40th European Regional Science Association Congress
Barcelone. 29th August-1st September 2000

GEOGRAPHICAL DETERMINANTS OF THE CREATION OF MANUFACTURING FIRMS: THE REGIONS OF SPAIN (♣)

Agustí Segarra Blasco. University Rovira i Virgili (*) (Spain)
Maria Callejón Fornielles.University of Barcelona (**) (Spain)

ABSTRACT:

The complexity of the mechanisms determining the entry and exit of firms increases when geographical differences in production structure, market structure, levels of skill and training of workers, and the presence of active local policies for promoting industry are considered. Inter-territorial disparities in the rate of the new firm start-ups within each industrial activity endure through long periods of time, a circumstance that indicates that there are non-conjunctural determinants to the capacity of regions to create new industrial projects. This study is concerned with establishing the influence of geographical variables on the setting up of new manufacturing companies. The Spanish autonomous communities (NUTS-2) have been taken as the units of analysis for the period 1980-1992.

KEY WORDS:

Firm start-ups, industrial dynamics, geographical determinants, Spanish regions.

(*) Department of Economics
UNIVERSITY ROVIRA I VIRGILI
Avda. de la Universitat, 1
43204 REUS (SPAIN)
Phone: (+34)-77-759800 Fax: (+34)-77-759814
e-mail: asb@fcee.urv.es

(**) Department of Economic Policy and EEM
UNIVERSITY OF BARCELONA
Avda Diagonal, 690
08034 BARCELONA (SPAIN)
Phone: (+34)-3-4021945 Fax: (+34)-3-4024573
e-mail: callejon@riscd2.eco.ub.es

1.- INTRODUCTION.

Regional economic well-being has been traditionally associated with, among many other variables, strong business dynamics and, in particular, with high rates of new business formation. In the last ten to fifteen years much empirical work has been produced that tries to better understand the relationship between regional development and the intensity of new firms start-ups. In general, the results tend to confirm the expected positive relationship - with some interesting nuances - but the task of identifying the spatial factors that foster entrepreneurship, especially successful entrepreneurship, has proved to be complicated. This paper adds some more information on the determinants of new business formation in the case of the Spanish regions.

As usual we will refer briefly to previous work in this field. Geographical analysis of business dynamics differs from non-geographical analysis in many aspects, but one of these is the extent in which theoretical models are employed. By non-geographical analysis we mean a plurality of approaches that consider space as abstract. The industrial organization approach is one of them and has produced a set of entry models that, whatever their differences, are founded on a few well-established concepts. These concepts relate entry behaviour with profit incentives and barriers to entry. The work of Orr (1974) is usually referred to as the first stylised formulation of a model of entry rooted in the industrial organization tradition. Geroski (1991a) has produced further developments of this basic model, and Baldwin (1995) argues that entry may occur even in a zero profit industry if entrants expect to displace incumbents[1]. Other non-spatial approaches use more dynamic settings: the *schumpeterian hypothesis* of innovative entrepreneurship (Malerba and Orsenigo, 1995), evolutionary models (Nelson and Winter, 1982), innovation models (Audretsch, 1995), product cycle models (Klepper, 1996,), embodied technology models (Campbell, 1998), and learning models (Jovanovich, 1982; Hopenhayn, 1992; Pakes and Ericson,1998).

By contrast, many theoretical models used in the geographical analysis of new business formation, appear more open and loosely defined. Regional analysis relies to a greater extent on insight, and on broad empirical tests with selected types of explanatory variables. But in both types of approach, spatial and non-spatial, empirical results show a large degree of variability and are open to more than one interpretation.

---

[1] Surveys on the industrial dynamic in Caves (1998); Gerosky (1995); Malerba and Orsenico (1996).

The type of explanatory factors, and their corresponding indicators, adopted in a cross-national research project carried out for the OECD (Reynolds, Storey, Westead, 1994) are a fair representation of those considered most crucial in current research given the available data. The adopted regional variables were: demand conditions (population growth and immigration); urbanization/agglomeration (population density, proportion of skilled labour); unemployment; personal wealth (income, home ownership); small firms/specialization (share of small firms, specialization index); local political conditions (socialist voting); and government policies (expenditure on local infrastructure, support programmes for new and small firms).

The OECD study shows the advantage of a unified methodology - with respect to the tested variables - for the seven countries included in the research: France, Germany, Ireland, Italy, Sweden, the United Kingdom, and the United States. Its results point to the fact that the underlying processes affecting the setting-up of new companies at the regional level appear to be fairly uniform across countries. And it is the apparent regularities observed that stimulates interest in further research in this area.

In parallel to the coordinated research, the participating experts have also developed models that link the appearance of new companies to specific regional aspects. Audretsch and Fritsch (1994) proceed to test the validity of Krugman's propositions about "the new economic geography" (Krugman, 1991) according to which production convexities of local scope arise from pecuniary, technological and labour market externalities[2]. Since convexities are linked to agglomeration, the rate of new firm formation in Audretsch and Frisch's model also capture the size of the external forces or agglomeration forces. Meanwhile, Garofoli (1994), looking at Italy, advances the hypothesis that regional differences in business formation can be explained by the local "milieu" or socio-economic environment.

In this paper we estimate two groups of explanatory variables: industrial determinant variables and geographical determinant variables of firm start-ups in the Spanish regions. The vector of sectorial variables includes the main factors that, according to the studies undertaken, have a bearing on the firm's entry and survival in the industry: short term company profits (profit expectations), investment in R&D (technological barriers to entry), advertising costs (barriers to differentiating the product); marginal price-cost margin (market

---

[2] For a general view of new spatial economy see Fujita, Krugman and Venables (1999).

structure), and industry growth. The territorial variable vector includes five factors that impact upon the rate of firm start-ups (start-ups relative to the existing firm stock): population density (agglomerative forces); average firm size and productive diversity (industry structure); rate of unemployment; and human capital availability.

We will look first at the effects of those five variables in other developed countries, according to the works published in an special issue of Regional Studies 28 (4), in 1994: Garofoli (Italy); Audretsch and Fritsch (Germany); Davidsson, Lindmark, Olofsson (Sweden); Keeble and Walker (United Kingdom); and Reynolds (United States).

Population density, interpreted as a measure of agglomeration externalities, emerges in most cases as a positive influence on the rate of firm start-ups[3]. Audretsch and Fritsch find that it spurs start-ups in manufacturing. Reynolds and Davidsson et al. find that agglomeration is more important to the service sector than to manufacturing. Only Garofoli concludes that it has no significant impact in the case of Italy.

When looking at the dominant characteristics of local businesses, results found most generally suggest that those environments dominated by small firms present higher rates of firm formation, but Audretsch and Fritsch differentiate between manufacturing and service industries. While the predominance of small firms has no effect on the rate of manufacturing firm start-ups - due to the importance of minimum efficiency scales - it has a positive influence on the service sector. Keeble and Walker argue that their results confirm the idea that small firms are incubators of new firm founders, while large firms perform as incubators of professional services.

The role of unemployment on firms start-ups is controversial. Audretsch and Fritsch find a positive relationship, but the rest of authors do not. Only Davidsson et al. discover a positive influence but it is restricted to the service sector.

All the reviewed studies support the hypothesis that human capital fosters the formation of new firms[4]. Reynolds partially differs in the sense that he finds a negative relationship

---

[3] The presence of agglomeration externalities at the local level generates external economies for the company which are, however, internal for the region, thus favouring the creation of new businesses and reducing their hazard rates. The effect of external economies on industrial location has been studied by Glaeser et al. (1992) and Henderson et al. (1995), among others. For Spanish locals productive systems, see Costa and Viladecans (1999).

[4] The role of human capital in the creation of new businesses at a local level is discussed in Duranton and Puga (2000), and the positive incidence of human capital on local productivity local is discussed in Rauch (1993).

between the share of population with college education and the rate of firm start-ups in manufacturing.

Only Garofoli includes an index of specialization/diversity in his study. He finds a strong positive impact of sectoral specialization on the rate of firm birth. It could be argued that this result is specific to Italian conditions, given the profusion of very specialized local districts in that country.

The above results are generally compatible with those obtained in this paper, as will be seen in the following sections. It may be worth noting that the main discrepancy, in the case of Spanish regions, corresponds to the unemployment variable which, according our estimates, tends to favour new firm start-ups in manufacturing.

This paper is organized as follows: Section 2 presents the gross entry and gross exit rates at the regional-industrial level during the period 1980-92. Section 3 describes the model of determinants for new firms with industrial and geographical explanatory variables and the methodology used for the empirical analysis of the determinants of entry of new firms in the Spanish regions. Section 4 discusses the data set used. Section 5 presents the empirical results. Finally, Section 6 gives the main conclusions of this study.

2.- REGIONAL DISTRIBUTION OF THE NEW INDUSTRIAL ESTABLISHMENTS.

During the period between 1981 and 1992 the average annual gross rate of creation of establishments in Spanish manufacturing was 6,33%[5] (see Table A-1 in the statistical annex). Among the regions of Spain (17 administrative units at NUTS□2 level) it can be seen that there are great differences in the rhythm of creation of new centres of production.

The region of Extremadura registered a gross rate of entry of 2,87%, the lowest in the regions of Spain. At the opposite extreme, the Community of Madrid reached a rate of 9,72%[6]. Even if we correct these indicators for the industrial mix of each region, there are without doubt inter□regional differences in the rate of entry due to the different behaviour of industries in the various regions of Spain. Descriptive statistics are offered below of the regional disparities for

---

[5] The gross rate of entry is the number of entering establishments over the total number of active establishments from the previous period.
[6] See the gross entry and exit rates for Spanish regions in Callejón and Segarra (1999).

each of the industrial activities[7].

The diverging intensities of the regions in the creation of industrial establishments are not sporadic in time but persist during the various phases of the economic cycle[8]. Between 1981 and 1985, during one of the most drastic phases of recession in Spanish manufacturing, differences persisted in the geographical capacity to create industrial establishments and the regional ranking is fairly similar to that registered during industrial expansion. The greatest dynamism in the setting-up of new industrial establishments continues to be in Madrid, with a gross rate of 8,60%, and the lowest dynamism continues to be in Extremadura, with a rate of 2,75%.(see Table A-2 in the statistical annex).

Inter-regional differences can be accentuated during phases of growth due to the behaviour of entries and exits directly correlated to the economic cycle[9]. During the period 1986-1992, Spanish manufacturing industry shows an intensive growth. In that period the region registering the largest capacity to create new firms continued to be Madrid, with a gross entry rate of 10.84% and the lowest was Extramadura with a rate of 2,98%. The differences between the Spanish regions in the creation of new firms continue throughout the economic cycle and they are by nature permanent and not conjunctural. The heterogeneity of this phenomenon shows the influence of geographical factors on the formation of enterprises throughout the various phases of the economic cycle.

In this paper we attempt to analyse the factors that influence the capacity of the regions of Spain to project and materialise entrepreneurial initiatives. Before this we will briefly comment on the most relevant characteristics of business turnover when we consider the size of the establishments and the regional entry and exit rates of each industrial sector.

The available data shows that the majority of the entry and exit flow is concentrated in small-sized industrial projects. The dominant share of small manufacturing establishments in the entry and exit flows points to the fact that decisions to initiate or conclude a business activity show great sensitivity to variables in the economic situation in which the industrial enterprise

---

[7]   Differences among industries in the rates of entry of manufacturing firms is a common characteristic in studies carried out in a wide range of countries (United States, Canada, France, United Kingdom, Portugal, etc.), see Cable and Schwalbach (1991).
[8]   There are significant differences in the rates of entry and exit in manufacturing industries between countries, although it should be said that available data is scarce on countries and industries that cover long common periods (Gerosky, 1992).
[9]   As we have demonstrated in other studies the gross rate of creation of establishments is positively correlated to the economic cycle while the gross rate of closure is negatively correlated (Callejón and Segarra, 1999).

operates and interacts. The micro-enterprise nature of the industrial dynamic supports the importance of factors of a geographical character in the materialisation of new industrial initiatives.

The small establishments increase their share in the majority of the industrial sectors. Among OECD members, after Italy and Japan, Spain is the country with the greatest number of small firms (see Table A-3 in the statistical annex). The growing share of small enterprises is a general phenomenon related to a multiplicity of factors (Acs and Audretsch, 1990). Among the hypotheses that account for the increase in small and medium□sized establishments the following stand out: *i)* the use of new technologies in the process of treating information that reduces the optimum scale of the phases of production, *ii)* growing openness to the outside increases competition in industrial markets, as industrial organizations adopt flatter and more flexible profiles; *iii)* improvements in the level of training of the industrial work force is a mechanism that favours initiative in the creation of small enterprises; *iv)* segments of the market for specific consumers encourage the manufacture of small series; and *v)* the appearance of new products facilitates the entry of innovative firms that generate a process of destructive creation in the market.

There is a considerable increase in the presence of micro□enterprises among entering firms that are starting their activity[10]. The gross rate of entry (number of entries in relation to active establishments in the previous year) diminishes the larger the establishment. On the other hand, micro□establishments continue to absorb the largest part of the exits but to a lesser extent than the percentages registered for the entry flows.

Entry and exit flows of firms are characterised by the high proportion of small-sized establishments, and a large part of firm turnover depends upon small-sized industrial projects. The entering establishments begin their activity with a below-average size for the active establishments: for example, in Spanish manufacturing as a whole, between 1980 and 1992, the relative size of those entering was 44%.

The data presented in Table 1 shows two interesting aspects of flows in industrial firm

---

[10]The distribution by ranges of size of new industrial establishments between 1980 and 1992 is as follows: 49.8 only had one salaried employee; 22% had between 2 and 5 workers; 15.2% between 6 and 10; 8.2% between 11 and 20; 3.6% between 21 and 50; 0.6% between 51 and 100; 0.2% between 101 and 500 and finally, establishments with more than 500 workers accounted for only 0.02% of the new registrations (Registry of Industrial Establishments).

turnover: firstly, there are notable differences between industries in the entry and exit rates of establishments; and secondly, within the same industry the capacity of the regions for the attraction and materialisation of new initiatives varies considerably.

Table 1
Distribution of the gross entry rate in industrial sectors in the regions.

	Period 1980-85		Period 1986-92	
Industries	Regional Average	Regional Variation coefficient	Regional Average	Regional Variation coefficient
Ores and metals	0,43	1,97	1,03	1,68
Mineral Products	3,02	0,31	4,81	0,37
Chemical Products	6,51	0,25	7,67	0,38
Metal Products	5,88	0,33	7,64	0,24
Ag./Ind. Machinery	7,35	0,32	11,04	0,51
Office Machinery	0,46	1,33	1,95	1,23
Electrical Goods	16,36	0,59	15,58	0,59
Transport Equipment	12,58	1,70	31,87	1,01
Food/Bev./Tob	2,99	0,46	3,65	0,56
Textiles	5,44	0,59	9,15	0,45
Paper/Printing	5,05	0,21	7,90	0,23
Rubber/Plastic	13,18	0,45	12,98	0,35
Other Manufacturing	6,36	0,38	8,62	0,49
Total Manufacturing	4,80	0,25	6,61	0,29

Note: The average is the arithmetic mean of the regional gross entry rates. The coefficient of variation is the norm standard deviation of the mean
Source: Registry of Industrial Establishments and Industrial Survey.

The existing dispersion of the regional rates of firm start□ups by industrial sectors indicates that the geographical variables are of great importance for a good understanding of the determinants of industrial turnover flows. For industrial manufacturing as a whole the average of the gross rates of regional entry, between 1980 and 1985, was 4.80%, with a coefficient of variation among regions of 25%, while between 1986 and 1992, the arithmetic mean of the gross rates of entry rose to 6.61%, registering a coefficient of inter□regional variation of 29%. The persistence of the range of inter□regional variation in entry, in phases of recession as well as in phases of expansion in the cycle, underlines the fact that local and regional factors play a role of the first order in the capacity of areas to found new manufacturing establishments.

When we go into the details of the industrial sectors, geographical differences in the intensity of the flow of opening establishments persist all through the period studied. Activities with low rates of entry of firms (mineral and metal products, office machinery) together with industries with a high firm turnover (transport equipment) present wide ranges of inter□

regional variation[11]. Among the thirteen industrial sectors, the lowest degrees of regional dispersion are found in the metal products industries and in paper manufacturing and printing.

The presentation of the data for the sub□periods □1980□1985 and 1986□1992□ pursues a double objective: to eliminate the conjunctural effects that could influence the dynamics of the creation of industrial establishments and to show the persistence of geographical differences in various phases of the cycle. Between 1980 and 1985, during a period marked by industrial adjustment, the sectors show different intensities of creation of new industrial establishments, and within the same industry the capacity of the regions for new firm creation varies notably. Between 1986 and 1992, during the phase of recovery, industries continue to show disparities in the average values of their gross entry rates, despite increases in the rhythm of creation, and the fact that regional coefficients of variation for each industry remain stable, showing the permanent nature of inter□regional differences in the entry of industrial firms.

During the two periods, for the majority of the industries, the maximum and minimum levels of the gross entry rates registered correspond to the same regions. The regions with the greatest and the least capacity for firm start□ups in a particular industry maintain this differential behaviour all through the 1980□1992 period.

3.- GEOGRAPHICAL DETERMINANTS OF NEW FIRMS: A MODEL.

The conditions governing the generation of new enterprises are subject to a wide range of factors: the personal qualities of the founder of a new firm (Vivarelli, 1991); the expected profits following entry (Gerosky, 1991b); the barriers to entry (Orr, 1974); the barriers to exit (Shapiro and Khemani, 1987); and the factors related to the geographical environment in which the new firm operates (Reynolds, Storey, Westead, 1994).

Often, the empirical studies on entry and exit enterprises deal with the sectorial determinants (expected profits, barriers to entry, barriers to exit) that have a bearing on the industrial turnover, but rarely included in the analysis are the determinants of a geographical nature. The regional differences in the generation of new firms in an industrial activity make it advisable to incorporate, together with the industrial factors, the territorial variables that make up the

---

[11] Sectorial disparities in the gross entry rates are also notable in other industrialised economies, see Gerosky (1992) and Audretsch (1995).

local environment of the new firms.

Papers that undertake an empirical study of the entry and exit flows of firms from an industrial point of view often present ambiguous results. This could be due to the absence in the explanatory variables of specific territorial factors that also influence the generation and survival of firms. The models that analyse the determinants in the creation of firms from a sectorial point of view only include as entry rate explanatory variables the profits of the industry and determinants of the entry barriers. The entry rates will have a positive relationship with the expected profits for potential entrants, and a negative relationship with normal profits or those sustainable over a long period. In the long term, profits depend on the characteristics of the industry that generates barriers to the entry of new firms. (Orr, 1974, Geroski, 1991b). The static models deal with the entry of firms in accordance with the expected profits and the long-term profits of the industry where,

$$(1) \qquad GER_{it} = f\ (\pi_{it} - \pi^{*}_{i})$$

where GER_{it} is the gross rate of entries, π_{it} are the industry's extraordinary profits and $\pi^{*}it$ are the long-term profits of the industry.

The scale of the industry's long-term profits are determined by the barriers to entry of new firms in every industry. The barriers to entry for new firms will be a function of the technological intensity of the industry ($R\&D$), advertisement expenditure *(A),* and the price-cost margin (*PCM*).

In this way, the long-term profits of the industry can be expressed as a function of a vector of variables determining barriers to entry for new competitors,

$$(2) \qquad \pi^{*}_{i} = f\ (R\& D_{it},\ A_{it},\ PCM_{it})$$

and the estimated expression after taking logarithms would be,

$$(3) \qquad \ln GER_{it} = \alpha_{i}\ + \beta_{0}\ \pi_{it} + \beta_{1i}\ R\& D_{it} + \beta_{2i}\ A_{it} + \beta_{3i}\ PCM_{it}$$

The β coefficients will be different for each industry, according to the specific characteristics of the sector (technological intensity, economies of scale, degree of competence, demand growth, capital intensity, product differentiation, etc.). As we have seen in the presentation of the gross entry rates for industries and regions, territorial factors also have a bearing on the

entry of firms, such that, once the decision has been taken to create a company in a certain sector, the likelihood that it will be set up in a particular region will vary substantially according to the specific factors of the territory[12].

The birth of firms depends on a vector of territorial variables such as the level of education and skills of the workers (*HK*), the average size of local firms (*SIZE*), the region's specialization in the industry in question (*SPE*), the degree of industrial diversification of each region as measured by the Hirsman-Herfindahl index (*HHI*) and, also, job market indicators, such as the unemployment rate of the region (*U*). If we incorporate these territorial variables into the above expression, the equation in question would take the following form,

(4)
$$\ln GER_{ijt} = \alpha_i + \beta_0\, \pi_{it} + \beta_{1i}\, R\&D_{it} + \beta_{2i}\, A_{it} + \beta_{3i}\, PCM_{it} + \beta_{4j}\, HK_{jt} + \beta_{5j}\, SIZE_{jt} + \beta_{6j}\, SPE_{jt} + \beta_{7J}\, HHI_{jt} + \beta_{8J}\, U_{jt} + \mu_{it}$$

In this study we deal with the geographical factors in the creation of new businesses, grouping different industrial sectors in terms of the main variable which determines their competitivity following OECD criteria. We also introduce a control variable using the interannual variation in added value for each industry. The econometric model employed, based on an estimate of the fixed regional affective factors, is as follows,

(5)
$$\ln GER_{ijt} = \alpha_i + \beta_0\, \pi_{it} + \beta_{1i}\, R\&D_{it} + \beta_{2i}\, A_{it} + \beta_{3i}\, PCM_{it} \\ + \beta_{4j}\, Growth_{jt} + \beta_{5j}\, HK_{jt} + \beta_{6j}\, SIZE_{jt} + \beta_{7j}\, SPE_{jt} \\ + \beta_{8J}\, HHI_{jt} + \beta_{9J}\, U_{jt} + v_j + \mu_{it}$$

where *lnGERit* is the logarithm of the gross rate of entries in industry "i" during period "t"; π_{it} is the current profits in the industry; $R\&D_{it}$, A_{it} and PMC_{it} is the vector of the barriers to entry of new firms in each industry; $Growth_{it}$ is the rate of annual variation in the industrial production; DEN_{jt}, $SIZE_{jt}$, HHI_{jt}, SPE_{jt}, and U_{jt} is the vector of the geographical variables; v_j are the fixed regional effects and μ_{it} is random term.

---

[12] Therefore, the correct question to ask is not 'How do territorial variables influence the rate of new firm creations?'; nor is it is, 'To what extent do entry rates differ between the different sectors?'; but rather, according to Audretsch and Frisch (1995), is `Given a certain entry rate in an industry or sector, where will new businesses tend to locate themselves?'.

4.- THE NATURE OF THE DATA: STATISTICAL SOURCES AND VARIABLES.

The empirical application carried out required two types of determining variables for firm turnover in the geographical ambit and the industry. The variables used fulfill two requirements. In the first place, they are available for the regions of Spain or for the manufacturing sectors (classification NACE R□25). In the second place, they have a temporal (annual observations between 1980 and 1992) and regional (Autonomous Communities) dimension.

The nature of the statistical sources used makes a panel available for each of the thirteen manufacturing industries (NACE□25) with the gross entry rates and the geographical factors which explain the region's capacity to attract industrial projects. The double dimension of the data facilitates the use of an econometric model of fixed effects that shows greater robustness than the estimation by Ordinary Least Squares. The individual effects of the estimations gather together the differential behaviour of the geographical factors among the regions of Spain.

The Industrial Survey (EI) provides, for the period under study, data segregated by industries and regions on production, employment, and the distribution of establishments by ranges of size. The EI is an application which was specifically designed by the National Institute of Statistics for the study of industrial manufacturing. It constitutes a good reference in determining the number of industrial establishments by sectors and regions. The entry flows of establishments come from the Registry of Industrial Establishments (REI). The REI compiles the applications for investment and extension of industrial establishments made by industrial firms through an administrative process. It constitutes an exhaustive and very detailed source at a sectorial and local level. The real population of the regions comes from the demographic census and its periodical updates. The unemployment rate is supplied by the Survey of the Active Population (EPA). Finally, the percentages of labour resources with secondary or higher education come from the Valencia Institute of Economic Research.

We also show the explanatory variables used in the econometric work. Firstly, we show the set of industrial variables; secondly, the control variable measured for the growth of industry activity; and finally, the geographical variables.

Industrial variables

π_{it} business profits for the industry expressed by the relationship between the Gross

Operating Surplus and the Gross Added Value. This variable takes in the profit expectations of the agents that decide to create a firm. If there are excess profits, additional agents are attracted into the market..

investment in R&D/sales ratio. Indicates the R&D intensive industries. Industries with a greater technological intensity may induce firm turbulence, but they may also create barriers to the survival of the new firms.

ID_{it} investment in R&D/sales ratio. This indicates the degree to which the industry is R&D intensive. The industries which are more technologically intensive may induce firm turbulence but at the same time they may set up survival barriers to new firms.

A_{it} advertisement expenditure/sales ratio has been included as a measure of the degree of product differentiation in the industry. Advertising intensive industries created barriers to entry and survival of new enterprises.

PCM_{it} price-cost margin in the industry reflects the market power of active firms. When the price-cost margin rises the firms may react to impede the entry of new firm into the market.

Control variable:

$Growth_{it}$ annual variation rate of the industry's gross added value. This control variable shows the direct correlation between the industrial cycle and the entry of new firms into the markets.

The territorial factors that participate as explanatory variables of the gross rate of the creation of industrial establishments have their temporal and regional variation in common.

Geographical variables:

DEN_{jt} is the population density of the region and is obtained from the relation between the real population and the area (inhabitants per square kilometer). It expresses the influence of the economies of agglomeration on the creation of new industrial establishments.

$SIZE_{jt}$ indicates the mean size of the industrial establishments at regional level. This variable reflects the effects of the industrial network on business dynamics. The empirical literature has demonstrated, in other geographical contexts, that in geographical areas where small and medium□sized firms predominate there are higher rates of entry of new entrepreneurs.

HHI_{jt} is an indicator of the industrial mix of the region. It indicates the level of diversification of the industrial activities through the inverse Hirsman□Herfindahl

Index. Index values near to 1 show a high degree of specialisation in a small number of industries and index values over 1 indicate a highly diversified industrial mix.

SPE_{jt} is an indicator of the sectorial specialization of each region in relation to Spanish industry. This indicator shows the share of the added value of the industry 'i' over the total industrial added value of the region 'j'.

U_{jt} is the rate of unemployment in the region. The introduction into the analysis of this variable has the objective of establishing the pressure on the unemployed to carry out self-employment strategies. Greater unemployment rates can put pressure on the unemployed to carry out self-employment strategies in those industries that present low barriers to entry and exit.

HK_{jt} constitutes an indicator of the level of training of the active population in the region and shows the proportion of workers with a secondary and higher education over the total resources in percentage form. The construction of a *proxy* of human capital in the region that reflects the levels of secondary education (college education and technical training) as well as university degrees is much more suited to our analysis than the exclusive consideration of higher levels of training.

Together with the variables mentioned, econometric estimates were also of the levels of wages and salaries in the industries in each region (in terms of payment per worker as well as payment per hour worked) and the provision of public infrastructures in relation to the stock of private capital in the region. The inclusion of these two variables hardly improved the closeness of the fit and the parameters obtained showed low levels of significance in practically all the estimates by sectors. The very limited explanatory value of these variables and the limited statistical significance of the parameters obtained made it advisable to concentrate our attention on a smaller number of variables.

5.- EMPIRICAL RESULTS.

In this section we offer a presentation of the most relevant econometric results. In all the contrasts made the dependent variable is the annual gross rate of openings of industrial establishments and the explanatory variables are those indicated previously. We made a preliminary approach from the aggregated data for regional industries and industries by sectors (NACE R-25) at the regional level.

The results obtained, taking regional industries as the unit of analysis, are highly satisfactory, the contrasts are significant and the parameters present the expected signs, but they fall into

the often committed error of accepting that the structural variables of the various industries as identical. Later, we will comment on the results achieved when the unit of observation passes over to the industrial sector of each region. In the segregated estimations we find results that show the unequal influence of geographical factors on the dynamics of the creation of establishments in the industrial sectors. The plurality of the empirical evidence should not be a motive for disorientation, but on the contrary, an incentive to finding regularities in the complex and varied economic world.

Table 2
Geographical determinants for new firm entries in industries and regions
Dependent variable: Gross entra rate
Period: 1980-1992
Fixed effects method: GLS (Gross Section Weights)

	Aggregate Regional Industry		Sectorial Regional Industry (NACE R-25)	
Sectorial variables				
PROFITS	-0,068	(-0,346)	-0,023	(-5,692)*
R&D	4,418	(0,522)	0,164	(8,978)*
ADVERTISING	-4,687	(-0,564)	-0,119	(-3,178)*
PRICE-COST MARGIN	-0,060	(-0,547)	-0,006	(-0,728)
Geographical variables				
SIZE	-0,014	(-0,877)	-0,039	(-2,896)*
DIVERSITY	-0,059	(-2,452)*	-0,081	(-2,680)*
HUMAN CAPITAL	0,009	(1,151)	0,011	(5,722)*
UNEMPLOYMENT	-0,009	(-1,176)	0,007	(1,511)
Control variables				
INDUSTRY GROWTH	0,016	(1,584)	0,027	(12,397)*
Individual effects				
Andalusia	8,83		3,82	
Aragon	8,71		3,86	
Asturias	8,47		3,69	
Balearic Islands	8,28		3,59	
Canary Islands	8,55		3,37	
Cantabria	8,73		3,93	
Castile-Leon	8,36		3,49	
Castile-La Mancha	8,38		3,58	
Catalonia	8,76		3,84	
Valencia	9,05		4,05	
Estremadura	7,85		3,14	
Galicia	8,46		3,78	
Madrid	9,29		4,39	
Murcia	8,82		3,87	
Navarre	8,57		3,95	
Basque Country	8,85		4,04	
La Rioja	8,28		3,37	
N°. of observations	220		2460	
R^2	0,959		0,402	
R^2 adjusted	0,953		0,397	
Durbin-Watson	1,636		0,907	
F-statistic	561,99		205,21	

Table 2 presents a first estimation of the geographical determinants of the entry of firms into the various industries. First, the results correspond to the aggregated values of regional manufacturing during the period 1980⎕1992. Second, they present the regression for industry in sectors at regional level.

The geographical parameters present the expected signs. The dimension of the establishments in the region takes a negative sign that can be interpreted as meaning that business networks of small and medium⎕sized firms favour the entry of new entrepreneurs. The labour resources that have their jobs in small firms acquire a global perception of the activity and have greater initiative in opening their own firm. The negative sign of the index of industrial diversity in the fixed effects regression indicates that regions that have a diversified industrial⎕mix present lower higher entry rates, which couldn't demonstrate the presence of Jacobs' externalities at the regional level. During the period 1980⎕1992 the industrial⎕mix of the Spanish regions tend s to decrease, but above all, during the growth phase of the economic cycle, between 1986 and 1990, the gross entry rate was high.

The human capital presents significant positive values in all estimations. The training of the active population strengthens the creation of business projects. Finally, the rate of unemployment presents significant positive values in OLS regressions. High unemployment rates in the region put pressure on the unemployed to decide upon self⎕employment strategies.

The fixed effects model improves the closeness of the econometric fit, showing the presence of specific geographical factors. The data obtained makes it advisable to carry out estimations with sectorial panels to calibrate the prominence of the geographical variables in each of the industries. In order to obtain empirical evidence related to the influence of territorial factors in the creation of new industrial businesses the thirteen sectors of the NACE R⎕25 have been reorganized into five large groups, according to their competitive processes in the market. Following the OECD classification we present the industries under these five headings: industries that use natural resources intensively, labour intensive industries, industries with large economies of scale, industries with a capacity for product differentiation and industries with high investment in R&D.

The results demonstrate that the effect of territorial factors on the creation of new firms varies

considerably according to the characteristics of the industry. The results of the estimations with the fixed effects model for the five groups of manufacturing industries are presented in Table 3. The explanatory capability of the fixed effects method used stands out. In general terms, the extraordinary short◻term profits have little influence on the decision as to whether to create a new company, except in the case of firms that are intensive in the use of natural resources. The R&D intensive industries provide more opportunities for new firms. Generally, R&D may induce firm turbulence (Audrestch and Mahmood, 1994). The advertising/sales ratio allows the incumbent firms to differentiate their products and set up barriers to the entry of new companies. The price◻cost margin presents an ambiguous result. In the case of industries intensive in natural resources, the existence of a greater market power limits the entry of new firms. On the other hand, in the sectors intensive in economies of scale and in differentiated products the market power does not impede the entry of new competitors.

In all the industrial groupings, the control variable used to capture the behaviour of company entry directly correlated to the economic cycle shows a significant and positive sign, except in the technology intensive industries. Below there are some brief comments on the more notable aspects of the geographical factors that have an influence on industrial entry flows.

Mean size of the industrial establishments of the region: the negative sign of the parameter predominates, but only in two industries is it significant at a level of 1%. As in the estimations carried out for the aggregated levels of regional manufacturing, the presence of business networks where small◻sized establishments predominate favours the creation of firms.

Specialisation of industry in the region: the negative sign of the parameter predominates but it only reaches statistically significant levels in the industries intensive in natural resources. The specialisation of a region in a certain industry is not a feature that encourages the opening of centres of production, with the exception of the labour intensive industries and science◻based industries, but the parameters are not significant.

Diversified industrial structure: in all the estimations the parameter is negative, being statistically significant in three industrial groups (natural resource industries, labour intensive industries and product differentiated activities). At the sectorial level a greater industrial diversification in the region does not directly influence the entry rate of establishments. From the results obtained it can be inferred that regions with diversified industry are not favoured in comparison to those regions notable for maintaining a greater concentration in a small number of industrial sectors. The existence of a certain process of crossing◻in of the most important

industries of the region over the industries that are not so well represented can be derived from these results.

Table 3
Sectorial and Geographical determinants for firm entries
Dependent variable: Gross entry rate
Period: 1980-1992
Fixed effects method: GLS (Gross Section Weights)

Variables	Natural resources	Labour intensive	Scale economies-based	Product differentiated	Science-based
Sectorial variables					
PROFITS	0,058	-0,037	-0,058	-0,081	0,002
	(3,349)*	(-1,929)**	(-4,180)*	(-5,546)*	(0,149)
R&D	0,640	0,133	0,430	-0,018	1,181
	(2,461)*	(1,531)	(3,537)*	(-0,109)	(3,327)*
ADVERTISING	-0,772	-0,767	-0,708	-0.289	-1,444
	(-3,727)*	(-2,158)**	(-5,623)*	(-2,491)*	(-1,865)**
PRICE-COST MARGIN	-0,188	0,064	0,172	0,079	0,001
	(-4,609)*	1,385	(4,633)*	(2,847)*	(0,031)
Geographical variables					
DIMEN	-0,007	-0,033	0,025	-0,041	-0,118
	(-0,285)	(-1,580)	(1,066)	(-2,438)*	(-3,644)*
ESP	-0,007	0,007	-0,008	-0,002	0,006
	(-1,971)**	(1,137)	(-1,291)	(-0,399)	(0,376)
DIVERSITY	-0,095	-0,103	-0,026	-0,097	-0,012
	(-2,176)**	(-3,198)*	(-0,441)	(-2,702)*	(-0,144)
HUMAN CAPITAL	0,009	0,029	0,010	0,023	0,005
	(1,084)	(6,805)*	(2,569)*	(5,852)*	(0,668)
UNEMPLOYMENT	0,011	-0,015	0,012	-0,007	-0,027
	(1,213)	(-1,614)	(1,181)	(-0,851)	(-1,455)
Control variables					
INDUSTRY GROWTH	0,032	0,018	0,021	0,028	-0,001
	(4,188)*	(4,815)*	(5,623)*	(7,007)*	(-0,251)
Individual effects					
Andalusia	2,97	1,53	1,22	3,28	3,41
Aragon	2,92	1,33	0,90	3,20	2,97
Asturias	2,83	0,30	0,60	3,18	3,85
Balearic Islands	2,86	-0,00	1,82	2,67	3,03
Canary Islands	2,86	0,21	1,30	2,82	2,72
Cantabria	3,07	0,76	0,55	3,45	3,66
Castile-Leon	2,76	0,73	1,01	2,88	2,57
Castile-La Mancha	2,74	1,32	1,42	2,67	2,23
Catalonia	3,01	1,03	0,58	3,41	3,07
Valencia	3,28	1,54	1,23	3,52	2,85
Estremadura	2,31	0,51	1,58	2,47	2,38
Galicia	2,97	0,70	1,14	3,29	3,22
Madrid	3,78	1,79	0,33	3,88	4,13
Murcia	3,22	1,39	1,44	3,04	2,76
Navarre	2,85	1,11	0,51	3,31	3,70
Basque Country	3,09	1,25	-0,22	3,55	4,57
La Rioja	2,44	0,80	0,74	2,51	2,86
Nº. of observations	433	438	662	657	270
R^2	0,818	0,892	0,522	0,732	0,691
R^2 adjusted	0,807	0,885	0,503	0,721	0,658
Durbin-Watson	1,425	1,290	1,230	1,524	1,626
F-statistic	203,08	377,36	77,07	191,25	60,28

Note: * significance at 1%, ** significance at 10%. Statistic t-Student in brackets.
Source: Registry of Industrial Establishments and Industrial Survey

Provision of human resources with secondary or higher levels of education: takes a positive value in all the estimations, being significant in three groups of industries. The presence of trained labour resources favourably influences the capacity of the areas to found firms. These results are supported by the lower mobility of the labour factor in relation to capital and decisions to locate new firms in the area of residence of the entrepreneur. The gains in the levels of training and qualification of the new generations constitute one of the principal correcting mechanisms of geographical imbalance, in the sense that the regions provided with a smaller industrial base can favour their capacity to begin industrial ventures.

Regional unemployment rate: local unemployment levels offer ambiguous results in the creation of new firms. The unemployment rate can be an incentive to the creation of enterprises in low technology sectors, often through self‐employment strategies, but may also simultaneously bear a slight relation to the rate of company creation in product differentiated and science-based sectors (Audretsch y Fritsch, 1995). As could be expected, the diversity of the results points to the varying impact of the functioning of the labour market on the intensity of new industrial firm formation, in relation to the characteristics of each industry.

6.- CONCLUSIONS.

The opening of any kind of industrial establishment depends on a great number of factors which are related to the structural characteristics of the industrial activity to be developed and to the capacity of the local environment to offer conditions that are favourable in the space in which the new center of production will act (cost advantages, access to markets, flows of information, technological spillovers, the supply of entrepreneurs, etc.).

From a dynamic point of view regions compete among themselves to attract the centers of production of already active firms as well as encouraging the appearance of new entrepreneurs. The micro‐firm size of the majority of the new establishments underlines the role of the environmental factors effecting the economic agents residing in a specific region. The empirical analysis carried out underlines the influence of geographical factors on a region's capacity to create new industrial establishments.

The regions that enjoy a business network of small and medium‐sized firms show a greater capacity to create new industrial projects. The regions with higher levels of education and training of the labour force benefit from a greater industrial dynamism that favours

modernisation and the adaptation of the industrial network to new cost and demand conditions. On the other hand, the influence of a sectorial specialisation and a diversified industrial mix in the region on the entry flow of new establishments is ambiguous and not very significant.

DATA APPENDIX

Table A-1
Regional entry and exit rates (1981-1992)

Regions	Entry and exit rates					Cyclical componen	
	Gross entry ra	Gross exit rate	Net entry rate	Rate of turnover	Rate of volatility	Entries	Exits
Andalusia	6,91	7,98	-1,07	14,89	13,83	25,20	52,18
Aragon	5,95	7,58	-1,63	13,52	11,89	24,26	46,31
Asturias	5,21	6,34	-1,12	11,55	10,43	30,54	91,66
Balearic Islands	5,36	7,51	-2,15	12,87	10,72	33,11	97,81
Canary Islands	6,88	6,65	0,23	13,52	13,30	33,03	116,84
Cantabria	5,50	7,18	-1,68	12,68	11,00	26,08	106,95
Castile-Leon	4,59	7,16	-2,57	11,74	9,18	19,73	24,30
Castile-la Mancha	4,86	6,75	-1,89	11,61	9,72	40,60	36,73
Catalonia	6,29	7,91	-1,63	14,20	12,57	31,99	65,83
Valencia,	8,27	8,75	-0,48	17,02	16,54	26,25	33,77
Estremadura	2,87	5,97	-3,11	8,84	5,73	54,42	11,,21
Galicia	4,76	6,96	-2,21	11,72	9,51	25,64	51,80
Madrid	9,72	11,09	-1,38	20,81	19,43	22,82	60,14
Murcia	7,40	8,19	-0,80	15,59	14,79	32,89	92,31
Navarre	4,72	5,13	-0,41	9,85	9,44	27,16	85,42
Basque Country	5,96	6,71	-0,75	12,67	11,92	39,17	105,34
La Rioja	4,80	7,33	-2,53	12,13	9,60	17,13	92,14
Spain	6,33	7,89	-1,56	14,22	12,67	21,67	17,15

Note: The cyclical component expresses the normal standard deviation for the average of the period 1980-1992,
Source: Registry of Industrial Establishments and Industrial Survey

Table A-2
Regional entry and exit rates for periods.

	Period 1981-85				Period 1986-92			
	Gross rates		Cyclical component		Gross rates		Cyclical component	
Regions	Entries	Exits	Entries	Exits	Entries	Exits	Entries	Exits
Andalusia	5,37	7,10	21,1	67,9	8,12	7,54	11,0	46,4
Aragon	5,10	7,75	11,1	56,2	6,83	7,44	14,4	48,6
Asturias	3,97	9,35	18,1	89,0	6,16	5,93	22,1	46,2
Balearic Islands	4,79	7,43	39,6	102,6	6,01	8,92	25,9	51,6
Canary Islands	5,96	5,45	15,3	85,3	7,30	8,40	39,2	71,2
Cantabria	4,74	7,83	19,1	121,7	5,97	7,16	27,6	83,5
Castile-Leon	3,74	7,53	9,7	28,0	5,25	6,80	8,7	25,1
Castile-la Mancha	4,65	7,59	32,3	35,9	5,05	5,75	48,1	33,5
Catalonia	5,60	8,97	19,0	73,1	7,39	8,07	13,5	44,9
Valencia,	7,34	9,39	33,3	41,8	9,17	8,59	18,9	32,2
Estremadura	2,75	8,53	21,7	101,6	2,98	5,61	62,9	85,4
Galicia	4,34	10,60	29,0	32,6	5,31	4,71	14,7	35,8
Madrid	8,60	9,34	11,4	73,1	10,84	11,89	19,2	58,8
Murcia	5,12	9,01	30,9	91,4	9,08	7,85	14,3	58,6
Navarre	4,36	7,87	29,0	38,3	5,19	3,89	21,9	123,2
Basque Country	5,27	7,38	18,3	115,0	7,06	7,96	27,1	50,9
La Rioja	4,85	7,31	15,0	92,0	4,87	7,08	19,4	92,1
Spain	5,44	8,00	14,9	22,2	7,22	7,64	9,5	15,7

Note: The cyclical component expresses the normal standard deviation for the average of the period 1980-1992,
Source: Registry of Industrial Establishments and Industrial Survey

Table A-3
Turnover of industrial establishments according to size (1981-1992)

	Establishments		Entries			Exits		
1981	**Number**	**%**	**Number**	**%**	**GER**	**Number**	**%**	**GXR**
Less than 10 workers	126.480	76,00	5.223	88,30	4,0	10.370	66,89	7,9
10-19 workers	17.218	11,31	421	7,12	2,3	2.797	18,04	14,3
20-49 workers	13.126	8,60	226	3,82	1,6	1.998	12,89	13,4
50-99 workers	3.339	2,01	24	0,41	1,3	170	1,10	4,9
100-500 workers	3.024	1,82	17	0,29	0,7	142	0,92	4,5
More than 500 workers	412	0,25	4	0,07	0,5	25	0,16	5,8
Industry total	163.599	100,00	5.915	100,00	3,5	15.502	100,00	9,0
1992								
Less than 10 workers	109.918	77,11	7.445	87,30	6,6	10.344	81,31	9,2
10-19 workers	15.036	10,55	671	7,87	4,3	1.081	8,50	7,0
20-49 workers	11.537	8,09	317	3,72	2,6	1.077	8,47	8,8
50-99 workers	3.168	2,22	55	0,64	1,7	131	1,03	4,0
100-500 workers	2.618	1,84	39	0,46	1,5	66	0,52	2,5
More than 500 workers	276	0,19	1	0,01	0,3	22	0,17	7,4
Industry total	142.553	100,00	8.528	100,00	5,8	12.721	100,00	8,7

Note: GER is the gross entry rate and GXR is the gross exit rate.
Source: Registry of Industrial Establishments and Industrial Survey.

REFERENCES.

Acs, Z,J, and Audretsch, D,B, (1990): *Innovation and Small Firms*, The MIT Press.

Audretsch, D and Mahmood, T (1994), "Firm Selection and Industry Evolution: The Post-entry performance of New Firms", *Journal of Evolutionary Economics*, 4 (3): 243-260.

Audretsch, D, and M, Fritsch (1994): "The Geography of Firm Births in Germany", *Regional Studies*, 28 (4): 359-365.

Audretsch, D,B, (1995): *Innovation and Industry Evolution*, Cambridge, Mass, The MIT Press.

Audretsch, D,B, and Fritsch, M, (1995): *The Geographic and Industry Components of New Firm Startups in Germany*, Discussion Paper FS IV 95-16, Wissenschaftszentrum, Berlin.

Baldwin, J,R, (1995): *The Dynamics of Industrial Competition*, Cambridge University Press,

Cable, J, and Schwalbach, J, (1991): "International Comparisons of Entry and Exit", in P A Geroski y J Schwalbach (eds) *Entry and Market Contestability: an International Comparison*, Basil Blackwell.

Callejón, M. and Segarra, A.(1999): "Business Dynamics and Efficiency in Industries and Regions. The case of Spain", *Small Business Economics* ,13, 253-271.

Campbell, J,R, (1998) "Entry, Exit, Embodied Technology, and Business Cycles", *Review of Economic Dynamics*, 1: 371-408.

Caves, RE (1998): "Industrial Organization and New Findings on the Turnover and Mobility of Firms", *Journal of Economic Literature,* 36 (4):1947-1982.

Costa, M,T, and Viladecans, E, (1999): "The district effect and the competitiveness of manufacturing companies in local productive systems", *Urban Studies*, 36:2085-2098,

Duranton, G, and Puga, D, (2000): *"Nursery Cities: Urban diversity, process innovation, and the life-cycle of products",* Discussion Paper 445, Centre for Economic Performance

Fujita, M., Krugman, P. and Venables, A. (1999): The Spatial Economy. Cities, regions and International Trade, MIT press, Cambridge, Massachusetts.

Garofoli, G, (1994): "New Firm Formation and Regional Development: The Italian Case", *Regional Studies* 28 (4): 381-393.

Geroski, P, (1991a): *Market dynamics and entry*, Oxford: Blackwell.

Geroski, P,A, (1991b): "Domestic and Foreign Entry in the United Kingdom: 1983-1984", in Geroski, P,A, and J, Schwalbach (eds) *Entry and Market Contestability: an International Comparison*, Basil Blackwell.

Geroski, P,A, (1992): "Entry, Exit and Structural Adjustment in European Industry", Cool, K, Neven, D,J, and Walter, I, (eds), *European Industrial Restructuring in the 1990s*, McMillan.

Geroski, P (1995): "What do we know about entry?", *International Journal of Industrial Organization,* 13 (4): 421-440.

Glaeser, E,, Kallal, H,, Scheinkman, J, and Shleifer, A, (1992): "Growth in Cities", *Journal of Political Economy*, vol, 100: 1126-1152.

Henderson, V,, Kundoro, A, and Turner, M, (1995): "Industrial Development in Cities", *Journal of Political Economiy*, 103: 1067-1090.

Hopenhayn H, (1992): "Entry, exit and firm dynamics in long run equilibrium", *Econometrica*, vol, 60, Nº 5.

Jovanovic, B, (1982): "Selection and the Evolution of Industry", *Econometrica* 50 (3): 649-670.

Keeble, D, and Walker, S, (1994): "New Firms, Small Firms and Dead Firms: Spatial Patterns and Determinants in the United Kingdom", *Regional Studies* 28 (4): 411-427.

Klepper, S, (1996): "Entry, Exit, Growth and Innovation over the Product Cycle", *American Economic Review* 86 (3): 562-583.

Krugman, P, (1991): "Increasing Returns and Economic Geography", *Journal of Political Economy* 99 (3): 483-99.

Malerba F, and Orsenigo L, (1995): "Schumpeterian patterns of innovation", *Cambridge Journal of*

Economics, vol, 19.

Malerba, F, and L, Orsenigo (1996): "The Dynamics and Evolution of Industries", *Industrial and Corporate Change* 5 (1): 51-87.

Nelson, R,R, and S,G, Winter (1982): *An Evolutionary Theory of Economic Change*, Cambridge, Mass,: Harvard University Press.

Orr, D, (1974): "The Determinants of Entry: A Study of the Canadian Manufacturing Industries", *Review of Economics and Stadistics*, 56 (1), pp, 58-66.

Pakes, A, and Ericson, R, (1998): "Empirical Implications of Alternative Models of Firm Dynamics", *Journal of Economic Theory*, (79): 1-45.

Rauch, J,E, (1993): "Productivity gains from geographic concentration of human capital: Evidence from the cities, *Journal of Urban Economics*, 34: 380-400.

Reynolds, P, (1994): "Autonomous Firm Dynamics and Economic Growth in the United States, 1986-1990", *Regional Studies* 28 (4): 429-442.

Reynolds, P,, D,J, Storey and P, Westhead (1994): "Cross-national Comparisons of the Variation in New Firm Formation Rates", *Regional Studies* 28 (4): 443-456.

Shapiro, D. and Khemani, R.S. (1987): "The Determinants of Entry and Exit Reconsidered", *International Journal of Industrial Organization*, 5: 15-26.

Vivarelli, M. (1991): "The Birth of New Enterprises", *Small Business Economics*, 3: 215-223.