krugman (1991) frameworks. The model is not fully developed, our main purpose being that of estimating an structural equation that links worker's migrations decisions with market access we will present the main features of the model and the price index and migration equations from which this equation is derived, and will not describe the nature of the final equilibrium.

The economy has three sectors, a perfectly competitive agriculture, a monopolistically competitive industry and a monopolistically competitive non traded services. Each of these sectors employs a single factor, farmers in the agricultural sector and workers in the industry and services sector. Each of these sector-specific factors (farmers and workers) is in fixed supply.

Let there be one country composed of R regions. The country has a fixed supply of L^A farmers, and each region is endowed with an equal share of the country agricultural labour force, this population is assumed to be completely immobile between regions. On the contrary, the labour force used in manufacturing and services is mobile over time and at any point in time we denote region r supply of mobile workers by L_r^M.

All regions have identical preferences and technology. The agricultural sector is perfectly competitive and produces a homogeneous good under constant returns to scale, which is traded between the regions at no cost. Both industry and services are monopolistically competitive sectors that produce a variety of goods under increasing

returns to scale. The manufactured goods are subject to iceberg transport costs; we assume a fraction of the good melts away in transportation so that T_{rs} >1 units of the good have to be exported from region r to deliver one unit to region s. This transport cost is assumed to be an increasing function of the distance between the two regions d_{rs}:

$$T_{rs} = Bd_{rs}^{\delta} \tag{1}$$

Services are produced locally and not traded.

3.1 Consumers

All individuals in this economy share a utility function of the form:

$$U = I^{\mu} \cdot S^{\phi} \cdot A^{1-\mu-\phi} \tag{2}$$

in which μ, ϕ and (1 - μ - ϕ) are respectively, expenditure shares for the industrial goods, services and the agricultural good. A is the consumption of the homogeneous agricultural good. I is an aggregate of the industrial varieties defined by a CES function of the form:

$$I = \left[\int_0^{n_I} x(i)^{\rho_I} di \right]^{1/\rho_I} \quad , \qquad 0<\rho_I<1 \tag{3}$$

where $x(i)$ denotes the consumption of each available variety and n_I is the number of available varieties in the economy composed by R regions ($n_I = \sum_{r=1}^{R} n_{Ir}$). If we set σ_I = 1/(1-ρ_I), then σ_I represents the elasticity of substitution between any two industrial varieties. S is also an aggregate of service varieties defined by a CES function of the form:

$$S = \left[\int_0^{n_S} x'(i)^{\rho_S} di \right]^{1/\rho_S} \quad , \ 0<\rho_S<1 \tag{4}$$

Consumers cannot import service varieties from other regions; therefore, the number of available service varieties in region r is the number of varieties produced within the region (n_{sr}). Setting $\sigma_S = 1/(1-\rho_S)$, then σ_S represents the elasticity of substitution between any two service varieties.

Consumers maximize utility under the budget constraint:

$$Y = p^A A + \int_0^{n_I} p_I(i)x(i)di + \int_0^{n_S} p_S(i)x'(i)di$$

(5)

Solving the consumer's problem yields the following demand function in region r of an industrial variety produced in s (all varieties produced in the same region are symmetric):

$$x_r(j) = \mu Y_r (p_{Is} T_{sr})^{-\sigma_I} P_{Ir}^{\sigma_I - 1}$$

(6)

where

$$P_{Ir} = \left[\sum_{s=1}^{R} n_{Is} (p_{Is} T_{sr})^{1-\sigma_I} \right]^{1/1-\sigma_I} = \left[\sum_{s=1}^{R} n_{Is} (Bd_{rs}^{\delta} p_{Is})^{1-\sigma_I} \right]^{1/1-\sigma_I}$$

(7)

is the industrial price index in region s and measures the minimum cost of purchasing a unit of the composite index I of manufacturing goods, so it can be thought of as an expenditure function.

While the price index of the aggregate of service goods in region r is:

$$P_{Sr} = (n_{Sr})^{1/1-\sigma_S} \cdot p_{Sr}$$

(8)

3.2 Producers

Both industrial goods and services are monopolistically competitive industries. The production of each variety requires F units of mobile workers as a fixed cost and l_q units as a variable input, with $l_q = c.q,$ so the labour input requirement to produce a quantity q of any industrial and services variety at any given location is respectively:

$$l^I = F^I + c^I q^I$$

(9)

$$l^s = F^S + c^S q^S$$

(10)

Because of increasing returns to scale, the preference for variety by consumers and the unlimited number of potential varieties of manufactured and service goods, each variety will be produced by a single, specialized firm in only one region, so that the number of firms is the same as the number of available varieties. If n_{Ir} and n_{Sr} denote the number of varieties of good I and S produced in region r, the total employment in each industry or region r is:

$$L_r^I = n_{Ir}(c^I q_r^I + F^I) \text{ and } L_r^S = n_{Sr}(c^S q_r^S + F^S)$$

(11)

All producers have the same profit-maximizing price, which is a constant markup over marginal costs. Denoting w_r the mobile workers'wage in region r, the *fob* price of a variety produced in region r is:

$$p_{Ir} = \frac{\sigma_I}{\sigma_I - 1} c^I w_r \text{ and } p_{Sr} = \frac{\sigma_S}{\sigma_S - 1} c^S w_r$$

(12)

Equilibrium in the production side requires that the firms profits equal zero in each region so that no firm has interest in moving to the other region. The zero profit condition implies that the equilibrium output of any active firm is:

$$q^{I*} = \frac{F^I(\sigma_I - 1)}{c^I} \text{ and } q^{S*} = \frac{F^S(\sigma_S - 1)}{c^S}$$

(13)

Using (11) and (13) we obtain the following expressions for the number of firms in each region:

$$n_{Ir} = \frac{L_r^I}{F^I \sigma_I} \quad \text{and} \quad n_{Sr} = \frac{L_r^S}{F^S \sigma_S} \tag{14}$$

3.3 The price index of manufactures as a market potential function

The real wage of mobile workers is equal to the nominal wage deflated by the cost of living index in region *r*:

$$\omega_r = \frac{w_r}{P_{Ir}^{\mu} P_{Sr}^{\phi} p_{A_r}^{1-\mu-\phi}} \tag{15}$$

Recalling that the agricultural good is freely tradable and its price can be normalized to one, the real wage equation of mobile workers becomes:

$$\omega_r = \frac{w_r}{P_{Ir}^{\mu} P_{Sr}^{\phi}} \tag{16}$$

where P_{Ir} and P_{Sr} are respectively the price indexes of the industrial and service goods in region *r* that we obtained from the consumer's optimization problem and that can now be written more conveniently using the expression for the number of firms (equation (14)):

$$P_{Ir} = \left[\sum_{s=1}^{R} n_{Is} (Bd_{rs}^{\delta} p_{Is})^{1-\sigma_I} \right]^{1/1-\sigma_I} = \left[\sum_{s=1}^{R} \frac{L_r^{\ I}}{F^I \sigma_I} (Bd_{rs}^{\delta} p_{Is})^{1-\sigma_I} \right]^{1/1-\sigma_I} \tag{17}$$

$$P_{Sr} = (n_{Sr})^{1/1-\sigma_S} \cdot p_{Sr} = \left(\frac{L_r^S}{F^S \sigma_S} \right)^{1/1-\sigma_S} \cdot p_{Sr} \tag{18}$$

Equation (17), the manufacturing price index equation, contains an important relationship. It says that other things equal, the price index in a region will tend to be lower, the higher the share of manufacturing that is concentrated in this region or in regions that are close, simply because a smaller proportion of this region's manufacturing consumption bears transport costs. In the NEG, this effect is called the *price-index effect* or *forward linkage*. In Crozet's model, which adds a third sector, the services sector, the price index of services (equation (18)) would, similarly, be lower in regions offering a relatively high number of service varieties. Considering the real wage equation (16) and supposing that the nominal wages in all regions were similar, workers' real income would be lower in remote regions where the price index is higher or in regions with a low density of services. The price index of manufactures can therefore be considered as the inverse of a market potential function: it exhibits a sum of market sizes in all regions weighted by distances.

3.4 Migration choice

Crozet (2004) specification of the migration equation in the model follows that of Tabuchi and Thisse (2002). Consider a mobile worker k from region s and his location choice among R regions (including s). His migration choice results from a comparison of the perceived quality of life in the various locations. For empirical convenience, the migration decision is designed to maximize the following objective function:

$$\pi^{k}_{sr,t} = V^{k}_{sr,t} + \varepsilon^{k}_{r} = \ln\left[\omega_{r,t}\rho_{r,t-1}[d_{rs}(1+bFR_{rs})]^{-\lambda}\right] + \varepsilon^{k}_{r} \qquad (19)$$

where $\rho_{r,t}$ is the employment probability for an immigrant in region r at date t and $[d_{rs}(1+bFR_{rs})]^{-\lambda}$ is a migration cost which increases with the distance between home and host regions. λ and b are strictly positive coefficients, and FR_{rs} is a dummy variable indicating whether regions r and s share a common border. ε_r^k is a stochastic component capturing worker's k personal perception of the characteristics of region r. To avoid endogeneity problems in the empirical application, migration choices at date t are determined from a comparison of V_{sr}^{k} across regions at date t-1. So, worker k will choose to locate in region r if $V_{sr,t-1}^{k} > V_{sj,t-1}^{k}$, $\forall\ j \neq r$. The probability of choosing region r is given by the logit function:

$$P(M_{sr,t}) = e^{V^k sr,t-1} / \sum_{j=1}^{R} e^{V^k sj,t-1} \tag{20}$$

The expected migration flow between regions s and r is $L_{s,t}P(M_{sr,t})$. Similarly, the total outflow from s is $L_{s,t}[1-P(M_{ss},t)]$, the share of emigrants from region s choosing to go to region r is:

$$\frac{migr_{srt}}{\sum_{r' \neq s} migr_{sr't}} = \frac{e^{V^k sr,t-1}}{\sum_{j=1}^{R} e^{V^k sj,t-1} - e^{V^k_{ss,t-1}}} \tag{21}$$

Using equations (12), (15), (17) and (18) and the definition of $V_{sr,t}^{k}$, this share can be written as:

$$\ln\left(\frac{migr_{srt}}{\sum_{r' \neq s} migr_{sr't}}\right) = \ln\left[\left(L^S_{r(t-1)}\right)^{\frac{\phi}{\sigma S - 1}}\right] + \ln\left[\sum_{s=1}^{s=R} L^I_{s(t-1)} \cdot \left(w_{k(t-1)} \cdot \left(d_{rs}\right)^{\delta}\right)^{1-\sigma_I}\right]^{\frac{\mu}{\sigma_I - 1}} + \ln\left[w^{1-\phi}_{r(t-1)} \rho_{r(t-1)}\right] + \ln\left[d_{rs}(1 + bFR_{rs})\right]^{-\lambda} + \tilde{a}_{s(t-1)}$$

(22)

being:

$$\tilde{a}_{s(t-1)} = -\ln\left(\sum_{j=1}^{R} e^{V^k sj,t-1} - e^{V^k_{ss,t-1}}\right)$$

Equation (22) captures the trade-off faced by potential migrants that have to choose among several possible locations. The variable in the left-hand side of the equation is the share of migrants from a given region who have decided to move to region r. The first two first terms in the right-hand of the equation denote regions r's access to markets. The first is the price index for non-traded service varieties in region r. The second is the price index for manufactured goods in region r and is the most important. It corresponds to a market potential function and captures the forward linkage of the NEG models. Through this term, labour migrations are related to the location of industrial activities. The third term represents the expected wage in the region that is increasing with the host's nominal wage and the probability of being employed in this region. And finally, the fourth term captures the impact of bilateral distance on migration flows and can be interpreted as a measure of mobility costs. This is the relationship that centers the empirical analysis that is carried out in the next section.

4. Data and empirical analysis

For our empirical analysis of internal migrations we used the sources and data collection procedure described in Silvestre (2004). The main source on migrations prior to the 1960s is the information on population *Born in Another Province* recorded in the *Spanish Population Census(es)* (CPE). This information on "lifetime" migrants and an inter-census survival coefficient are used to estimate the inter-census flow of migrants from each origin to each destination. This procedure has been used in previous studies on migration in nineteenth-century England and Wales by Boyer (1997) and Boyer and Hatton (1997). The origin of the *Born in Another Province* population is given only in the 1920 and 1930 censuses, and therefore it is not possible to estimate out-migrants flows before 1920s.[6]

Given the high level of concentration of migrant stock in Spain around 1930, we decided to analyse migration from each of the origins towards the twelve destinations with the greatest pull. These flows in fact accounted for 70.33% of total migration.[7] We have 492 records of positive migratory flows in the nineteen twenties expressed in terms of a rate, that is, divided by the total population at the beginning of the decade.

To assess wages in the various provinces, we used the industrial wages weighted by sectors in 1920 on the basis of the *Statistics for Wages and Days worked in the period 1914-1930*. For the compilation of the data for the working population for each province (both total and by sectors) we used the information provided in the *Spanish Population Census* of 1920. We calculated inter-provincial distances on the basis of the railway system existing in 1919 and assumed that the mean internal distance of a Spanish province is 75 km.

In the empirical analysis, furthermore, we calculated the expected wage in destination *r* on the basis of the existing wage. The reason for this is that we did not have information on unemployment, either at aggregate or at provincial level, for the period under study.

[7] Apart from big destinations such as Madrid, Barcelona, Seville, Vizcaya and Valencia, other intermediate destinations such as Guipuzcoa, Zaragoza, Valladolid and Santander in the north, and Córdoba, Cádiz and Alicante, in the south, are also included. Assessing a larger number of destinations means a substantial increase in the number of negative migratory flows.

However there are no historiographical records of major industrial unemployment in the nineteen twenties.

We estimated two versions of the structural equation derived in the above section. The first is a reduced form equivalent to a gravity equation. Here, in addition to the nominal wage in the host regions, the migratory flows between two regions increase with the size of the host region and decrease with the distance between the two locations. The aim is to provide an initial empirical estimation of the attraction exerted by large regions on migrants, and thus to be able to assess the explanatory power of the complete functional form derived from the NEG model.

The gravity equation is:

$$\log\left(\frac{migr_{srt}}{\sum_{r'\neq s} migr_{sr't}}\right) = \beta_1 \cdot \log\left(L_{r(t-1)}\right) + \beta_2 \cdot \log\left(w_{r(t-1)}\right) + \beta_3 \cdot \log\left(d_{rs}\right) + \beta_4 \cdot FR_{rs} + \alpha_s + v_{rst}$$

(23)

We estimated two alternative versions of equation 23 (table 3), both using ordinary least squares and including fixed effects for each region of origin. The difference between the versions is that in the second one we broke down the total working population in the host region into its three components: agricultural, industrial, and services.

The explanatory power of the gravity equation is high in both cases; the coefficients estimated are significant and present the expected signs. The influence of distance on the migratory flows remains negative. These flows, in addition, are stronger in the case of neighbouring provinces. Higher wages in the host region encourage migration. Finally, we observe a significant, positive influence of the size of the host region on migratory flows, confirming the existence of the expected centripetal force in the determination of the bilateral migratory flows. Differentiating between the information presented in the two columns allows a more precise estimation of the phenomenon.

In the first case, the estimation does not distinguish between the size of the three productive sectors, and so in this gravity equation the size of the host region variable simply reflects its scale. But in the context of NEG models, the positive relation

between the migratory flow and the size of the host region has other causes. Specifically, it is associated with the market potential of the regions, which will be transferred to the price index observed there. So, in large regions a wider variety of goods are offered in markets operating in imperfect competition, leading to lower prices. This is why migrations are expected to increase in line with the size of the regions. But this should only be the case in relation to the size of the sectors that operate in imperfect competition, that is, industry and services. The estimation presented in the second column confirms this: there is a significant positive relation between the volume of migration and the size of the industrial and services sector in the host regions, but not between the volume of migration and the size of the agricultural sector.

Table 3

Gravity Estimation.Ordinary Least Squares/Fixed Effect

Total employment	1.531 (0.000)	
Agricultural employment		-0.347 (0.000)
Industrial employment		1.006 (0.000)
Service employment		0.628 (0.000)
Wage	5.583 (0.000)	1.616 (0.002)
Distance	-2.190 (0.000)	-1.981 (0.000)
Border	0.230 (0.301)	0.624 (0.001)
N	492	492
R^2-adj.	0.676	0.749
Akaike	3.227	2.977
Schwartz	3.261	3.028

Notes: In brackets, the likelihood of rejecting the null hypothesis that the estimated parameter is not significant. Consistent estimation of standard errors using White's method.

Using Akaike's or Schwartz's criterion to compare the models, we see that the one that allows an interpretation of the determinants of migratory movements more closely tied to the theoretical NEG model offers better empirical results than the generic gravity equation. So the exercise suggests a positive relation between the bilateral migratory flows and the size of the industrial and services sector in the host regions, as the forward linkage derived from the NEG model predicts.

In any case, after demonstrating the apparent explanatory power of the linkages highlighted by the NEG models, we now present an estimation that will reflect more accurately the functional form relating the migratory movement with the market potential derived directly from the NEG model. This is the aim of equation (24). As can be seen, the relation fully reflects the market potential of the regions by considering that their production is also sold in neighbouring regions. Furthermore, it allows a direct

estimation of key parameters in the NEG models such as elasticities of substitution, transport costs and migration costs.

$$\log\left(\frac{migr_{srt}}{\sum_{r'\neq s} migr_{sr't}}\right) = \frac{\mu}{\sigma_I - 1}\cdot\log\left(\sum_{s=1}^{s=R} L^I_{s(t-1)}\cdot\left(w_{s(t-1)}\cdot\left(d_{rs}\right)^{\delta}\right)^{1-\sigma_I}\right) + \alpha_1\cdot\log\left(L^s_{r(t-1)}\right) +$$

$$+\alpha_2\cdot\log\left(w_{r(t-1)}\right) - \lambda\cdot\log\left(d_{rs}\cdot\left(1 - b\cdot FR_{rs}\right)\right) + \vartheta_s + v_{rst} \qquad (24)$$

The equation presents an estimation of the trade-off facing a potential migrant who has to choose between the possible destinations as proposed in equation (22). That is to say, the endogenous variable is the proportion of emigrants from a specific region *s* who decide to migrate to region *r*. The first two explanatory variables reflect aspects linked to the market potential of the host regions. The first (the more important one) corresponds to the market potential deriving from the production of manufactured goods, and is interpreted as the inverse of the price index of manufactured goods in region *r*. As these are traded goods, the market potential considers the market size of neighbouring regions. The second variable reflects the market potential derived from the production of services which are not traded outside the region. The third explanatory variable is the nominal wage in the host region. Finally, the fourth is the cost of migration, which increases with distance and decreases if there is a common border between the regions in question.

Table 4 shows the expected values for the estimated coefficients, which are consistent with the theoretical NEG model presented in the above section.

Table 4
Coefficients and expected values

Coefficients		**Expected values**
σ_I	Elasticity of substitution-Sector I	$1< \sigma_I$
μ	Share of consumer expenditure on good I	μ=0.4 or 0.6
δ	Elasticity of trade costs to distance	$0< \delta$
$\alpha_1 = \Phi/(\sigma_s-1)$	Influence of local service supply	$0< \alpha_1 < 1$
α_2	Influence of expected wage	$0 < \alpha_2$
λ	Distance elasticity of migration cost	$0 < \lambda$
b	Influence of provincial borders on migration	$b > 0$
	No black hole condition	$(\sigma_I-1)/ \sigma_I > \mu$

Before presenting the results of the estimation of equation 24, we should note that it is not possible to offer a joint estimation of parameters μ and σ_I. For this reason, following standard practice in exercises of this kind, we consider μ (the proportion of total share of consumer expenditure on manufactured goods) as an exogenous parameter and grant it a reasonable value: 0.4[8]. In addition, to compare the robustness of the results with the value we propose for μ, in Table 5 we also present the results obtained by supposing that the share of expenditure on manufactured goods is 0.6. In these conditions, we can perform a complete estimation of equation 24 by non-linear least squares. The results are shown in Table 5.

[8] In Spain, in 1930, the distribution of the working population by sectors was: 40% industry, 30% services and 30% agriculture.

Table 5
NEG Framework Estimation.Non-Linear Least Squares/Fixed Effects

	Model 1 $\mu = 0.4$	**Model 2** $\mu = 0.6$
σ_I (elasticity of substitution)	2.810 (0.021)	4.173 (0.009)
δ (transport cost)	1.794 (0.000)	2.119 (0.000)
α_1 (service employment)	0.819 (0.041)	0.815 (0.037)
α_2 (wage)	2.061 (0.000)	2.152 (0.000)
λ (migration cost)	1.757 (0.034)	1.754 (0.029)
b (border)	0.815 (0.003)	0.821 (0.007)
N	492	492
R^2-adj.	0.615	0.613
Akaike	3.259	3.262
Schwartz	3.293	3.296

Notes: In brackets, the likelihood of rejecting the null hypothesis that the estimated parameter is not significant. Consistent estimation of standard errors using White's method

Observe how all the parameters converge towards values that are consistent with the basic theoretical model. In addition, the results are not greatly affected by the value assigned to parameter μ. The goodness of fit in general terms is high and is not vastly inferior to that obtained with the gravity model presented above, despite the greater restrictions imposed.

Unlike the gravity model, the estimation of equation (24) offers a structural estimation of the parameters that define the function of market potential in the NEG model. In this regard the results obtained are very positive. All the parameters that capture the price index associated to the CES demand function have the expected signs and are highly significant. The values obtained by the elasticities of substitution between pairs of varieties of manufactured products (σ_I) are significantly larger than 1, between 2.8 and 4.2. The values obtained seem to be consistent with those estimated in other recent NEG studies (Hanson, 1998, Head and Ries, 2001). There is also a strong positive influence of service employment (the estimated value of the coefficient α_1 is 0.8). Setting Φ (the share of services in consumption) equal to 0.3, the computed value of σ_s would be 1.3,

which is consistent with the constraints imposed by the theory and reflects a high level of product differentiation in the services sector.

As for the elasticity of trade costs to distance it is strictly positive and relatively high (the estimated values of δ are comprised between 1.8 and 2.1). For this reason, the complete elasticity to transport costs ($\delta*(1-\sigma_I)$) is very high (3.2 to 6.5), indicating that in nineteen twenties Spain the market potential of a region was determined mainly by the size of the local market and was barely affected by that of neighbouring regions. These values are much higher than contemporary values estimates by Crozet (2004).

Note, also, that with the estimated coefficients, the no black hole condition that permits the existence of a dispersed equilibrium holds. That is, long-term equilibrium does not necessarily imply the total concentration of industrial production (and the industrial population) in a single region. In both estimations $(\sigma_I-1)/\sigma_I > \mu$. This is consistent with what we know of Spain's industrial geography at that time.

The coefficient associated to the expected wage in the host region (α_2) is highly significant and takes the expected sign. Its value is close to that estimated with the gravity model in the second specification. Finally, the coefficients that reflect the importance of migration costs (λ and b) are highly significant and take the expected signs. λ is very high as compared to Crozet (2004) results, its estimated value is around 1.75.

So as in the case of the predictions derived from the NEG model, we conclude that Spanish workers' decisions to migrate were influenced by the market potential of the host regions. That is, Spanish workers were attracted by industrial agglomerations. The internal migratory flows in nineteen twenties Spain reflect one of the main forces towards agglomeration that the NEG models propose: the forward linkage relating workers' decisions to migrate with the geography of the supply of goods.

Nevertheless, from the parameters estimated we also deduce that this potential was closely linked to the size of the host region, since the high complete elasticity of transport costs meant that the size of neighbouring regions had a low impact on the

market potential of the host region. Furthermore, the high migration costs, proxied by the distances, and the absence of borders, were a key factor in the workers' choice of destination during the long first stage of the development of Spanish industry.

5. Agglomerations and internal migration: Spain, 1887 and 1920

Our results may also contribute to the analysis of two of the most important debates in Spanish economic history: why the acceleration in internal migration came so late, and why, once it was underway, (Table 2), the volume of migration from the poorest regions remained comparatively low.[9] To answer the first question, by focusing on demand-based factors, recent studies have stressed the weakness of economic growth and industrial and services demand before the 1920s (particularly, Prados de la Escosura, 1997 and Silvestre, 2004).[10] As for the second, by using a supply-based approach, several authors have focused on the pull of some southern provinces because of the existence of a highly worker intensive agricultural system, offering stable if poorly paid jobs throughout the year (Bernal, 1985, Gallego, 2001, Simpson, 1995a, 1995b, Carmona and Simpson, 2003). In fact, some of the southern provinces had a considerable pull on rural temporary short-distance migrants who found agricultural jobs, specially in large states.

[9] The great migration from the southern half of the country, to destinations both inside and outside Spain, would arrive during the 1960s and the early 1970s.

[10] See also Nadal (1975) and Tortella (1994), although their interpretation is more ambiguous. Both authors do not distinguish clearly between the lack of pull of urban and industrial areas and the lack of push of the countryside.

Nonetheless, we can complement the explanations from the demand side –the slow industrialization process- and from the supply side -the substitution of permanent long-distance migration by short-term, short-distance migration- by considering the forward linkage proposed in the NEG models. This linkage may have reinforced the migratory trend throughout the process of geographical concentration of industry. Indeed, this acceleration may have been particularly marked in the case of the regions closest to the industrial agglomerations. In this section we compare two time points which differ substantially in terms of migratory intensity – 1920 and 1887 – in order to determine whether the New Economic Geography can explain a part of the increase in migration between the two dates.

Crozet (2004) derives a migratory function by manipulating equations (19) and (20) and assuming a two region economy where the two regions just differ in population size but have identical wages, shares of services, ... The share of emigrants in the total population of region *s* would be:

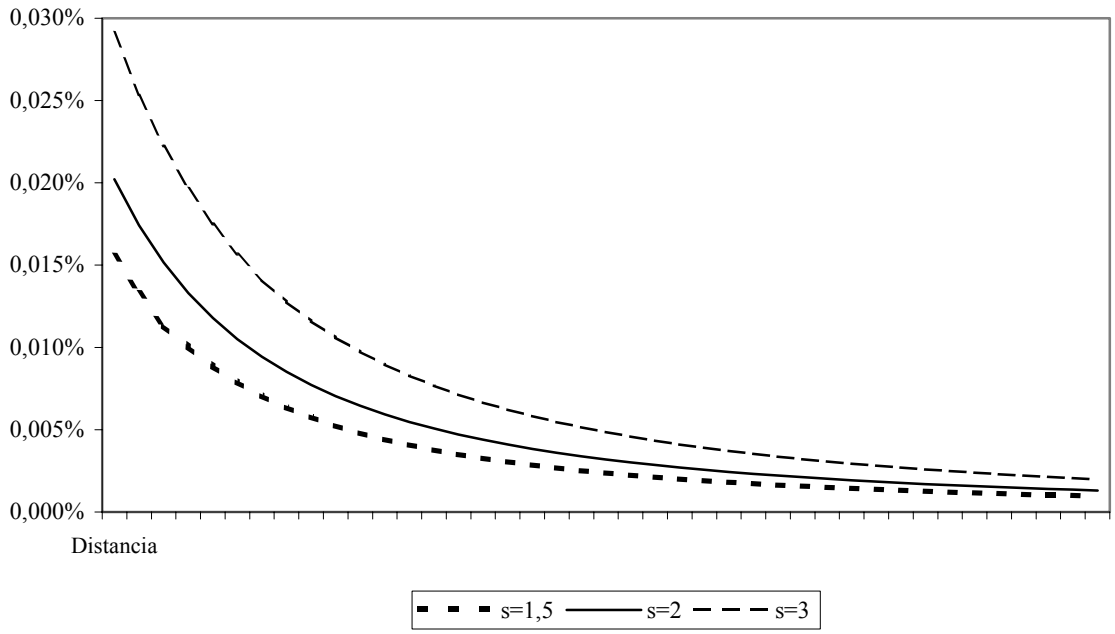
$$\frac{Migr_{sr}}{L_s} = \frac{B}{B + (d_{ij} \cdot (1+b))^{\lambda}}; \qquad B = \frac{L_r^{\alpha 1}\,(L_r(d_{rr}^{\delta(1-\sigma)}) + L_s(d_{rs}{}^{\delta(1-\sigma)}))^{\mu/(\sigma-1)}}{L_s^{\alpha 1}\,(L_s(d_{ss}^{\delta(1-\sigma)}) + L_r(d_{rs}{}^{\delta(1-\sigma)}))^{\mu/(\sigma-1)}}$$

(25)

Two important relationships stand out in this equation: first, the volume of migration between two regions would be greater, the larger the size difference between them. Second, the distance between two regions may generate either one of two contrasting effects: first, long distances between the regions increase the expected benefits of migration, since migrants will be able to buy manufactured products at prices that are lower the greater the distance between the home and host regions and hence the forward linkage is reinforced; second, the need to travel long distances raises migration costs, causing the opposite effect.

With the coefficients estimated for equation (24) we can produce a simulation of the migratory flows expected between two regions of different sizes and separated by different distances. This information is shown in figure 1.

Figure 1
Implicit migration rates



This simulation of the migratory flows envisages two regions of different sizes in terms of industrial employment, one being 1.5, 2, or 3 times larger than the other, and separated by distances ranging from 100 to 500 kilometres. The figure shows that the migratory flows are greater the larger the size differences between the regions. In addition, the migratory flows are lower when inter-regional distances are greater, indicating that the higher migration costs derived from the increase in the distance between regions more than compensates for the positive effect of greater price differentials between the regions at greater distances.

Figure 1 highlights a factor that may go a long way to explaining the low intensity of migratory flows inside Spain. The great distances existing between some Spanish regions determined that the benefits derived from migration were clearly eroded by the costs. This may well be key to an understanding of the low internal migratory flows during the first stage of the process of industrialization in Spain, and to gain a clearer idea of the routes that they followed. The southern regions were the furthest away from the great industrial agglomerations, especially Barcelona, and for this reason migration from the south was only on a small scale. And from the point of view of destinations,

the migratory flows were concentrated in the two large industrial areas of Barcelona and Madrid.

However, the changes in Spain's industrial landscape in the period between the late nineteenth century and the nineteen twenties may have helped to accelerate internal migratory flows, especially from the regions nearest the agglomerations. First, the mean distance that a Spanish worker had to cover to reach an area 1.5, 2, or 3 times larger than his own fell markedly during this period; so the relative growth of important new industrial centres during the first third of the twentieth century seems to have been a trigger for internal migrations. Second, the growing concentration of Spanish industry meant that the differences in size between the provinces also increased at this time. Both these factors contributed to increasing the rate of migration.

Tables 6 and 7 compare data on these issues at the end of the nineteenth century (1887) and the period analysed in this article (1920-1930). Table 6 presents data on the distance that a Spanish worker had to move to reach a province 1.5, 2, or 3 times greater than his own. Observe that the distances are very great, and so the existence of agglomerations would be unlikely to cause the average worker to migrate. However, it is also true that these distances decreased over this period by more than 50 km in all the three scenarios analysed. According to the model, a reduction in the distance from an agglomeration of some 50 km. would double the initial migratory flow when this reduction occurs in the 100 - 150 km bracket, and increase it by 50% if the reduction occurs in the 200 - 250 km bracket. In these conditions the changes in the country's industrial geography (i.e. variations in the location of important industrial centres) would have a significant effect on the migratory flows originating in nearby provinces.

Table 6
Mean distances from different sizes of agglomeration

	s_i/s_j >1.5	s_i/s_j >2	s_i/s_j >3
1887	497.87	625.18	747.56
1920	444.48	574.52	689.21

Sources: CPE (1887 and 1920), Public Works Records.

Table 7 shows data regarding the second of the changes in Spain's industrial geography during this period: the variations in the relative size of the provinces. Specifically, it provides data on the relative size of certain Spanish provinces in relation to the mean and its evolution between 1887 and 1920. Observe that the relative differences continued to grow throughout the process of integration of the Spanish market and the geographical concentration of industrial activity.

Table 7

Relative size of the main industrial agglomerations in Spain

	1887	**1920**
Barcelona	3.24	5.94
Valencia	2.67	3.21
Madrid	2.51	3.01

Source: CPE (1887 and 1920).

The following example taken from this model may serve as a preliminary evaluation of the importance of these changes for the migratory flows: for a distance of 150 km, doubling the relative differences in the size of two regions means approximately doubling the migratory flows between them.

In summary, the existence of industrial agglomerations was not a key factor for the development of migratory flows between distant regions, since the centripetal force deriving from the forward linkage was more than compensated for by the migration costs. However, this same effect may have attracted migratory movements from regions near the great industrial centres. Besides, considering that Spain's industrial activity was characterized by an increasing geographical concentration and by the emergence of new industrial centres, the explanatory power of this centripetal force increased over the period from the end of the nineteenth century to the Civil War, helping to account for the acceleration of internal migratory flows as the industrialization process advanced.

6. Concluding remarks

This study has explored several factors that may account for the growing geographical concentration of industry in Spain in the first decades of the twentieth century at a time when the internal market of goods and services became integrated. We suggest that this concentration was linked to processes of accumulative causation closely associated with the existence of increasing returns to scale in industrial production.

To test this hypothesis we define a NEG model and apply it to Spain's economy at the start of the twentieth century. From this model we derive the structural relation that reflects the forward linkage between workers' localization decisions and the geography of the supply of goods: that is, one of the centripetal forces at the root of the processes of accumulative causation proposed by NEG models.

We then consider two empirical approaches to analyse the existence of linkages of this type in the Spain of the inter-war period. We provide a gravity estimation of the determinants of bilateral migratory flows in the nineteen twenties which serves as a reference model for our evaluation of the explanatory power of the functional form derived structurally from the New Economic Geography model. We show that the gravity model that allows the interpretation of the determinants of migratory flows in the light of those suggested in NEG models offers better results than the more generic one.

The structural estimates obtained of the migration equation derived from the NEG model concord in sign and magnitude with the theoretical predictions. These results prove the existence of a cumulative process of agglomeration and the presence of the forward linkage described by NEG models in the Spanish economy of the inter-war period. That is, we demonstrate the existence of a direct relationship between workers' localization decisions and the market potential of the host regions. Spanish workers were attracted by industrial agglomerations, reinforcing henceforth the agglomeration process in a cumulative manner.

In addition, the direct estimation of the values associated with key parameters in the NEG model allows us to make some observations on the importance of the linkage

described in the explanation of migratory flows in Spain at the time. With the simulation of the migratory flows derived from different scenarios of the relative size of regions and the distances between them we show that in Spain the power of attraction of the agglomerations grew as they increased in size, but that the high elasticity estimated for the migration costs reduced the intensity of the migratory flows, especially in the light of the long distances that Spanish workers often had to travel to reach the major industrial centres.

Nonetheless, we have also pointed to the existence of relevant changes in the industrial geography of Spain in the period between the late nineteenth century and the Civil War. On the one hand, during these years, a higher number of provinces started to develop industrially. On the other hand the biggest industrial centres still increased their relative size compared with the average of the Spanish provinces. These findings may help to explain more exactly the acceleration observed in internal migratory flows as industrialization advanced. The connection is clear when we consider the geography of migrations in Spain during this period, which hardly affected the regions furthest from the large industrial agglomerations (that is, regions such as Andalusia, Estremadura and Castile-La Mancha) but had an intense effect on the Mediterranean, Aragonese and Castilian provinces nearest to the principal centers of industrial development.

References

BAINES, D. (1994): "European Labour Markets, Emigration and Internal Migration, 1850-1913", in T. HATTON and J. G. WILLIAMSON (eds.*): Migration and the International Labour Market, 1850-1939*. London: Routledge, pp. 35-54.

BARQUÍN, R. (1997): "Transporte y precios del trigo en el siglo XIX", *Revista de Historia Económica*, XV, 1, pp. 17-48.

BERNAL, A. M. (1984): "Economía agraria en la Andalucía contemporánea", *Papeles de Economía Española*, 20, pp. 281-297.

BETRÁN, C. (1999): "Difusión y localización industrial en España durante el primer tercio del siglo XX", *Revista de Historia Económica*, 3, 663-696.

BOYER, G. R. (1997): "Labour migration in southern and eastern England, 1861-1901", *European Review of Economic History*, I, pp. 191-215.

BOYER, G. R. AND HATTON, T. J. (1997): "Migration and labour market integration in late nineteenth-century England and Wales", *Economic History Review*, L, 4, pp. 697-734.

CARMONA, J. AND SIMPSON, J. (2003): *El laberinto de la agricultura española. Instituciones, contratos y organización entre 1850 y 1936*, Zaragoza, Prensas Universitarias de Zaragoza.

CASTAÑEDA, LL. AND TAFUNELL, X. (1993): "Un nuevo indicador para la historia financiera española. La cotización de las letras de cambio a corto plazo", *Revista de Historia Económica*, 2, pp. 367-384.

CHISWICK, B. R. AND HATTON, T. J. (2003): "International Migration and the Integration of Labor Markets" in M. D. BORDO, A. M. TAYLOR AND J. G. WILLIAMSON (eds.): Globalization in Historical Perspective. Chicago, The Chicago University Press.

CROZET, M. (2004): "Do migrants follow market potentials? An estimation of a new economic geography model", *Journal of Economic Geography*, 4, pp. 439-458.

GALLEGO, D. (2001): "Sociedad, naturaleza y mercado. Un análisis regional de los condicionantes de la producción agraria española (1800-1936)", *Historia Agraria*, 24, pp. 11-57.

GEHR (1985): "Los precios del trigo y la cebada, 1874-1906", in GARRABOU, R. and SANZ, J. (eds.) *Historia agraria de la España Contemporánea. 2. Expansión y crisis (1850-1900)*, Barcelona, Crítica, 321-368.

HANSON, G. H. (1998): "Market potential, increasing returns, and geographic concentration", Working Paper 6429, National Bureau of Economic Research.

HATTON, T. J. AND WILLIAMSON, J. G. (eds.) (1994): *Migration and the International Labor Market, 1850-1939*. London: Routledge.

HATTON, T. J. AND WILLIAMSON, J. G. (1998): *The Age of Mass Migration. Causes and Economic Impact*. New York: Oxford University Press.

HEAD, K. and RIES, J. (2001): "Increasing Returns versus National Product Differentation as an Explanation for the Patterns of U.S. Canada Trade", *American Economic Review*, 91, 4, pp. 858-876.

HELPMAN, E. (1998): "The size of regions", in D. PINES, E. SADKA and I. ZILCHA (eds.) *Topics in Public Economics*, Cambridge, Cambridge University Press, pp. 33-54.

HERRANZ, A. (2001): "Una aproximación al stock de infraestructuras español (1844-1935)", *Revista de Historia Económica*, 19, pp. 129-152.

KIM, S. (1995): "Expansion of markets and the geographic distribution of economic activities: the trends in US regional manufacturing structure, 1860-1987", *Quarterly Journal of Economics*,110, pp. 881-908.

KRUGMAN, P. (1991): "Increasing returns and economic geography", *Journal of Political Economy*, 99, pp. 483-499.

NADAL, J. (1975): *El fracaso de la revolución industrial en España, 1814-1913*, Barcelona, Ariel.

O´ROURKE, K. H. AND WILLIAMSON, J. G. (1999): *Globalization and History. The evolution of a Nineteenth-Century Atlantic Economy*. Cambridge: MIT Press.

PALAFOX, J. (1992): *Atraso económico y democracia. La Segunda República y la economía española (1892-1936)*, Barcelona, Crítica.

PALUZIE, E., PONS, J. AND TIRADO, D. A. (2004): "The geographical concentration of industry across Spanish regions, 1856-1995", *Jahrbuch für Regionalwissenschaft,* 24 (In Press).

PRADOS DE LA ESCOSURA, L. (1997): "Política económica liberal y crecimiento en la España contemporánea: un argumento contrafactual", *Papeles de Economía Española*, 73, pp. 83-99.

ROSES, J. R. (2003): "Why isn´t the Whole of Spain Industrialized? New Economic Geography and Early Industrialization, 1797-1910", *Journal of Economic History*, 64, 4, pp. 995-1022.

ROSES, J. R. AND SANCHEZ-ALONSO, B. (2004): "Regional wage convergence in Spain, 1850-1936", *Explorations in Economic History*, (In press).

SANCHEZ-ALONSO, B. (2000a): "European emigration in the late nineteenth century: the paradoxical case of Spain", *Economic History Review*, LIII, pp. 309-330.

SANCHEZ-ALONSO, B. (2000b): "Those Who Left and Those Who Stayed Behind: Explaining Emigration from the Regions of Spain, 1880-1914", *Journal of Economic History*, 60, pp. 730-755.

SICSIC, P. (1992): "City-Farm Wage Gaps in Late Nineteenth-Century France", *Journal of Economic History*, 52, pp. 675-695.

SILVESTRE, J. (2004*): Internal migrations in Spain, 1877-1930,* manuscript

SIMPSON, J. (1995a): *Spanish agriculture: the long Siesta, 1765-1965*. Cambridge: Cambridge University Press.

SIMPSON, J. (1995b): "Real wages and labour mobility in Spain, 1860-1936", in P. SCHOLLIERS AND V. ZAMAGNI (eds.). *Labour´s Reward. Real wages and economic change in 19th and 20th century Europe*, Cheltelham, Edward Elgar, pp. 182-199.

SORI, E. (1979): *L´emigrazione italiana dall´Unità alla seconda guerra mondiale*, Bolonia, Il Mulino.

TABUCHI, T. AND THISSE, J.F. (2002): "Taste heterogeneity, labour mobility and economic geography", *Journal of Development Economics*, 69, pp. 155-177.

TIRADO, D.A, PALUZIE, E. AND PONS, J. (2002): "Economic integration and industrial location: the case of Spain before World War I.", *Journal of Economic Geography*, 2, pp. 343-363.

TORTELLA, G. (1994): *El desarrollo de la España contemporánea. Historia económica de los siglos XIX y XX*, Madrid, Alianza.

TREVES, A. (1976): *Le migrazioni interne nell´Italia fascista. Politica e realtà demografica*, Turin, G. Einaudi.

WOLF, N. (2003): "Endowments, market potential and industry location: Evidence from Interwar Poland (1918-1939)", Paper presented at the 5th Conference of the European Historical Economics Society, Madrid.