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Entrepreneurship Spillover and the determinants of Key Sectors for new business creation: An inter-sectorial approach

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Abstract:

Whereas the knowledge spillover theory of entrepreneurship focuses on the diffusion of innovative output and knowledge filter among new firms and industries (Acts, *et al.*, 2005; Audrescht, 2007), it has not been studied the phenomenon of entrepreneurship dissemination or entrepreneurship spillover among sectors. From an adaptation of the model of input-output matrix (Leontief, 1936; Dietzenbacher and Los, 2002) we develop a methodology that allows calculating the concept of entrepreneurship spillover. Besides, using intra-sectorial data from the 73 Spanish sectors, we empirically test the characteristics of the sectors with more entrepreneurship spillover. In short, the results clearly state that higher diversity and competition entails more entrepreneurship spillover. Moreover, the innovation only affects positively entrepreneurship spillover in restricted situations, briefly when the sectors have high competition and/or a high degree of technology.

Key words: *Entrepreneurship, knowledge spillover, input-output matrix, multipliers*
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1. Introduction

Spillovers occur if an innovation, discovery of a new productive activity, firm agglomerations, industry concentration (Ellison and Glaeser, 1999), or any improvement implemented by a certain enterprise increases, the performance of another enterprise without the latter benefiting having to pay full compensation. According to the endogenous growth theory (Lucas, 1988; Romer, 1986), spillovers are the engine of growth. Therefore, the diffusion of knowledge and innovation are a key element for explaining the comparative advantage of OECD countries in the current globalized economy (Audrescht and Thurik, 2000). In this sense, governments are developing policies that encourage the creation of regional clusters (Audrescht and Lehmann, 2005). Examples of such policies are the stimulation of R&D spillovers, venture capital, and the creation of start-ups[1] by entrepreneurs, who are the single most important player in a modern economy (Lazear, 2002).

The traditional view of knowledge and innovation is that the firm exists exogenously and then invests in research and development or the augmentation of human capital through training and education of workers to endogenously create new knowledge and ideas (Audrescht and Lehmann, 2005). Thus, Griliches (1979) postulated that the production of knowledge is exogenous and depends on the *Firm's Knowledge Production Function*. While this theory has been proved at the levels of country and industry, the results are quite ambiguous at the firm level, particularly when new and small enterprises were included.

Small firms were found to contribute more to innovative outputs than would have been expected from their rather meager investments in R&D and other knowledge inputs (Audrescht and Lehmann, 2005, pp. 1192). Consequently, there exists a paradox. Small firms have a high innovative output with a relatively low level of inputs what seems to contradict the model of Griliches (1979). This paradox was solved by Acs, *et al.*, (2005) and Audrescht, (2007) who introduced the *Knowledge Spillover Theory of Entrepreneurship* (KSTE). This theory suggests that, ceteris paribus, entrepreneurial activity will tend to be greater in contexts where investments in new knowledge are relatively high, since the new firm will be started from knowledge that has spilled over from the source actually producing that new knowledge.

[1] A public mechanism to create start-ups is the figure of incubators (Rice, 2002; Peña, 2004). When they have a technological profile they are called technological parks, in this case they usually have strategic agreements with universities.

The empirical tests that supports KSTE was provided from analysing variations in start-up rates across different industries reflecting different underlying knowledge contexts. In particular, those industries with a greater investment in new knowledge exhibited higher start-up rates, which were interpreted as a mechanism by which knowledge spillovers are transmitted. Indeed, Audrescht and Lehman (2005) states that in a low knowledge context, the lack of new ideas will not generate entrepreneurial opportunities based on potential knowledge spillovers.

It is worth noting that the notion of knowledge spillover has been considered before to KSTE. For example, in the Romer (1986) model of endogenous growth new technological knowledge is assumed to automatically spillover. This notion is also consistent with Arrow (1962) who pointed out that knowledge differs from the traditional factors of production (capital and unskilled workers) in that it is non-excludable and non-exhaustive.

Although the development of the concept of knowledge spillover is important by itself, the existent methodologies[2] do not allow evaluating other types of systemic externalities, like the produced ones through the creation of firms. Those externalities are generated for structural need, consequently even if there is no diffusion of knowledge the system will require the creation of new enterprises, whether or not the economies are knowledge-intensive. Besides, these externalities can be understood as *Entrepreneurship Spillover*.

The matrix input-output of Leontief (1936) allow the quantification of individual and systemic impacts and direct, indirect and induced effects of the creation of one employment in a particular sector (Hazari, 1970). Furthermore, the model input-output capture the linkages between different sectors of the economy and predicts the total number of firms for the different economic sectors in the region (Maoh, *et al.,* 2005). This methodology also has been implemented for the calculation of knowledge spillover using R&D multipliers (Dietzenbacher and Volkerink, 1998; Dietzenbacher and Los, 2000; Dietzenbacher and Los, 2002). Therefore, an adaptation of this model will allow us estimating the impacts and effects of the creation of one firm, what can be interpreted as *Entrepreneurship Spillover.*

While the KSTE evaluates the spillover from the creation of new firms intensive in knowledge, the *Entrepreneurship Spillover* evaluates the systemic effect of creating enterprises in different sectors and industries from a new firm created in a given sector. In this

[2] See the work of Dean *et al.* (2007) for a revision of the methodologies used in previous studies of entrepreneurship.

regard the objective of the paper is analysing whether the determinants of KSTE are the same than the ones that generate *Entrepreneurship Spillover*.

As it is well-known, in the literature there have been attempts to determine which variables affect knowledge spillover. There are two approaches. Intra-sectoral approach (Marshall, 1890; Arrow, 1962; Romer, 1986; Porter, 1990, Glaeser *et al.*, 1992; Stel and Nieuwenhuijsen, 2002) focuses on the impact of specialization and competition on knowledge spillover, and inter-sectorial approach which studies the effects of diversity and competition on knowledge spillover (Jacobs, 1969; Stel and Nieuwenhuijsen, 2002).

We remark then that the present paper has two important contributions. First, it is the first work that introduces a methodology that allows calculating *Entrepreneurship Spillover*. Second, it studies the impact of diversity, competition (Jacobs, 1969; Stel and Nieuwenhuijsen, 2002) and innovation (Audrescht, 1995) on *Entrepreneurship Spillover* with Spanish data in an inter-sectorial framework. The remainder of this paper is as follows. Next a theoretical explanation for the measures of entrepreneurship spillover is made. In the third section the variables that affect entrepreneurship spillover are introduced and hypothesis settled up. In the fourth and five sections data and results are discussed. Conclusions close the work.

2. Measuring Entrepreneurship Spillover

2.1. The intuition of Inter-sectorial Entrepreneurship Spillover

The idea that Entrepreneurship can be transmitted through different sectors come indirectly from a statement of Sala-i-Martin (2004). He points out that when a new or established firm increases their capital stock through investments, there is not only rising their own production, there is also a positive effect on the production of the firms that operate around it. One of the reasons that explain this phenomenon is that firms that invest get also experience and knowledge. This knowledge can be used for the firms that operate around to the one making investments and therefore their production also rises.

Other relevant reason is the technological change o the transition effect of an economy what implies that certain sector starts to becoming more important because the phenomenon called *creative destruction* (Schumpeter, 1934;1942). Besides, other determinant factor is the effect of *role models* in the society. The successful entrepreneurs are a mirror for the future entrepreneurs, and the latter compare themselves with "reference groups" who occupy the social role to which the individual aspires (Merton, 1945).

Other reason important to generate entrepreneurship spillovers is the entrepreneurship capital, that it implies the capacity for economic agents to creation new firms. Audretsch and Keilbach (2004a; 2004b; 2004c; 2005) explain that the entrepreneurship capital contribute to output and growth by serving as a conduit for knowledge spillovers, increasing competition, and by injecting diversity among enterprises, configuring a entrepreneurial economy (Audretsch and Thurik, 2000; 2006). Stel *et al.*, (2005) also suggest the same idea with the entrepreneurial activity and its impact in the economics growth.

Knowledge spillovers operate more strongly in some parts of the economy than others and so there are particular characteristics that tend to be associated with locations –such as high tech industries– where opportunities are found (Acts, *et al.*, 1995). Most innovations take place in high technology opportunity industries and not in low technology opportunity industries (Scherer, 1965).

Other important aspects are the active learning model in the industry (Ericson and Pakes, 1995). This model is based upon a stochastic model of the entry and growth of a firm through the active exploration of its economic environment. The firm invests to enhance its capability to earn profits in an environment characterized by substantial competitive pressure from both within and outside the industry. The stochastic outcome of a firm's investment, the success of other firms in the industry, and competitive pressure from outside the industry (both in the market and through entry) determine the "success" of the firm, i.e. its profitability and value. If success is limited, deterioration in the profitability of the firm can lead to a situation in which it is optimal to abandon the whole undertaking. This endogenizes exit behaviour, and provides a natural way of accounting for selection in the process of determining the evolution of the industry.

There are other reasons like the dynamics evolution of firms (firmography) that relate to the establishment of new business in a study area or to the growth decline failure and migration of existing business establishments (Maoh and Kanaroglou, 2007). Van Wissen (2000) notes that firmographic process are effective in informing changes in the distribution of business establishments over space and time that the modeling of such processes can play a significant role in regional planning. Acs and Mueller (2007) have other view, they suggest that the creation of employment is a function of the typology of firms created [gazelles, mices or elephants following the classification from Birch (1979)].

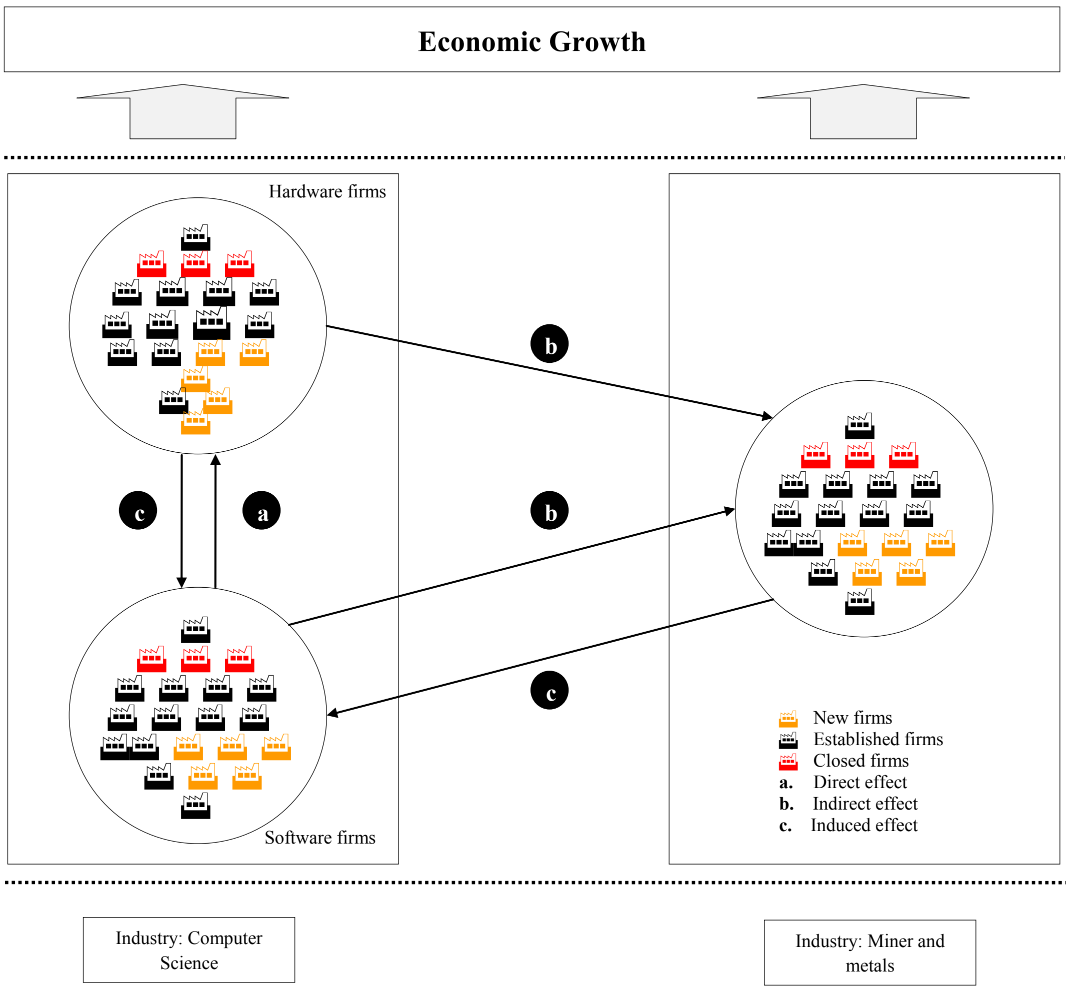
According with the theory of the population’s ecology the size of the population must be measured through the density, or the number of firms that constitute the population, developing the model called crossed density (Hannan y Freeman, 1989). This model points out that the intensity of the competence is proportional to the density of the populations competing business.

Callejón (2003) explains that the intersectorial variation suggest that the specific patterns of entry, exit and behaviour (survival, growth and/or innovation) are related also with intrinsic characteristics of each industry such as the importance of the increasing returns to scale, the differentiation of product, or the effort incurred in R&D. Indeed, the role of the knowledge shows the importance of the sectorial dimension of the industry policy (Audretsch and Callejón, 2007). In this regard, Callejón (2003) points out that its origin comes with the asymmetric distribution of the firms’ size among sectors, fact that Gibrat (1936) shows in situations where the growth of each firm in each period is random and independent of the size.

When new businesses enter an industry, they may have both direct and indirect effects on industry-wide economic performance. Stel and Suddle (2008) held the direct effect relates to the new jobs that are created in the new units at the start of business operations; the indirect effects relate to the effects the new businesses have on the incumbent firms in the market.

Under these perspectives, we hypothesized that firms that are created in one sector contribute first to the creation of firms in the same sector (*direct effects*), second contribute to the creation in other sectors (*indirect effects*) and finally a feedback effect allows the creation of firms in the original sector (*induced effects*). These effects can be measured through the methodology of the multipliers and chains stated by Rasmussen (1956), Hirschman (1958), Chenery and Watanabe (1958), Hazari (1970), Dietzenbacher and Los (2002). Using this methodology we create a measure for the *Entrepreneurship Spillover* or in other words the impact generated in the economy (enterprise system) for the creation of one firm in a given sector.

Graph 1: Entrepreneurship Spillover from the Software sector.



Source: Self -elaborated

In order to illustrate all these concepts we use an example from the computer science sector. Let us assume the creation of a group of firms in the Software sector. These firms will require hardware that in part will be commercialized through a group of new firms in the Hardware sector, generating the direct effect.

In order to produce their products hardware firms require an increasing amount of products and services from other sectors (i.e. metallurgic, business services), this is the indirect effect. Finally, firms created in other sectors will require software sectors generating start-ups in the Software sector, this is the induced effect. This case is shown graphically in Graph 1.

Although the example is a simplification of the reality, because the creation of firms in the economy is multidimensional, it allows evaluating directions and determines in a static way strategies of the entrepreneurship activity at the sector level. From all this reasoning it is possible to measure the speed which the entrepreneurship is disseminated in the economy among sectors. This speed contains the direct, indirect and induced effects and measures the entrepreneurship spillover. It is calculated from the multipliers mentioned above, in this sense, sectors can be interrelated, being higher the entrepreneurship spillover when this networks are stronger.

2.2. Calculation of Inter-sectorial Entrepreneurship Spillover.

In order to analyze the inter-sectorial entrepreneurship spillover relationships, this paper apply the model proposed by Leontief (1936) and Dietzenbacher and Los (2002b). In this context, the vector **X** of the *Input-Output Tables* reports the production; the **Z** that represents the demand of Intermediate Goods and Services; and the vector **Y** that shows the final demand[3]. Additionally, z_{ij} elements correspond to the intermediate industry consumption, where i represent the sector inputs and j the sector outputs.

$$\mathbf{X} = \mathbf{Z} + \mathbf{Y} \tag{2.1}$$

According with the classical perspective of the demand (Leontief, 1936) and the supply (Gosh, 1958), these **Z** matrix's elements allow us estimating the direct requirement. For example, if we divide each z_{ij} element (intermediate industry consumption) by the each element of the column X_i (final production), we obtain a new matrix called the *Technical Coefficient Matrix* (function 2.2). In this sense, the **A** matrix represents the inputs "i" that a

[3] The final consumption in Spain is calculated by the sum of the consumption of all household, public administration, and not lucrative organizations. The invest expense denotes the formation of the fixed capital.

sector requires to produce a unit of the "*j*" product. In addition, the columns represent the cost structure from every economical sector.

$$a_{ij} = \frac{z_{ij}}{X_i} \tag{2.2}$$

Afterwards, each element of a_{ij} is grouped in the **A** matrix. The $\hat{\mathbf{X}}$ matrix is the diagonal matrix of the **X** vector like shows the function 2.3. Then, when z_{ij} is cleaned and replaced by the function 2.1, the Leontief's (1958) model is obtained.

$$\mathbf{A} = \mathbf{Z}\hat{\mathbf{X}}^{-1} \tag{2.3}$$

$$\mathbf{X} = \mathbf{AY} + \mathbf{Y} \tag{2.4}$$

The elements from the Leontief Inverse Matrix [$(\mathbf{I} - \mathbf{A})^{-1}$, or **B**] reveals the economic relationships among the industries. The vertical sum of **B** shows the direct and indirect requirements of outputs produced by the final demand of the sector increments in one unit *j* (individual effect). Similarly, the horizontal sum represents the necessity of direct and indirect inputs when final demand of all economical sectors increment in one unit (system effect). The main diagonal of **B** measures the direct impact; while the elements outside of the diagonal measure the indirect impact.

$$\mathbf{X} = (\mathbf{I} - \mathbf{A})^{-1}\,\mathbf{Y} \tag{2.5}$$

$$\mathbf{X} = \mathbf{BY} \tag{2.6}$$

One of the most important applications of the Leontief's (1936) Model is that allows estimating the capacity that an economic or productive activity has to generate the development of others. For example, buying products from the others (*backward linkages*) or selling their own products (*forward linkages*). This is known as the *industrial linkages* developed by Hirschman (1958). In this sense, he pointed out that not all economic activities have the same capacity to induce effect over others. Also, he supported that if these linkages are known it is possible to predict the future.

In this paper, the data to estimate these linkages are obtained from the Leontief matrix **(B)**. These linkages will be used to determine the multipliers that depend on the matrix[4] employed,

[4] Matrix Type I = not endogeneized, and Matrix Type II = endogeneized (because include –macroeconomic- consumption in the matrix)

Schuschny (2005).[5] The multipliers allow evaluating the effects that some variables have over the level of economic activity (Thomas and Miller, 2006). These multipliers present important conclusions in order to develop economic policies.

Supported on that, the total demand perspective and also the Gosh's (1958) perspective are used to compare the results that will be obtained.[6] Also, this paper intent to evaluate the entrepreneurship spillovers using the **M** vector (m_i) that represents the direct coefficients of the entrepreneurship (the total new business creation divided by the volume of production from each sector).

$$m_i = \frac{e_i}{X_i} \tag{2.7}$$

Later, the **M** vector is diagonalized and it is multiplied by the Inverse Matrix of Leontief (**B**). As a consequence, a new matrix (**K**) with all the k_{ij} coefficients denominated direct, indirect and induced technical coefficients of entrepreneurship is obtained. At this moment, these indicators are called Entrepreneurship Spillovers. Concretely, the sum of the elements from the **K** matrix's columns represents the *backward multipliers* or number of new enterprises that are required by the sector or industry; in order to answer to a unitary increment in the demand of a product. The column vector of the *backward multipliers* is obtained pre-multiply the **K** matrix by a row vector with values 1. In the present paper the induced effects are not separated, for an extensive revision for calculating them, see Dietzenbacher and Los (2002a), whom include them as direct effects.

$$\mathbf{K} = \hat{\mathbf{M}}(\mathbf{I} - \mathbf{A})^{-1} \tag{2.8}$$

Afterwards, it is overlay with the following function; where, $\mathbf{U_j}$ is the column vector with the number of new enterprises created by each sector, when is observed a variation of a unit in the demand of each one. This indicator was called Dispersion Power by Rasmussen (1936).

$$\mathbf{U_j} = \bar{\mathbf{U}}_\mathbf{j} = \mathbf{Vuf} * \mathbf{K} \tag{2.9}$$

[5] For further description about the types of multipliers (from income, employment, product, consumption,) see Charney and Leones (1997).

[6] In fact, Dietzenbacher and Los (2000; 2002) combine these perspectives. For example, for the backward linkages, they used the demand perspective while for the *forward linkages* used the supply perspective.

The normalized values of U_j allows comparing the results and to show graphically (Graph 2) in which sectors the enterprises multiply more the business creation than others; and also which ones are produced the most relevant direct, indirect and induced effects.[7]

$$U_j = \frac{\frac{1}{n}K_j}{\frac{1}{n^2}\sum_{j=1}^{n}K_j} \tag{2.10}$$

The traditional methodology suggests that to calculate the *forward linkages* are used the values by rows from the same **K** matrix[8]. These values represent the direct or indirect effect of the business creation when the demand changes in one unit in all sectors. Also, the *forward multipliers* denominate the Sensibility Power of the Dispersion indicators. Finally, these multipliers are obtained when the **K** matrix is multiplied by a unitary column vector like this:

$$\mathbf{U_i = K * Vuc} \tag{2.11}$$

Then, the column vector information is normalized by the following function:

$$U_i = \frac{\frac{1}{n}K_i}{\frac{1}{n^2}\sum_{i=1}^{n}K_i} \tag{2.12}$$

The two vectors U_i and U_j allow constructing the dependent variable what measures entrepreneurship spillovers. Besides, it quantifies the multiplicative effects that have the creation of firms in the rest of the economy (growth, enterprise systems, output,…) (Graph 1). In the other hand, those indicators allow obtaining the direct, indirect and induced effects of the firm creation, what can be used to measure the speed of dissemination of the firms. Besides, we can estimate individual effects in a given sector and systemic effects when a new firm is created. Finally, those vectors allow classifying the productive sectors in four groups: key sectors, strategic sectors, drivers sectors and independent sectors (Table 1.a).

[7] On the other side, the dispersion coefficients (V_j and V_i) represents the variability of the direct and indirect requirement of new enterprises. The recommendation is that this indicator will be lower because the dispersion is uniform in all sectors:

$$V_j = \frac{n}{\sum_{i=1}^{n}K_{ij}}\sqrt{\frac{1}{n-1}\sum_{i=1}^{n}\left(K_{ij}-\frac{1}{n}\sum_{i=1}^{n}K_{ij}\right)^2} \qquad V_i = \frac{n}{\sum_{j=1}^{n}K_{ij}}\sqrt{\frac{1}{n-1}\sum_{j=1}^{n}\left(K_{ij}-\frac{1}{n}\sum_{j=1}^{n}K_{ij}\right)^2}$$

[8] This paper follows the methodologies proposed by Rasmussen (1956). However, Dietzenbacher (1997; 2002) suggests the possibility to use the Gosh's (1958).

3. Developing Hypotheses

According to Jacobs' theory (1969) knowledge spillovers work out most effectively among enterprises that practice different activities. Thus, it matters to construct networks among different sectors. Stel *et al.* (2002) found evidence for this positive relation. In particular, using sectorial and regional data from Netherland they found that more diversity implies higher relative growth of real value added. Feldman and Audretsch (1999) identified the extent to which the extent of diversity influences innovative output.

They link the innovative output of product categories within a specific city to the extent to which the economic activity of that city is concentrated in that industry, or conversely, diversified in terms of complementary industries sharing a common science base, Audretsch (2007). For other side, not only does entrepreneurship capital generate a greater number of enterprises, but it also increases the variety of enterprises in the location (Audretsch and Keilbach, 2004a; 2004b; 2004c; 2005).

Hannan and Freeman (1989), based in the population ecology literature, explain that each new organization represents a unique approach. There has been a series of theoretical arguments suggesting that the degree of diversity, as opposed to homogeneity, in a location will influence the growth potential (Audretsch and Keilbach, 2004a). This argument that was used previously to explain the positive relation between knowledge spillover and diversity can be used now to postulate a relation between diversity and entrepreneurship spillover. In this sense, different types of firms in the same sector imply more entrepreneurship that is transmitted into the sectors that operate with the first sector. Consequently, as a first hypothesis we can point out that it may exist a positive relation between entrepreneurship spillover and diversity.

H_1: Diversity affects positively entrepreneurship Spillover.

There are two dominant and contradicting views in the relation between competition and knowledge spillovers. Jacobs (1969) is referring to the competition for the new ideas embodied in economic agents. Not only does an increased number of firms provide greater competition for new ideas, but in addition, greater competition across firms facilitates the entry of a new firm specializing in some particular new product niche. While Jacobs (1969), Porter (1990) and Stel *et al.* (2002) consider that competition has a positive effect on knowledge spillover because accelerates imitation and upgrades innovation, MAR (Marshall, 1890; Arrow, 1962; Romer, 1986) stated that they have a negative relation as the externalities associated with the innovation are internalized by the innovator.

We consider that the first view can explain better the effect of competition on entrepreneurship spillover. In this sense, more competition may entail more entrepreneurship that is transmitted into the sectors that operate within them. Feldman and Audretsch (1999) and Glaeser et al. (1992) found empirical evidence supporting the hypothesis that an increase in competition, as measured by the number of enterprises, in a city increases the growth performance of that city. Consequently, our Hypothesis 2 suggest a positive relation between competition and entrepreneurship spillover.

H_2: *Competition affects positively entrepreneurship spillover*

According Cohen and Levinthal (2003), by depeloping the capacity to adapt new technology and ideas developed in other firms, firm-specific investments in knowledge such as R&D provided the capacity to absorb external knowledge. The technological progress and the innovation generate *"technological paths"* through specific knowledge (Audretsch and Callejón, 2007). Therefore, the sectors with technological dynamism and high impact in the final demand must be identified (i.e. aeronautical, biotechnology, medicine, renewal energy) For doing so the regulator must introduce policies that allow increasing the relative weight of such sectors in the productive structure; for instance, impelling that big firms takes the role of "tractors" or "propulsive" firms that push the innovation in the rest of the firms (Trullén, 2006; Nadal, 2003; Perroux, 1991).

The effect between innovation and knowledge spillover is important in the literature (Audrescht and Feldman, 1996; Fristsch and Franke, 2004) being considered a positive relation. We hypothesize also a positive sign for innovation and entrepreneurship spillover. The argument is as follows, sectors with high innovation stimulate entrepreneurship (Audrescht, 1995) that is transmitted into sectors that operate around the innovation.

H_3: *Innovation affects positively entrepreneurship Spillover.*

3.1 Model

In order to contrast empirically our hypothesis we state the following model shown in equation (3.1)

$$KS = \beta_0 + \beta_1 \cdot D + \beta_2 \cdot C + \beta_3 R\,\&\,D + \beta_4 \cdot I + \beta_5 \cdot I * D + \beta_6 \cdot I * C + \sum_{i=7,\dots,9}^{j=1,\dots,3} \beta_i T_j \qquad (3.1)$$

where:

KS:	*Key Sector or Key Sector Continuous (Entrepreneurship Spillover Index)*
D:	*Diversity*
C:	*Competition*
R&D:	*Research and Development*
I:	*Innovative Sector. Dummy variable with value 1 when the R&D overcomes 0,5.*
T:	*Degree of technology of the sector.* T_1 *denotes high-tech sectors,* T_2 *indicates medium-tech sectors and* T_3 *for Innovative sectors (I) minus the ones that belong to the* T_1 *and* T_2*.*

Hypothesis 1 states a positive relation between diversity and entrepreneurship spillover. It means that in the model stated in equation (3.1) β_1 is positive and statistical significant (β_1>0). Moreover, Hypothesis 2 points out a positive relation between competition and entrepreneurship spillover, in our model it implies that β_2 is positive and statistical significant (β_2>0).

Finally, Hypothesis 3 postulates a positive relation between innovation and entrepreneurship spillover. In terms of equation (3.1) this relation means that either β_3 or β_4 are positive depending on the specification (β_3>0 or β_4>0). Indeed, when the parameters of high tech sectors (β_7>0), medium tech sectors (β_8>0) and/or the rest of the innovative sectors (β_9>0) have a positive and significant sign means that they have a higher impact on generating entrepreneurship spillover respect with non-innovative sectors.

It is worth noting that β_5 and β_6 play the function of calculating whether there is different competition and/or diversity in innovative sectors. For example, if β_5 is positive and statistically significant would mean that the diversity plays a different role depending on the degree of innovation of the sector, contributing more to entrepreneurship spillover when the sector is innovative by itself.

4. Data Construction[9]

The main data source was the *Input-Output Table* that is published by the National Institute of Statistics (INE)[10] of Spain. The last published table integrates the economic information from 73 (R-73) sectors during the 2002. Additionally, the information to build the enterprise vector was obtained by the Central Directory of Enterprises in Spain (DIRCE)[11]. In this point, it is important to mention that this information was reclassified in order to have a vector for 73 sectors. The main reason is that this directory does not register the enterprise from the agricultural, silviculture, and fishing. In this sense, the information of these sectors was obtained from the iPYME database that develops the Spanish Ministry of Industry[12], and complemented by the SABI database.[13]

4.1 Dependent Variables: Entrepreneurship Spillover measures.

From the input-output matrix **K** we obtained four coefficients for each sector. These coefficients are constructed from the impact forward and backward for the creation of one start-up. From this coefficient we create two variables in order to make a robust analysis of entrepreneurship spillover.

Firstly we create a continuous variable that is called *Key sector Continuous (KSC) or Entrepreneurship Index.* It is created from the sum of the forward and backward coefficients minus the value of the diagonal ($KSC = U_i + U_j - U_{ij}$).[14] Besides, we create a dummy that differentiate whether the sector is a key sector or not, what is called *Key sector* (KS). It has value one when the two (forward and backward) coefficients measuring the inter-sector impact of the creation of one firm are higher than 1. Those sectors, by construction, have the higher *Entrepreneurship Spillover Index*.[15]

- Insert Table 1a and 1b about here -

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[9] The list of the sectors and detailed information of the dependent and independent variables can be consulted in the Appendix 1.
[10] INE, [http://www.ine.es/]
[11] DIRCE, [http://www.ine.es/inebmenu/mnu_empresas.htm]
[12] Dirección General de Política de la PYME, [http://www.ipyme.org]
[13] SABI, [http://sabi.bvdep.com]
[14] It is worth noting that we subtract the value of the Diagonal ($\mathbf{U_{ij}}$) because we have it in the backward and forward coefficients and hence it must be deducted once.
[15] Take notice that, by construction, the analysis made with the continuous variable is less strict than the one made with the dummy variable. While the first one simply determines small changes in entrepreneurship spillover, the latter requires a dramatic change. Looking at the distribution of the sectors in Graph 2, most of them need to rise from the *independent sectors* quadrant to the *Key sector* one.

4.2 Independent Variables: Diversity, Competition and Innovation.

We introduce 3 independent variables. *Diversity* is measured as the proportion of firms created with a number lower than 5 employees and by autonomous divided by the total firms in each sector. *Competition* is calculated as the amount of established firms over the value created in the sector multiplied by 10^6. In this sense we measure the inverse of the average size of the established firms.

The factor that the sector is innovative or not is controlled through *R&D*, this variable is the ratio of employees dedicated to research and development for 1.000 of employees in each sector. We also define that a sector is *innovative*[16] when R&D is higher than 0.5. 36 over 73 sectors accomplish with such restriction. We can also classify innovative sectors into three groups using the notation of DIRCE. In particular, 2 sectors[17] belong to *High-tech* sectors (Computer activities and R&D), 9 sectors more belong to *medium technology*, and the rest (25) can be considered innovative with low degree of technology.

[16] We recognize that is a general definition. In this sense this value has been generated because the need of dividing the sample in groups of similar size. In particular, we have 37 sectors that are considered non-innovative and 36 that are considered innovative.

[17] DIRCE also includes the sector 52 ("Post and Telecommunications") to high-technology. Due to the presence of Post in this sector (it is low innovative) and the fact that the data of the input-output can not be separated, we decide to consider the sector 52 as medium technology.

5.- Results

In a first stage we run a one-way ANOVA analysis in order to know whether the means of the continuous variables are equal depending on the fact of being a Key sector or not. The results are shown in Table 2.

- Insert Table 2 about here -

From Table 2 we can reject the null hypothesis that the means are equal for diversity, competition and innovation. In this sense sectors that generate more entrepreneurship spillover are those that have higher diversity, competition and innovation. Those results support our Hypotheses 1, 2 and 3.

In the second stage we test the model (3.1) through two methodologies. First, we estimate the probability of being a key sector (KS equal 1). To do so we use the dummy variable that takes value 1 when the values of U_i and U_j (inward and upward effects) are higher than 1, and 0 otherwise.

It is worth noting that only 17 sectors are considered key (23,3% of the cases) what imply that being Key can be considered a rare event, besides our sample is also small (73 observations). For those cases a methodology called RELOGIT is recommended[18] (King and Zeng, 2001), it modifies the logistic distribution to the observed mean and specifically controls for small samples. For this regression we cannot use the dummies of innovative sectors as many observations are completely determined, for this case then we assumes that β_4, to β_9 equal 0. The results are shown in the models 1 and 2 of the Table 3.

- Insert Table 3 about here -

From the Model 2 of Table 3 we observe that β_1 and β_2 are positive and statistically significant. Instead, β_3 is positive but not significant. In this sense, the evidence supports Hypothesis 1 and 2 and hence more diversity and competition increases the probability of the sector being Key.

Respect to Hypothesis 3 the sign is consistent with the predicted one but it is not significant. Therefore the positive relation between innovation and Entrepreneurship Spillover is very weak. At this point it is worth noting that the fact that a explicative variable is not significant

[18] We test both, LOGIT and RELOGIT. Although the parameters are the same, it can be observed in Table 2 that the statistical significance differs among methods due to the modifications of the distribution.

in converting a sector in a key-sector, it does not mind that it can be significant in explaining small improvements in entrepreneurship spillover. For that purpose a continuous analysis is required. The mentioned analysis is shown in the Models 3 and 4 of the Table 3 and uses a continuous dependent variable (KSC).

In the Model 3 we use the two interactive variables and in order to avoid high correlation between the dummies and the continuous variables of high innovative sector we decide to assume that β_3 equal 0. We use OLS to estimate such model. Again the signs and significances of the parameters highly support Hypotheses 1 and 2. Therefore, more competition and diversity entail a higher Speed of transmitting entrepreneurship and thus a high amount of *Entrepreneurship Spillover*.

The parameter β_6 is positive and statistically significant what implies that competition have a more important effect for innovative sectors. In particular, an increase of 10% in the competition of an non-innovative sector implies that the speed of entrepreneurship increases in 3,07%, this effect moves to 4,89% (0,307 + 0,182) when the sector is innovative.

The Model 4 assumes that β_3 to β_6 are 0 in order to avoid correlation with the variables denoting the degree of innovation. The results indicate that innovation generates entrepreneurship spillover when the technology used is very high. In this regard, we could conclude that Hypothesis 3 is accepted for restricted situations. In particular we can state that innovation produces a higher amount of entrepreneurship spillover only when the competition and the degree of technology are high.

6. Conclusions

The input-output methodology created by Leontief (1936) allow calculating the marginal effect in the production of sector *i* when introducing one unit of production to the sector *j*. This methodology has been used for calculating the concept of Knowledge Spillover (Audrescht, 1995) through the use of R&D multipliers (Dietzenbacher, 2002; Dietzenbacher and Los, 2002; Diezenbacher and Volkerink, 1998). In this sense, an important contribution of the paper is the use of the same methodology for calculating the *entrepreneurship spillover*. In short, we quantify the amount of star-ups created in the sector *i* given a marginal variation in the sector *j*.

Once introduced the concept of *entrepreneurship spillover* we decided to analyse different variables that have been studied previously for analysing the impact on knowledge spillover in an intra-sectorial framework. In this sense, consistently with previous literature we hypothesize that diversity, competition and innovation have positive effect on entrepreneurship spillover.

Although the descriptive results state that the three variables have a positive relation with entrepreneurship spillover, the multivariate analysis show that only diversity and competition significantly explain the fact of a sector having a high degree of *entrepreneurship spillover*. The low capacity of innovation for explaining the variance of the *entrepreneurship spillover* can be explained by the fact that innovation is changing their relative importance. In this sense, the impact of innovation in the economy was higher some decades before.

The results allow making important recommendations for governments. Assuming that entrepreneurship is the engine of the economic growth (Schumpeter, 1934;1942) our evidence suggests that policy makers must introduce measures for incrementing diversity and competition. We propose two policies for doing so. First the establishment of incubators for the creation of very small projects (less than 5 workers). Second the reduction of the regulations of entry.

We understand that the concept of entrepreneurship spillover is very new and therefore further research is required, in both theoretical and empirical perspectives. In this sense, a particular issue that must be taken into account in future works is the analysis of entrepreneurship spillover in an intra-sectorial approach considering also the effect of being in a different region.

On the other hand, it is worth noting that the input-output model is static and hence can produce wrong interpretations. Even so, these problems can be overcome if we take into account that the technical coefficients used for the inverse matrix of Leontief (1936) do not change in the short/medium run, as it could make the business efficiency.

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TABLE 1a: **Key Sectors**

	$U_j < 1$	$U_j \geq 1$
$U_i \geq 1$	Strategic sectors or receptors	**Key Sectors**
$U_i < 1$	Independent sectors (Islands)	Sectors drivers

TABLE 1b: **Identification of Key Sectors**

	$U_j < 1$	$U_j \geq 1$
$U_i \geq 1$	Strategic sectors or receptors : 1	**Key Sectors:** 40, 41, 42, 43, 44, 45, 47, 55, 56, 57, 58, 59, 60, 64, 65, 66, 72
$U_i < 1$	Independent sectors (Islands): 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 46, 48, 49, 50, 51, 52, 53, 61, 62, 63, 68, 70, 71, 73	Sectors drivers: 54, 69

Note: It is possible of applying the same principle to the full range of multipliers.

TABLE 2: **Descriptive Statistics**

Variables	**Key Sector (KS)**	**No-Key sector (NKS)**	**Total**	**KS-NKS (a)**
KSC $(U_i+U_j-U_{ij})$	3,41	0,27	1	***
Diversity	90,89	64,68	70,79	***
Competition	8,98	0,60	2,55	***
R&D	6,66	1,18	2,45	*
Observations	17	56	73	

(a) One-way ANOVA. Significance Level: ***1%, **5%, *10%

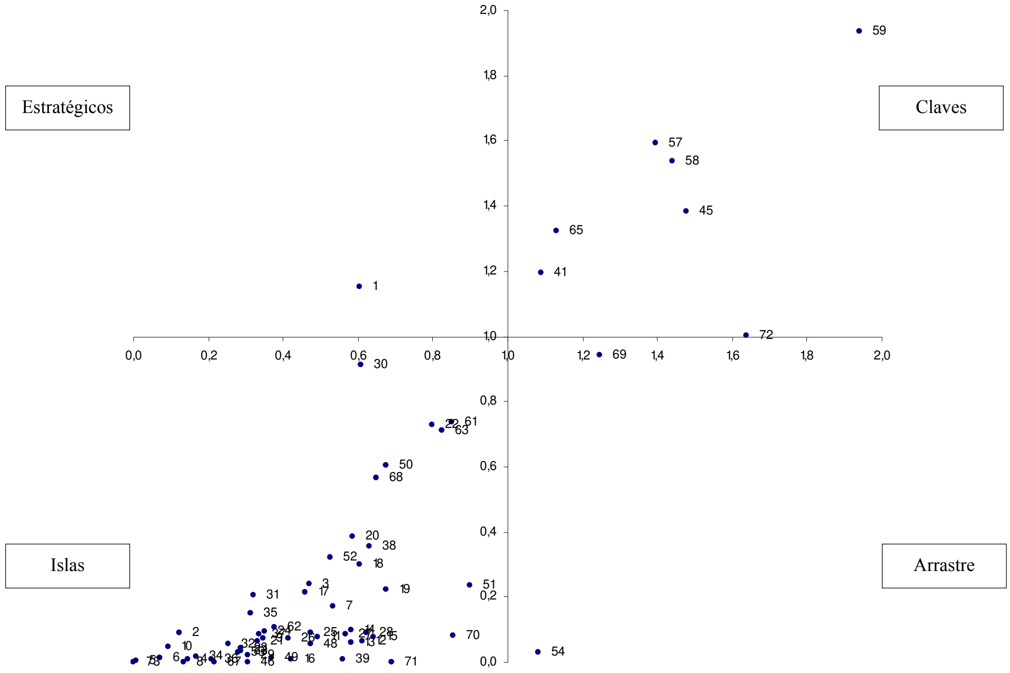
TABLE 3: **Multivariate analysis**

		(1) LOGIT	(2) RELOGIT	(3) OLS†	(4) OLS
Independent \\ Dependent	Parameter	KS Dummy	KS Dummy	KS Continuos	KS Continuos
Diversity (D)	β_1	0,214	0,214*	0,0043**	0,0048**
		(0,116)	(0,116)	(0,0021)	(0,0019)
Competition (C)	β_2	1,743***	1,743**	0,3071***	0,3077***
		(0,771)	(0,771)	(0,0051)	(0,0052)
R&D	β_3	0,173	0,173		
		(0,174)	(0,174)		
Innovative sector (I)	β_4			-0,0755	
				(0,3300)	
I*D	β_5			-0,0023	
				(0,0049)	
I*C	β_6			0,182***	
				(0,0620)	
High-Tech (HT)	β_7				0,519**
					(0,259)
Medium Tech (MT)	β_8				-0,188
					(0,138)
Innovative sector (I-HT-MT)	β_9				-0,095
					(0,091)
Constant	β_0	-22,997*	-22,997**	-0,0461	-0,090
		(10,906)	(10,906)	(0,1567)	(0,143)
R Squared				0,9842	0,9833
Pseudo R squared		0,8176	0,8176		
Observations		73	73	73	73

Significance Level: ***1%, **5%, *10%; Parenthesis: Standard errors

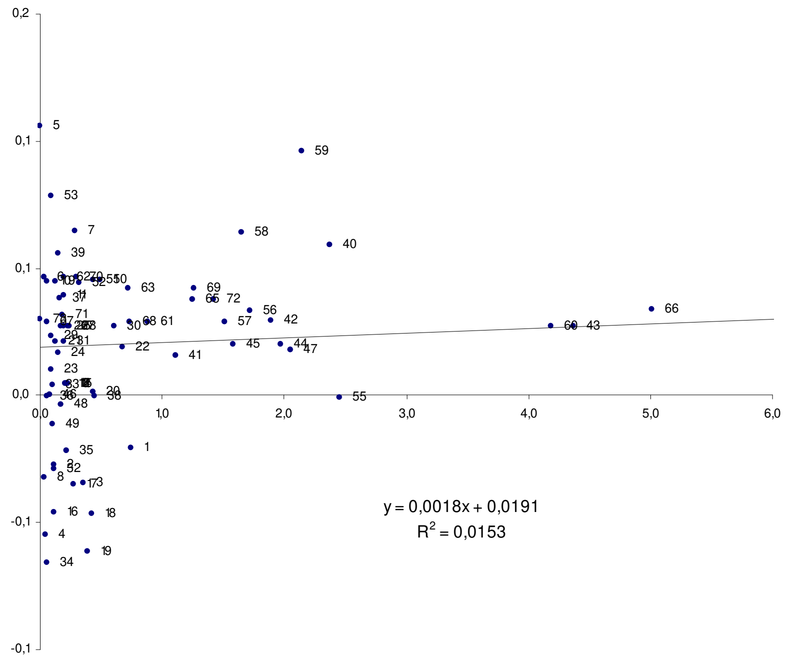
† The Interactive variables add information to the model. In particular, LR chi2(2) = 10.68; Prob > chi2 = 0.0048

Graph 2: Identificación de Sectores Claves para la Creación de Empresas



Fuente: Elaboración Propia

Graph No. 1: Economic Growth and Entrepreneurship Index



Fuente: Elaboración Propia

Anexo 1: Descriptivos Principales

Cód.	Sector	Y	X	L	*ea*	T	e	t=T/X	m=e/X	r=e/T	ΔPIB
1	Agricultura, ganadería y caza	13.276	40.134	937	26	86.432	6.551	2,15	0,16	0,08	-0,021
2	Selvicultura y explotación forestal	742	2.065	35	0	925	70	0,45	0,03	0,08	-0,027
3	Pesca y acuicultura	2.172	2.998	61	1	4.258	323	1,42	0,11	0,08	-0,034
4	Extracción de antracita, hulla, lignito y turba	6	2.033	10	0	136	5	0,07	0,00	0,04	-0,055
5	Extracción crudos de petróleo y gas, de uranio y torio	165	15.637	1	0	49	5	0,00	0,00	0,10	0,106
6	Extracción de minerales metálicos	29	1.337	1	0	64	8	0,05	0,01	0,13	0,046
7	Extracción de minerales no metálicos	528	3.048	36	1	2.739	192	0,90	0,06	0,07	0,065
8	Coquerías, refino y combustibles nucleares	11.055	26.767	9	0	18	1	0,00	0,00	0,06	-0,032
9	Producción y distribución de energía eléctrica	4.520	19.711	40	1	2.131	239	0,11	0,01	0,11	0,045
10	Producción y distribución de gas	835	3.857	7	0	527	59	0,14	0,02	0,11	0,045
11	Captación, depuración y distribución de agua	1.591	3.389	46	0	1.344	100	0,40	0,03	0,07	0,039
12	Industria cárnica	11.395	16.674	89	2	6.986	362	0,42	0,02	0,05	0,005
13	Industrias lácteas	5.450	7.380	35	1	3.380	175	0,46	0,02	0,05	0,005
14	Otras industrias alimenticias	20.623	38.130	275	4	15.258	790	0,40	0,02	0,05	0,005
15	Elaboración de bebidas	4.398	13.014	61	2	6.200	321	0,48	0,02	0,05	0,005
16	Industria del tabaco	1.827	2.035	7	0	77	6	0,04	0,00	0,08	-0,046
17	Industria textil	4.455	13.259	109	3	9.999	678	0,75	0,05	0,07	-0,035
18	Industria de la confección y la peletería	10.461	12.153	133	6	15.469	1.429	1,27	0,12	0,09	-0,047
19	Industria del cuero y del calzado	5.761	8.145	62	2	6.473	606	0,79	0,07	0,09	-0,062
20	Industria de la madera y el corcho	1.170	10.579	128	6	17.945	894	1,70	0,08	0,05	0,002
21	Industria del papel	2.594	14.131	59	0	2.185	142	0,15	0,01	0,06	0,021
22	Edición y artes gráficas	3.793	14.686	181	10	25.158	2.354	1,71	0,16	0,09	0,019
23	Industria química	19.545	49.628	174	1	4.589	243	0,09	0,00	0,05	0,010
24	Industria del caucho y materias plásticas	4.261	17.812	124	1	6.213	349	0,35	0,02	0,06	0,017
25	Fabricación de cemento, cal y yeso	126	2.866	12	0	1.659	95	0,58	0,03	0,06	0,027
26	Fabricación de vidrio y productos de vidrio	659	3.660	26	0	1.699	97	0,46	0,03	0,06	0,027
27	Industrias de la cerámica	2.435	5.834	80	1	3.647	208	0,63	0,04	0,06	0,027
28	Fabricación de otros productos minerales	891	10.113	100	1	5.765	330	0,57	0,03	0,06	0,027
29	Metalurgia	6.172	30.477	136	0	1.728	90	0,06	0,00	0,05	0,023
30	Fabricación de productos metálicos	7.364	30.855	391	12	45.265	3.863	1,47	0,13	0,09	0,027
31	Maquinaria y equipo mecánico	21.970	36.217	247	5	14.997	1.342	0,41	0,04	0,09	0,021
32	Máquinas de oficina y equipos informáticos	6.074	9.078	18	1	1.257	168	0,14	0,02	0,13	-0,029
33	Fabricación de maquinaria y material eléctrico	6.886	17.278	89	1	3.145	153	0,18	0,01	0,05	0,004
34	Fabricación de material electrónico	9.643	15.061	40	0	1.110	80	0,07	0,01	0,07	-0,066
35	Instrumentos médico-quirúrgicos y de precisión	5.548	7.756	32	3	5.919	466	0,76	0,06	0,08	-0,022
36	Fabricación de vehículos de motor y remolques	51.646	75.977	210	0	2.266	159	0,03	0,00	0,07	0,000
37	Fabricación de otro material de transporte	7.810	11.169	69	1	2.724	286	0,24	0,03	0,10	0,038
38	Muebles y otras industrias manufactureras	12.636	16.545	228	11	28.137	1.961	1,70	0,12	0,07	0,000
39	Reciclaje	1	2.829	15	0	214	10	0,08	0,00	0,05	0,056
40	Construcción	81.977	125.511	2.425	193	415.585	64.339	3,31	0,51	0,15	0,059
41	Venta y reparación de vehículos; comercio de combustible	13.818	22.302	418	27	77.173	6.672	3,46	0,30	0,09	0,016
42	Comercio al por mayor e intermediarios	26.460	49.420	714	98	213.907	22.627	4,33	0,46	0,11	0,029
43	Comercio al por menor; reparación de efectos person.	36.030	39.956	1.816	303	550.379	59.058	13,77	1,48	0,11	0,027
44	Alojamiento	9.174	12.978	274	25	57.413	8.054	4,42	0,62	0,14	0,020
45	Restauración	58.389	60.296	1.077	99	225.690	31.659	3,74	0,53	0,14	0,020
46	Transporte por ferrocarril	1.630	2.119								0,000
47	Transporte terrestre y transporte por tubería	10.551	30.580	646	131	205.822	14.822	6,73	0,48	0,07	0,018
48	Transporte marítimo	1.342	1.917	11	0	469	48	0,24	0,03	0,10	-0,004
49	Transporte aéreo y espacial	5.127	7.864	37	0	198	37	0,03	0,00	0,19	-0,011
50	Actividades anexas a los transportes	3.080	21.661	148	6	17.125	1.714	0,79	0,08	0,10	0,045
51	Actividades de agencias de viajes	3.916	6.091	43	2	4.998	500	0,82	0,08	0,10	0,045
52	Correos y telecomunicaciones	8.349	26.170	238	4	7.664	1.388	0,29	0,05	0,18	0,044
53	Intermediación financiera	10.673	27.406	259	1	1.510	149	0,06	0,01	0,10	0,078
54	Seguros y planes de pensiones	4.531	6.338	59	0	913	76	0,14	0,01	0,08	0,177
55	Actividades auxiliares	4.115	9.942	65	36	51.226	6.478	5,15	0,65	0,13	-0,001
56	Actividades inmobiliarias. Alquiler imputado	51.658	70.401	172	81	147.421	32.190	2,09	0,46	0,22	0,033
57	Alquiler de maquinaria y enseres domésticos	1.812	8.020	68	14	25.382	3.647	3,16	0,45	0,14	0,029
58	Actividades informáticas	7.425	11.408	164	18	30.261	5.585	2,65	0,49	0,18	0,064
59	Investigación y desarrollo	1.264	3.858	14	13	15.253	2.749	3,95	0,71	0,18	0,096
60	Otras actividades empresariales	17.410	70.520	1.308	265	409.379	49.404	5,81	0,70	0,12	0,027
61	Educación de mercado	9.163	10.760	324	9	19.845	3.149	1,84	0,29	0,16	0,029
62	Sanidad y servicios sociales de mercado	14.304	17.979	42	4	6.631	685	0,37	0,04	0,10	0,046
63	Saneamiento público de mercado	1.031	3.743	439	2	4.264	671	1,14	0,18	0,16	0,042
64	Actividades asociativas de mercado	1	423	77	8	29.004	3.268	68,58	7,73	0,11	0,042
65	Actividades recreativas, culturales y deportivas	14.897	21.786	287	26	49.788	7.645	2,29	0,35	0,15	0,038
66	Actividades diversas de servicios personales	4.964	5.574	276	44	90.077	9.841	16,16	1,77	0,11	0,034
67	Administración pública	42.965	42.965	1.347							0,029
68	Educación de no mercado	21.730	21.730	686	17	35.789	5.680	1,65	0,26	0,16	0,029
69	Sanidad y servicios sociales de no mercado	25.471	25.471	776	64	107.864	11.140	4,23	0,44	0,10	0,042
70	Saneamiento público de no mercado de las AAPP	1.867	1.867	23	0	439	69	0,24	0,04	0,16	0,046
71	Actividades asociativas de no mercado de las ISFLSH	1.876	1.876								0,000
72	Actividades recreativas y culturales de no mercado	5.344	5.344	188	9	16.188	2.485	3,03	0,47	0,15	0,038
73	Hogares que emplean personal doméstico	5.809	5.809	1.331							0,030
	Total	**778.663**	**1.394.400**	**20.061**	**1.602**	**3.155.744**	**381.038**	**2,26**	**0,27**	**0,12**	**0,030**

Nota: Y: demanda final del 2000, X: *output* del 2000, T: total de empresas en el 2005, *e*: nuevas empresas, *ea*: empresas de autónomos/1000, L: empleo del 2005 en miles. Los sectores, 1, 2 y 3 son estimaciones realizadas por el autor a partir de extrapolaciones con bases de datos oficiales de España.
Fuente: Elaboración Propia

Appendix 1: Entrepreneurship Spillovers by sectors.

Cód.	Sector	Ui	Uj	Vi	Vj	Nuevas	Economía	Empresas	HT	MT	LT	Indirecto	Directo P.	Directo I	Efecto Total	Indirecto	Directo P.	Directo I	Efecto Total
1	Agricultura, ganadería y caza	1,1532385	0,6057959	3,5724049	0,2809794	**E**	**E**	**E**	**0**	**0**	**1**	0,3507403	0,1761270	0,0080262	0,5348935	0,0968263	0,1761270	0,0080262	0,2809794
2	Selvicultura y explotación forestal	0,0917610	0,1227220	6,8305988	0,0569207	**I**	**I**	**I**	**0**	**0**	**1**	0,0085939	0,0339637	0,0000028	0,0425604	0,0229542	0,0339637	0,0000028	0,0569207
3	Pesca y acuicultura	0,2405924	0,4711057	8,2423307	0,2185076	**I**	**I**	**I**	**0**	**0**	**1**	0,0038954	0,1076624	0,0000334	0,1115912	0,1108117	0,1076624	0,0000334	0,2185076
4	Extracción de antracita, hulla, lignito y turba	0,0068037	0,1451478	6,7010435	0,0673223	**I**	**I**	**I**	**0**	**0**	**1**	0,0006847	0,0024599	0,0000111	0,0031557	0,0648513	0,0024599	0,0000111	0,0673223
5	Extracción de crudos de petróleo y gas natural. Extracción de uranio y torio	0,0023122	0,0065235	3,2824988	0,0030257	**I**	**E**	**I**	**0**	**0**	**1**	0,0007524	0,0003199	0,0000002	0,0010725	0,0027056	0,0003199	0,0000002	0,0030257
6	Extracción de minerales metálicos	0,0146622	0,0720491	7,5188746	0,0334177	**I**	**I**	**I**	**0**	**0**	**1**	0,0008115	0,0059857	0,0000033	0,0068006	0,0274286	0,0059857	0,0000033	0,0334177
7	Extracción de minerales no metálicos	0,1703111	0,5324321	6,8613346	0,2469520	**I**	**A**	**I**	**0**	**0**	**1**	0,0154836	0,0634102	0,0000996	0,0789934	0,1834422	0,0634102	0,0000996	0,2469520
8	Coquerías, refino y combustibles nucleares	0,0002369	0,1337559	3,2137818	0,0620385	**I**	**C**	**I**	**0**	**0**	**1**	0,0000686	0,0000410	0,0000002	0,0001099	0,0619972	0,0000410	0,0000002	0,0620385
9	Producción y distribución de energía eléctrica	0,0742697	0,3461348	3,5889098	0,1605438	**I**	**C**	**I**	**0**	**0**	**1**	0,0197840	0,0145112	0,0001524	0,0344477	0,1458801	0,0145112	0,0001524	0,1605438
10	Producción y distribución de gas	0,0455109	0,0932569	6,1802160	0,0432543	**I**	**I**	**I**	**0**	**0**	**1**	0,0057915	0,0153107	0,0000066	0,0211088	0,0279369	0,0153107	0,0000066	0,0432543
11	Captación, depuración y distribución de agua	0,0774056	0,4916634	7,0231515	0,2280426	**I**	**A**	**I**	**0**	**0**	**1**	0,0063211	0,0295543	0,0000269	0,0359022	0,1984615	0,0295543	0,0000269	0,2280426
12	Industria cárnica	0,0638975	0,6117465	7,2886441	0,2837394	**I**	**A**	**I**	**0**	**0**	**1**	0,0043509	0,0252447	0,0000413	0,0296369	0,2584535	0,0252447	0,0000413	0,2837394
13	Industrias lácteas	0,0599081	0,5824240	8,0788336	0,2701391	**I**	**A**	**I**	**0**	**0**	**1**	0,0014966	0,0262445	0,0000454	0,0277865	0,2438492	0,0262445	0,0000454	0,2701391
14	Otras industrias alimenticias	0,0987828	0,5826386	4,9722462	0,2702387	**I**	**C**	**I**	**0**	**0**	**1**	0,0195368	0,0250943	0,0011862	0,0458173	0,2439581	0,0250943	0,0011862	0,2702387
15	Elaboración de bebidas	0,0752565	0,6400443	7,1184837	0,2968645	**I**	**A**	**I**	**0**	**0**	**1**	0,0058953	0,0289960	0,0000140	0,0349054	0,2678544	0,0289960	0,0000140	0,2968645
16	Industria del tabaco	0,0070801	0,4225894	8,5440037	0,1960049	**I**	**A**	**I**	**0**	**0**	**1**	0,0000000	0,0032839	0,0000000	0,0032839	0,1927210	0,0032839	0,0000000	0,1960049
17	Industria textile	0,2142699	0,4606078	5,6965110	0,2136385	**I**	**C**	**I**	**0**	**0**	**1**	0,0348026	0,0644940	0,0000858	0,0993824	0,1490587	0,0644940	0,0000858	0,2136385
18	Industria de la confección y la peletería	0,3017405	0,6057242	7,4584846	0,2809462	**I**	**A**	**I**	**0**	**0**	**1**	0,0175636	0,1223228	0,0000665	0,1399529	0,1585569	0,1223228	0,0000665	0,2809462
19	Industria del cuero y del calzado	0,2221251	0,6743015	8,2377618	0,3127536	**I**	**A**	**I**	**0**	**0**	**1**	0,0036534	0,0993605	0,0000118	0,1030258	0,2133813	0,0993605	0,0000118	0,3127536
20	Industria de la madera y el corcho	0,3868906	0,5842804	5,4955098	0,2710001	**I**	**C**	**I**	**0**	**0**	**1**	0,0640641	0,1151554	0,0002276	0,1794471	0,1556171	0,1151554	0,0002276	0,2710001
21	Industria del papel	0,0636778	0,3319767	3,9092385	0,1539770	**I**	**C**	**I**	**0**	**0**	**1**	0,0165701	0,0128800	0,0000849	0,0295350	0,1410121	0,0128800	0,0000849	0,1539770
22	Edición y artes gráficas	0,7287126	0,7982733	4,4145844	0,3702540	**I**	**C**	**I**	**0**	**0**	**1**	0,1622197	0,1737237	0,0020471	0,3379905	0,1944833	0,1737237	0,0020471	0,3702540
23	Industria química	0,0433695	0,2870393	2,5961837	0,1331342	**I**	**E**	**I**	**0**	**1**	**0**	0,0139952	0,0060627	0,0000577	0,0201156	0,1270138	0,0060627	0,0000577	0,1331342
24	Industria del caucho y materias plásticas	0,0945594	0,3522117	4,3838838	0,1633623	**I**	**C**	**I**	**0**	**0**	**1**	0,0211868	0,0225455	0,0001261	0,0438584	0,1406907	0,0225455	0,0001261	0,1633623
25	Fabricación de cemento, cal y yeso	0,0882655	0,4740676	7,1611128	0,2198814	**I**	**A**	**I**	**0**	**0**	**1**	0,0068033	0,0340578	0,0000781	0,0409392	0,1857455	0,0340578	0,0000781	0,2198814
26	Fabricación de vidrio y productos de vidrio	0,0725283	0,4124405	6,9809252	0,1912976	**I**	**A**	**I**	**0**	**0**	**1**	0,0061285	0,0274897	0,0000217	0,0336400	0,1637861	0,0274897	0,0000217	0,1912976
27	Industrias de la cerámica	0,0862114	0,5663762	7,6657807	0,2626959	**I**	**A**	**I**	**0**	**0**	**1**	0,0040709	0,0358751	0,0000404	0,0399864	0,2267803	0,0358751	0,0000404	0,2626959
28	Fabricación de otros productos minerales	0,0920167	0,6216739	6,6233128	0,2883440	**I**	**A**	**I**	**0**	**0**	**1**	0,0096044	0,0329536	0,0001211	0,0426791	0,2552693	0,0329536	0,0001211	0,2883440
29	Metalurgia	0,0202617	0,3067054	3,1701336	0,1422557	**I**	**C**	**I**	**0**	**0**	**1**	0,0060886	0,0031752	0,0001340	0,0093978	0,1389465	0,0031752	0,0001340	0,1422557
30	Fabricación de productos metálicos	0,9109266	0,6064094	3,0851265	0,2812640	**I**	**C**	**E**	**0**	**0**	**1**	0,2841936	0,1331691	0,0051421	0,4225047	0,1429528	0,1331691	0,0051421	0,2812640
31	Maquinaria y equipo mecánico	0,2065353	0,3224248	3,4961873	0,1495466	**I**	**E**	**I**	**0**	**1**	**0**	0,0563793	0,0390704	0,0003453	0,0957949	0,1101310	0,0390704	0,0003453	0,1495466
32	Máquinas de oficina y equipos informáticos	0,0556927	0,2554662	6,9128908	0,1184900	**I**	**I**	**I**	**0**	**1**	**0**	0,0048741	0,0209351	0,0000221	0,0258313	0,0975328	0,0209351	0,0000221	0,1184900
33	Fabricación de maquinaria y material eléctrico	0,0337597	0,2888470	5,3802643	0,1339726	**I**	**A**	**I**	**0**	**1**	**0**	0,0057562	0,0098684	0,0000337	0,0156584	0,1240705	0,0098684	0,0000337	0,1339726
34	Fabricación de material electrónico	0,0171178	0,1673375	6,3788362	0,0776143	**I**	**I**	**I**	**0**	**1**	**0**	0,0020049	0,0059218	0,0000128	0,0079395	0,0716797	0,0059218	0,0000128	0,0776143
35	Instrumentos médico-quirúrgicos y de precisión	0,1510780	0,3136372	7,4979709	0,1454708	**I**	**I**	**I**	**0**	**1**	**0**	0,0085445	0,0614362	0,0000921	0,0700728	0,0839425	0,0614362	0,0000921	0,1454708
36	Fabricación de vehículos de motor y remolques	0,0092779	0,2091210	5,6211863	0,0969942	**I**	**C**	**I**	**0**	**1**	**0**	0,0015089	0,0027826	0,0000117	0,0043033	0,0941999	0,0027826	0,0000117	0,0969942
37	Fabricación de otro material de transporte	0,0865601	0,3364698	6,3161213	0,1560610	**I**	**A**	**I**	**0**	**1**	**0**	0,0105240	0,0295953	0,0000289	0,0401482	0,1264368	0,0295953	0,0000289	0,1560610
38	Muebles y otras industrias manufactureras	0,3536323	0,6312900	6,4105197	0,2928041	**I**	**A**	**I**	**0**	**0**	**1**	0,0405351	0,1232633	0,0002228	0,1640213	0,1693179	0,1232633	0,0002228	0,2928041
39	Reciclaje	0,0100314	0,5599026	6,7190679	0,2596933	**I**	**A**	**I**	**0**	**0**	**1**	0,0009981	0,0035741	0,0000806	0,0046527	0,2560386	0,0035741	0,0000806	0,2596933
40	Construcción	3,2623475	1,8312814	3,7689328	0,8493825	**C**	**C**	**C**	**0**	**0**	**1**	0,8477362	0,6600535	0,0053479	1,5131376	0,1839810	0,6600535	0,0053479	0,8493825
41	Venta y reparación de vehículos de motor; comercio de combustible para automoción	1,1960321	1,0898251	4,9921303	0,5054812	**C**	**C**	**C**	**0**	**0**	**1**	0,2286250	0,3242452	0,0018718	0,5547420	0,1793642	0,3242452	0,0018718	0,5054812
42	Comercio al por mayor e intermediarios	2,8866020	1,4489430	3,0342003	0,6720468	**C**	**E**	**C**	**0**	**0**	**1**	0,8579080	0,4780197	0,0029320	1,3388598	0,1910950	0,4780197	0,0029320	0,6720468
43	Comercio al por menor; reparación de efectos personales	4,2247732	3,5335120	6,4303113	1,6389087	**C**	**I**	**C**	**0**	**0**	**1**	0,4791501	1,4788527	0,0015258	1,9595286	0,1585303	1,4788527	0,0015258	1,6389087
44	Alojamiento	2,1107926	1,6969450	5,6054213	0,7870747	**C**	**I**	**C**	**0**	**0**	**1**	0,3571361	0,6209025	0,0009863	0,9790249	0,1651859	0,6209025	0,0009863	0,7870747
45	Restauración	1,3832321	1,4762710	6,9845187	0,6847220	**C**	**A**	**C**	**0**	**0**	**1**	0,1159433	0,5252668	0,0003587	0,6415688	0,1590964	0,5252668	0,0003587	0,6847220
46	Transporte por ferrocarril	0,0000000	0,3048129	0,0000000	0,1413779	**I**	**I**	**I**	**0**	**0**	**1**	0,0000000	0,0000000	0,0000000	0,0000000	0,1413779	0,0000000	0,0000000	0,1413779
47	Transporte terrestre y transporte por tubería	3,4604640	1,3761349	2,7038010	0,6382770	**C**	**C**	**C**	**0**	**0**	**1**	1,0986771	0,4910636	0,0152870	1,6050277	0,1319264	0,4910636	0,0152870	0,6382770
48	Transporte marítimo	0,0576199	0,4745466	8,0132959	0,2201036	**I**	**A**	**I**	**0**	**0**	**1**	0,0016383	0,0250600	0,0000269	0,0267252	0,1950167	0,0250600	0,0000269	0,2201036
49	Transporte aéreo y espacial	0,0142721	0,3709611	6,2566803	0,1720587	**I**	**A**	**I**	**0**	**0**	**1**	0,0017866	0,0048103	0,0000227	0,0066197	0,1672256	0,0048103	0,0000227	0,1720587
50	Actividades anexas a los transportes	0,6031890	0,6771683	3,1580018	0,3140833	**I**	**C**	**I**	**0**	**0**	**1**	0,1793242	0,0973586	0,0030874	0,2797703	0,2136372	0,0973586	0,0030874	0,3140833
51	Actividades de agencias de viajes	0,2336293	0,8990880	7,2034555	0,4170138	**I**	**A**	**I**	**0**	**0**	**1**	0,0168221	0,0911770	0,0003625	0,1083616	0,3254743	0,0911770	0,0003625	0,4170138
52	Correos y telecomunicaciones	0,3199806	0,5244119	3,5884895	0,2432320	**I**	**E**	**I**	**1**	**0**	**0**	0,0852489	0,0625218	0,0006423	0,1484130	0,1800679	0,0625218	0,0006423	0,2432320
53	Intermediación financiera	0,0290987	0,2792461	3,6602438	0,1295195	**I**	**E**	**I**	**0**	**0**	**1**	0,0076705	0,0058032	0,0000228	0,0134965	0,1236935	0,0058032	0,0000228	0,1295195
54	Seguros y planes de pensiones	0,0302282	1,0835231	7,3369956	0,5025582	**A**	**A**	**I**	**0**	**0**	**1**	0,0019549	0,0120503	0,0000152	0,0140204	0,4904927	0,0120503	0,0000152	0,5025582
55	Actividades auxiliares	2,6880288	2,0051072	5,6893864	0,9300061	**C**	**E**	**C**	**0**	**0**	**1**	0,4691555	0,7761426	0,0014598	1,2467579	0,1524037	0,7761426	0,0014598	0,9300061
56	Actividades inmobiliarias. Alquiler imputado	2,4507563	1,3549002	3,4547628	0,6284280	**C**	**E**	**E**	**0**	**0**	**1**	0,6723674	0,4611878	0,0031512	1,1367064	0,1640890	0,4611878	0,0031512	0,6284280
57	Alquiler de maquinaria y enseres domésticos	1,5920546	1,3950306	5,3942374	0,6470412	**C**	**I**	**C**	**0**	**0**	**1**	0,2703167	0,4668451	0,0012627	0,7384246	0,1789334	0,4668451	0,0012627	0,6470412
58	Actividades informáticas	1,5375907	1,4388167	6,6056601	0,6673500	**C**	**I**	**I**	**1**	**0**	**0**	0,1598242	0,5524120	0,0009270	0,7131632	0,1140110	0,5524120	0,0009270	0,6673500
59	Investigación y desarrollo	1,9356658	1,9419568	6,8205668	0,9007157	**C**	**I**	**C**	**1**	**0**	**0**	0,1790483	0,7170610	0,0016886	0,8977979	0,1819662	0,7170610	0,0016886	0,9007157
60	Otras actividades empresariales	9,5541353	1,9324764	1,4307450	0,8963186	**C**	**E**	**C**	**0**	**0**	**1**	3,6652476	0,7444678	0,0216706	4,4313860	0,1301802	0,7444678	0,0216706	0,8963186
61	Educación de mercado	0,7373194	0,8525059	7,3367463	0,3954081	**I**	**I**	**I**	**0**	**0**	**1**	0,0476726	0,2941828	0,0001271	0,3419825	0,1010982	0,2941828	0,0001271	0,3954081
62	Sanidad y servicios sociales de mercado	0,1065895	0,3786073	7,0762031	0,1756051	**I**	**I**	**I**	**0**	**0**	**1**	0,0083862	0,0410166	0,0000354	0,0494382	0,1345531	0,0410166	0,0000354	0,1756051
63	Saneamiento público de mercado	0,7105986	0,8228251	5,8529020	0,3816416	**I**	**C**	**I**	**0**	**0**	**1**	0,1256296	0,2038211	0,0001381	0,3295889	0,1776824	0,2038211	0,0001381	0,3816416
64	Actividades asociativas de mercado	17,4790691	17,1038658	8,1666164	7,9330918	**C**	**I**	**C**	**0**	**0**	**1**	0,3532640	7,7514070	0,0024471	8,1071181	0,1792377	7,7514070	0,0024471	7,9330918
65	Actividades recreativas, culturales y deportivas	1,3219725	1,1320034	5,4345570	0,5250443	**C**	**I**	**I**	**0**	**0**	**1**	0,2276816	0,3840417	0,0014321	0,6131555	0,1395705	0,3840417	0,0014321	0,5250443
66	Actividades diversas de servicios personales	4,0536120	4,2513956	8,1340089	1,9718765	**C**	**I**	**C**	**0**	**0**	**1**	0,0890744	1,7906721	0,0003943	1,8801408	0,1808101	1,7906721	0,0003943	1,9718765
67	Administración pública	0,0000000	0,2175415	0,0000000	0,1008998	**I**	**I**	**I**	**0**	**0**	**1**	0,0000000	0,0000000	0,0000000	0,0000000	0,1008998	0,0000000	0,0000000	0,1008998
68	Educación de no mercado	0,5635068	0,6498052	8,5440037	0,3013917	**I**	**I**	**I**	**0**	**0**	**1**	0,0000000	0,2613649	0,0000000	0,2613649	0,0400268	0,2613649	0,0000000	0,3013917
69	Sanidad y servicios sociales de no mercado	0,9429795	1,2450656	8,5440037	0,5774846	**A**	**I**	**C**	**0**	**0**	**1**	0,0000000	0,4373715	0,0000000	0,4373715	0,1401131	0,4373715	0,0000000	0,5774846
70	Saneamiento público de no mercado de las AAPP	0,0797512	0,8544011	8,5440037	0,3962872	**I**	**A**	**I**	**0**	**0**	**1**	0,0000000	0,0369901	0,0000000	0,0369901	0,3592971	0,0369901	0,0000000	0,3962872
71	Actividades asociativas de no mercado de las ISFLSH	0,0000000	0,6910098	0,0000000	0,3205032	**I**	**A**	**I**	**0**	**0**	**1**	0,0000000	0,0000000	0,0000000	0,0000000	0,3205032	0,0000000	0,0000000	0,3205032
72	Actividades recreativas y culturales de no mercado	1,0028390	1,6394011	8,5440037	0,7603848	**C**	**A**	**A**	**0**	**0**	**1**	0,0000000	0,4651354	0,0000000	0,4651354	0,2952494	0,4651354	0,0000000	0,7603848
73	Hogares que emplean personal doméstico	0,0000000	0,0000000	0,0000000	0,0000000	**I**	**I**	**I**	**0**	**0**	**1**	0,0000000	0,0000000	0,0000000	0,0000000	0,0000000	0,0000000	0,0000000	0,0000000

Fuente: Elaboración Propia

Appendix 2: Variables.

Cód.	Sector	Diversidad	RD/PEA	Compet.	Indirecto	Directo P.	Directo I	E. Total	Indirecto	Directo P.	Directo I	E. Total	Diagonal	Ui+Uj	KS Index
1	Agricultura, ganadería y caza	0,73580	0,14048	2,15359	2,17471	0,58444	6,81541	1,15324	0,60035	0,58444	6,81541	0,60580	1,01059	1,75903	0,74845
2	Selvicultura y explotación forestal	0,73580	0,04025	0,44794	0,05329	0,11270	0,00242	0,09176	0,14232	0,11270	0,00242	0,12272	0,10481	0,21448	0,10968
3	Pesca y acuicultura	0,73580	0,10631	1,42028	0,02415	0,35726	0,02839	0,24059	0,68707	0,35726	0,02839	0,47111	0,35579	0,71170	0,35591
4	Extracción de antracita, hulla, lignito y turba	0,55882	0,06884	0,06690	0,00425	0,00816	0,00944	0,00680	0,40210	0,00816	0,00944	0,14515	0,10879	0,15195	0,04316
5	Extracción de crudos de petróleo y gas natural. Extracción de uranio y torio	0,63265	0,24804	0,00313	0,00467	0,00106	0,00017	0,00231	0,01678	0,00106	0,00017	0,00652	0,00604	0,00884	0,00279
6	Extracción de minerales metálicos	0,75000	0,32396	0,04787	0,00503	0,01986	0,00283	0,01466	0,17007	0,01986	0,00283	0,07205	0,05476	0,08671	0,03195
7	Extracción de minerales no metálicos	0,61592	0,38513	0,89862	0,09600	0,21041	0,08458	0,17031	1,13740	0,21041	0,08458	0,53243	0,41983	0,70274	0,28291
8	Coquerías, refino y combustibles nucleares	0,22222	6,68528	0,00067	0,00043	0,00014	0,00021	0,00024	0,38440	0,00014	0,00021	0,13376	0,09936	0,13399	0,03464
9	Producción y distribución de energía eléctrica	0,88826	1,08405	0,10811	0,12267	0,04815	0,12943	0,07427	0,90450	0,04815	0,12943	0,34613	0,28848	0,42040	0,13193
10	Producción y distribución de gas	0,88826	1,06866	0,13663	0,03591	0,05081	0,00563	0,04551	0,17322	0,05081	0,00563	0,09326	0,07846	0,13877	0,06031
11	Captación, depuración y distribución de agua	0,79911	0,55888	0,39658	0,03919	0,09807	0,02280	0,07741	1,23053	0,09807	0,02280	0,49166	0,37492	0,56907	0,19415
12	Industria cárnica	0,71185	0,82624	0,41898	0,02698	0,08377	0,03503	0,06390	1,60250	0,08377	0,03503	0,61175	0,46087	0,67564	0,21477
13	Industrias lácteas	0,71185	0,82135	0,45799	0,00928	0,08709	0,03851	0,05991	1,51195	0,08709	0,03851	0,58242	0,43455	0,64233	0,20778
14	Otras industrias alimenticias	0,71185	0,82285	0,40016	0,12113	0,08327	1,00726	0,09878	1,51262	0,08327	1,00726	0,58264	0,46357	0,68142	0,21786
15	Elaboración de bebidas	0,71185	0,82878	0,47641	0,03655	0,09622	0,01192	0,07526	1,66079	0,09622	0,01192	0,64004	0,48434	0,71530	0,23096
16	Industria del tabaco	0,70130	0,92266	0,03784	0,00000	0,01090	0,00000	0,00708	1,19493	0,01090	0,00000	0,42259	0,31356	0,42967	0,11611
17	Industria textile	0,71227	1,16658	0,75413	0,21579	0,21401	0,07286	0,21427	0,92421	0,21401	0,07286	0,46061	0,39744	0,67488	0,27744
18	Industria de la confección y la peletería	0,77096	0,71558	1,27285	0,10890	0,40590	0,05649	0,30174	0,98311	0,40590	0,05649	0,60572	0,47754	0,90746	0,42993
19	Industria del cuero y del calzado	0,67449	0,56845	0,79472	0,02265	0,32971	0,01002	0,22213	1,32303	0,32971	0,01002	0,67430	0,50617	0,89643	0,39026
20	Industria de la madera y el corcho	0,80596	0,29795	1,69629	0,39722	0,38212	0,19330	0,38689	0,96488	0,38212	0,19330	0,58428	0,53602	0,97117	0,43515
21	Industria del papel	0,49565	1,10309	0,15462	0,10274	0,04274	0,07212	0,06368	0,87432	0,04274	0,07212	0,33198	0,27283	0,39565	0,12282
22	Edición y artes gráficas	0,82189	0,55741	1,71306	1,00582	0,57647	1,73831	0,72871	1,20586	0,57647	1,73831	0,79827	0,85182	1,52699	0,67516
23	Industria química	0,54761	5,24144	0,09247	0,08677	0,02012	0,04900	0,04337	0,78753	0,02012	0,04900	0,28704	0,23537	0,33041	0,09504
24	Industria del caucho y materias plásticas	0,56446	1,58923	0,34881	0,13137	0,07481	0,10711	0,09456	0,87233	0,07481	0,10711	0,35221	0,29523	0,44677	0,15154
25	Fabricación de cemento, cal y yeso	0,60219	0,82792	0,57886	0,04218	0,11301	0,06633	0,08827	1,15168	0,11301	0,06633	0,47407	0,36264	0,56233	0,19970
26	Fabricación de vidrio y productos de vidrio	0,60219	0,83012	0,46421	0,03800	0,09122	0,01845	0,07253	1,01553	0,09122	0,01845	0,41244	0,31583	0,48497	0,16914
27	Industrias de la cerámica	0,60219	0,81793	0,62513	0,02524	0,11904	0,03429	0,08621	1,40611	0,11904	0,03429	0,56638	0,42676	0,65259	0,22583
28	Fabricación de otros productos minerales	0,60219	0,81964	0,57006	0,05955	0,10935	0,10284	0,09202	1,58275	0,10935	0,10284	0,62167	0,47664	0,71369	0,23705
29	Metalurgia	0,47396	1,18751	0,05670	0,03775	0,01054	0,11379	0,02026	0,86151	0,01054	0,11379	0,30671	0,23731	0,32697	0,08965
30	Fabricación de productos metálicos	0,72802	0,88464	1,46702	1,76209	0,44189	4,36641	0,91093	0,88635	0,44189	4,36641	0,60641	0,90459	1,51734	0,61275
31	Maquinaria y equipo mecánico	0,68367	2,95402	0,41409	0,34957	0,12965	0,29319	0,20654	0,68285	0,12965	0,29319	0,32242	0,32943	0,52896	0,19953
32	Máquinas de oficina y equipos informáticos	0,91329	3,28478	0,13847	0,03022	0,06947	0,01878	0,05569	0,60474	0,06947	0,01878	0,25547	0,19735	0,31116	0,11381
33	Fabricación de maquinaria y material eléctrico	0,55580	5,15034	0,18202	0,03569	0,03275	0,02865	0,03376	0,76928	0,03275	0,02865	0,28885	0,22353	0,32261	0,09908
34	Fabricación de material electrónico	0,63333	5,99012	0,07370	0,01243	0,01965	0,01084	0,01712	0,44444	0,01965	0,01084	0,16734	0,12737	0,18446	0,05709
35	Instrumentos médico-quirúrgicos y de precisión	0,85690	6,19793	0,76315	0,05298	0,20386	0,07817	0,15108	0,52047	0,20386	0,07817	0,31364	0,24638	0,46472	0,21833
36	Fabricación de vehículos de motor y remolques	0,48102	2,05015	0,02982	0,00936	0,00923	0,00998	0,00928	0,58407	0,00923	0,00998	0,20912	0,15758	0,21840	0,06082
37	Fabricación de otro material de transporte	0,71366	6,79676	0,24389	0,06525	0,09821	0,02455	0,08656	0,78395	0,09821	0,02455	0,33647	0,26649	0,42303	0,15654
38	Muebles y otras industrias manufactureras	0,79845	0,63453	1,70063	0,25133	0,40902	0,18922	0,35363	1,04983	0,40902	0,18922	0,63129	0,53326	0,98492	0,45167
39	Reciclaje	0,44860	0,16869	0,07565	0,00619	0,01186	0,06842	0,01003	1,58752	0,01186	0,06842	0,55990	0,41704	0,56993	0,15289
40	Construcción	0,84210	0,16637	3,31114	5,25624	2,19025	4,54117	3,26235	1,14074	2,19025	4,54117	1,83128	2,71495	5,09363	2,37868
41	Venta y reparación de vehículos de motor; comercio de combustible para automoción	0,85890	0,09929	3,46036	1,41755	1,07594	1,58943	1,19603	1,11212	1,07594	1,58943	1,08983	1,17438	2,28586	1,11148
42	Comercio al por mayor e intermediarios	0,84530	0,16111	4,32835	5,31931	1,58621	2,48974	2,88660	1,18485	1,58621	2,48974	1,44894	2,44753	4,33554	1,88801
43	Comercio al por menor; reparación de efectos personales	0,95019	0,16299	13,77463	2,97089	4,90727	1,29560	4,22477	0,98294	4,90727	1,29560	3,53351	3,38835	7,75829	4,36994
44	Alojamiento	0,89963	0,11268	4,42387	2,21436	2,06034	0,83754	2,11079	1,02421	2,06034	0,83754	1,69695	1,83044	3,80774	1,97729
45	Restauración	0,89963	0,11269	3,74303	0,71889	1,74299	0,30463	1,38323	0,98645	1,74299	0,30463	1,47627	1,28086	2,85950	1,57864
46	Transporte por ferrocarril	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,87659	0,00000	0,00000	0,30481	0,22617	0,30481	0,07864
47	Transporte terrestre y transporte por tubería	0,94370	0,31568	6,73061	6,81216	1,62950	12,98098	3,46046	0,81799	1,62950	12,98098	1,37613	2,77868	4,83660	2,05792
48	Transporte marítimo	0,69510	0,04224	0,24465	0,01016	0,08316	0,02281	0,05762	1,20917	0,08316	0,02281	0,47455	0,35473	0,53217	0,17744
49	Transporte aéreo y espacial	0,61616	0,00530	0,02518	0,01108	0,01596	0,01930	0,01427	1,03685	0,01596	0,01930	0,37096	0,27811	0,38523	0,10713
50	Actividades anexas a los transportes	0,79655	0,11465	0,79059	1,11187	0,32307	2,62167	0,60319	1,32462	0,32307	2,62167	0,67717	0,78933	1,28036	0,49103
51	Actividades de agencias de viajes	0,79655	0,11516	0,82055	0,10430	0,30255	0,30783	0,23363	2,01805	0,30255	0,30783	0,89909	0,69403	1,13272	0,43869
52	Correos y telecomunicaciones	0,80415	0,59272	0,29285	0,52857	0,20747	0,54540	0,31998	1,11648	0,20747	0,54540	0,52441	0,52549	0,84439	0,31891
53	Intermediación financiera	0,67219	0,02265	0,05510	0,04756	0,01926	0,01939	0,02910	0,76694	0,01926	0,01939	0,27925	0,21947	0,30834	0,08888
54	Seguros y planes de pensiones	0,63308	0,06012	0,14405	0,01212	0,03999	0,01292	0,03023	3,04122	0,03999	0,01292	1,08352	0,80709	1,11375	0,30666
55	Actividades auxiliares	0,97718	3,06194	5,15248	2,90892	2,57547	1,23955	2,68803	0,94495	2,57547	1,23955	2,00511	2,23830	4,69314	2,45484
56	Actividades inmobiliarias. Alquiler imputado	0,95031	1,19301	2,09402	4,16890	1,53036	2,67585	2,45076	1,01741	1,53036	2,67585	1,35490	2,08094	3,80566	1,72472
57	Alquiler de maquinaria y enseres domésticos	0,91722	0,51955	3,16484	1,67605	1,54913	1,07224	1,59205	1,10945	1,54913	1,07224	1,39503	1,46754	2,98709	1,51955
58	Actividades informáticas	0,89835	6,01328	2,65261	0,99096	1,83307	0,78719	1,53759	0,70691	1,83307	0,78719	1,43882	1,32327	2,97641	1,65314
59	Investigación y desarrollo	0,96879	111,71167	3,95360	1,11016	2,37942	1,43385	1,93567	1,12825	2,37942	1,43385	1,94196	1,72735	3,87762	2,15028
60	Otras actividades empresariales	0,93315	0,43373	5,80515	22,72575	2,47037	18,40157	9,55414	0,80716	2,47037	18,40157	1,93248	7,29733	11,48661	4,18928
61	Educación de mercado	0,80715	0,00031	1,84433	0,29559	0,97619	0,10789	0,73732	0,62684	0,97619	0,10789	0,85251	0,70882	1,58983	0,88101
62	Sanidad y servicios sociales de mercado	0,92594	0,21587	0,36882	0,05200	0,13611	0,03005	0,10659	0,83427	0,13611	0,03005	0,37861	0,29434	0,48520	0,19086
63	Saneamiento público de mercado	0,77227	0,01569	1,13919	0,77895	0,67634	0,11729	0,71060	1,10169	0,67634	0,11729	0,82283	0,81150	1,53342	0,72192
64	Actividades asociativas de mercado	0,84268	0,00000	68,56738	2,19035	25,72148	2,07798	17,47907	1,11133	25,72148	2,07798	17,10387	13,25604	34,58293	21,32689
65	Actividades recreativas, culturales y deportivas	0,88426	0,21426	2,28532	1,41170	1,27437	1,21610	1,32197	0,86538	1,27437	1,21610	1,13200	1,20417	2,45398	1,24981
66	Actividades diversas de servicios personales	0,95663	0,49359	16,16021	0,55229	5,94198	0,33485	4,05361	1,12108	5,94198	0,33485	4,25140	3,29699	8,30501	5,00802
67	Administración pública	0,00000	0,00171	0,00000	0,00000	0,00000	0,00000	0,00000	0,62561	0,00000	0,00000	0,21754	0,16141	0,21754	0,05613
68	Educación de no mercado	0,80715	0,00015	1,64699	0,00000	0,86729	0,00000	0,56351	0,24818	0,86729	0,00000	0,64981	0,48215	1,21331	0,73116
69	Sanidad y servicios sociales de no mercado	0,92594	0,21556	4,23478	0,00000	1,45133	0,00000	0,94298	0,86875	1,45133	0,00000	1,24507	0,92383	2,18805	1,26422
70	Saneamiento público de no mercado de las AAPP	0,77227	0,01542	0,23514	0,00000	0,12274	0,00000	0,07975	2,22776	0,12274	0,00000	0,85440	0,63396	0,93415	0,30019
71	Actividades asociativas de no mercado de las ISFLSH	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	1,98723	0,00000	0,00000	0,69101	0,51272	0,69101	0,17829
72	Actividades recreativas y culturales de no mercado	0,88426	0,21340	3,02919	0,00000	1,54346	0,00000	1,00284	1,83064	1,54346	0,00000	1,63940	1,21642	2,64224	1,42582
73	Hogares que emplean personal doméstico	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000	0,00000

Fuente: Elaboración Propia