The Multipliers and Key Sectors of Entrepreneurship Spillover: An input-output approach

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The Multipliers and Key Sectors of Entrepreneurship Spillover: An input-output approach

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1. Problem Statement

The *Entrepreneurship Spillover* evaluates the systemic effect of creating enterprises in different sectors and industries from a new firm created in a given sector. One way to estimate these Entrepreneurship Spillovers is doing an adaptation of the methodology applied by Dietzenbacher, (2002); Dietzenbacher and Los, (2002a,b) Diezenbacher and Volkerink (1998) that they used to determinate the Knowledge Spillover through R&D multipliers. In this regard, the objectives of this paper are: (a) to develop a methodology that allows calculating the concept of entrepreneurship spillover; (b) to identify the key sectors of entrepreneurship; and (c) to determinate the multipliers of business creation. With these aims, the methodological design is based on an adaptation of the model of input-output matrix (Leontief, 1936; Dietzenbacher and Los, 2002 a y b).

2. Methodology

In order to analyze the inter-sectorial entrepreneurship spillover relationships, this paper apply the model proposed by Leontief (1936) and Dietzenbacher and Los (2002a y b). 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. 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 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 (1936) 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 [$\mathbf{(I - A)^{-1}}$, 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.

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

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

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[1] employed, Schuschny (2005).[2] 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.[3] 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).

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

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

[3] 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.

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

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).

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

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.[4]

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

The traditional methodology suggests that to calculate the *forward linkages* are used the values by rows from the same **K** matrix[5]. 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

[4] 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:

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

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

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 variable what measures entrepreneurship spillovers. Besides, it quantifies the multiplicative effects that have the creation of firms in the rest of the economy. On the other hand, those indicators allow obtaining the direct, indirect and induced effects of the business 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. Those vectors allow classifying the productive sectors in four groups: key sectors, strategic sectors, drivers sectors and independent sectors (Tables 1a).

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

3. Data

The main data source was the *Input-Output Table* that is published by the National Institute of Statistics (INE)[6] 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)[7]. 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[8], and complemented by the SABI database (detailed information is presented on Table 2)[9].

[6] INE, [http://www.ine.es/]
[7] DIRCE, [http://www.ine.es/inebmenu/mnu_empresas.htm]
[8] Dirección General de Política de la PYME, [http://www.ipyme.org]
[9] SABI, [http://sabi.bvdep.com]

4. Results Identification of Key Sectors

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 through the use of R&D multipliers (Dietzenbacher, 2002; Dietzenbacher and Los, 2002a y b; Diezenbacher and Volkerink, 1998). In this sense, an important contribution of this work is the adaptation 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*. The estimations and results are summarized in Table 3. Other contribution was the estimation of key sectors for creates new firms. In this respect, Table 1b shows the key sectors classified by the criterion summarized in Table 1a. As we can see, only 17 sectors are considered key (23,3% of the cases) what imply that being key sector can be considered a rare event (ICT, R&D, etc.), besides our sample is also small (73 observations). Based on this classification, sectors such as insurance and sanity are considerate drivers while agriculture is strategic.

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.

5. Conclusions

The main purposes of this paper were focused on (a) provide a methodological proposal to evaluate the entrepreneurship spillovers; (b) identify the key sectors of entrepreneurship; and (c) determinate the multipliers of entrepreneurship following the ideas proposed by Dietzenbacher, 2002; Dietzenbacher and Los, 2002; Diezenbacher and Volkerink, 1998. In this respect, this preliminary analysis provided interesting results that allows achieving partially these objectives. However, it is important to mention that this methodological design needs to be performed in order to provide robust

evidence about the key sector and the multipliers of entrepreneurship. In this line, the future investigations would be focused on use complementary statistical techniques (e.g. logistical analysis) to corroborate these results.

6. References

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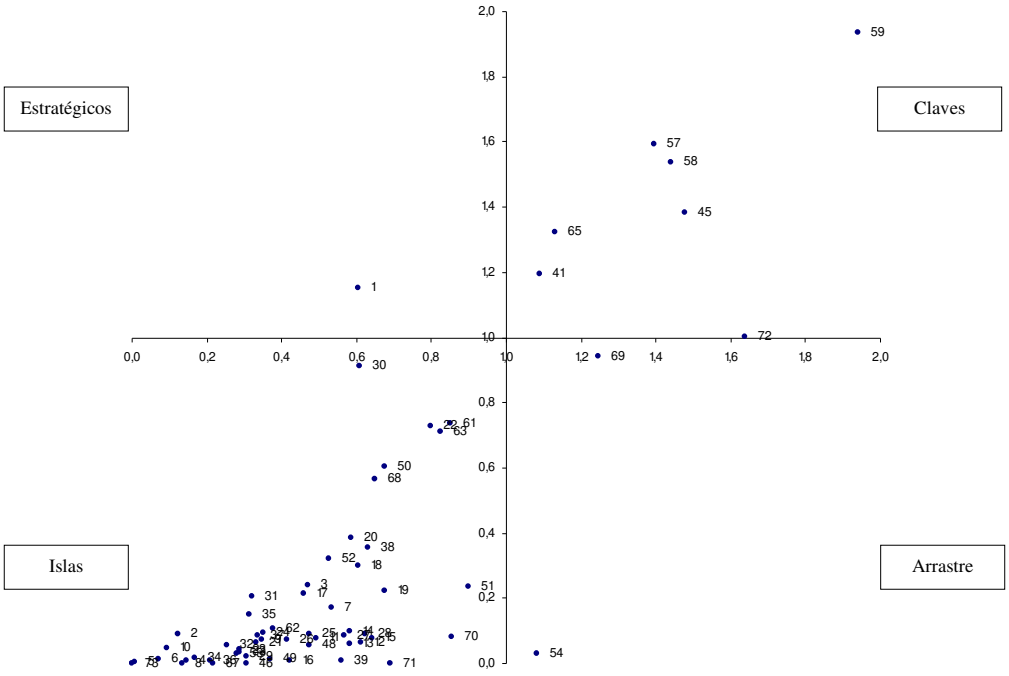
Graph 1: Identificación de Sectores Claves para la Creación de Empresas



Source: Self-devised.

Table 2: Main Descriptive

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 textile	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 ceramic	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 electronic	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 maritime	1.342	1.917	11	0	469	48	0,24	0,03	0,10	-0,004
49	Transporte aéreo y especial	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 financier	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.

Source: Self-devises

Table 3: Entrepreneurship Spillovers

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

Source: Self-devised.