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JOB FLOWS IN CATALONIA

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Abstract

We examine the magnitude and patterns of job creation, job destruction and job reallocation among Catalan industrial plants. We find an annual job creation rate of 6.1 percent, an annual job destruction rate of 3.4 percent and an annual job reallocation rate of 9.5 percent. We report separate results by industry, size of the plant, juridical form of the firm and wage per hour. We also investigate, in a multivariate context, the determinants of job reallocation and why some plants create jobs and why some plants destroy them. Finally we compare our results with other national and international studies.

JEL CODES: J60, J63, J23
KEYWORDS: gross job flows, job reallocation, job creation, job destruction

1. Introduction

Economists have long studied net changes in employment, but only lately have they turned their attention to gross flows. The study of gross flows is interesting and important for a number of reasons. Studying gross flows rather than net flows allow us to obtain additional information on employment dynamics that is not available from traditional employment statistics. For example, if aggregate employment grew 5 percent, this could be the result of 8 percent of job gross job creation and 3 percent of gross job destruction, or 30 percent gross job creation and 25 percent gross job destruction. Furthermore, gross job flows can give an indication of the amount of structural change an economy is undergoing (Konings, 1995; Dolado and Gómez, 1995).

The methodology used in the paper is based on the work of Davis and Haltiwanger (1990, 1992, 1999) and Davis, Haltiwanger and Schuh (1996a). This methodology has been widely used in the literature in almost all the OECD countries. The most striking result from that literature is the great heterogeneity of employment growth experiences within very narrowly defined groups of firms or plants. For example, even in 3- or 4-digit industries inside specific regions and age classes of firms, there are simultaneous, and often substantial, job creation and job destruction. Researchers have also shown that job reallocation (the sum of job creation and destruction) is systematically related to age and size classes and to the state of the business cycle. Much of this work relates the manufacturing only, and most of it is limited to the private sector. For the Spanish economy, only seven papers have studied job flows using different datasets (Dolado and Gómez, 1995; Garcia-Serrano and Malo, 1997a and 1997b; Dolado et al., 1997; Ruano, 2000; Díaz-Moreno et al., 2000).

In this paper, we examine job creation and destruction in Catalonia across the industrial sector, using data from the Industrial Survey of Catalonia (ISC) ("Encuesta Industrial de Empresas") of 1996. This survey covers around 6500 plants that compose a representative cross-section of Catalan industrial plants. Our database provides retrospective information about the number of workers in the precedent year that allow us to estimate job flows.

The paper offers new results in at least two fields: first of all, this is the first time that the ISC has been used to estimate gross job flows. The ISC is a survey designed to obtain detailed economic and financial information from industrial firms but it also provides information about jobs. Secondly, this is the first time job flows are estimated for Catalonia. Catalonia is one of the richest regions of Spain and its industrial sector accounts for a 25% of the industrial sector of Spain in terms of production. Therefore, the performance of the Catalan industrial sector is important not only for Catalonia but also for Spain.

The paper is organised as follows. Section 2 explains the concepts and data on gross job flows used in this paper. Section 3 represents evidences on gross job flows by industry, plant size, wage per hour and juridical form of the firm. Section 4 studies the determinants of job reallocation in a multivariate context. In section 5, we compare job flows obtained in Catalonia with job flows obtained in Spain and other countries. Finally, we summarise and discuss our main findings in section 6.

2. Concepts and Data

Following Davis et al. (1996a) we define gross job flows as follows. Gross job creation at time t equals employment gains summed over all plants that expanded or start up between t-1 and t. Similarly, gross job destruction a time t equals employment losses summed over all plants that contract or shut down between t-1 and t. To express these measures as rates, we divide by a measure of sector size. Thus, gross job creation and destruction rates are given by:

$$JPOS_t = \sum_e \left(\frac{x_{et}}{X_t} \right) \times \max \{ g_{et}, 0 \} = \frac{\sum_{e:g_{et}>0} (n_{et} - n_{et-1})}{\sum_e x_{et}} \qquad \text{(E 1)}$$

$$JNEG_t = \sum_e \left(\frac{x_{et}}{X_t} \right) \times \max \{ -g_{et}, 0 \} = \frac{\sum_{e:g_{et}<0} |n_{et} - n_{et-1}|}{\sum_e x_{et}} \qquad \text{(E 2)}$$

where $X_t = \sum_e x_{et}$, x_{et} is the size of the plant e at t, and g_{et} is the growth rate of establishment e at t. Our measure of plant size at time t is simply the average of plant

employment at time t and t-1. We define g_{et} as the change in plant employment from t-1 to t, divided by the measure of plant size[1].

The gross job reallocation rate between t-1 and t (JR_t) is defined as the sum of the gross job creation rate ($JPOS_t$) and the gross job destruction rate ($JNEG_t$). Finally, the net employment growth rate (NET_t) equals the gross job creation rate minus the gross job destruction rate.

To interpret our measures of gross job creation and destruction we should remark that we observe only plant-level employment and we cannot determine whether a given level of employment in two different periods for the same plant represents the same or different employment positions. This observation and the point-in-time nature of employment data imply that $JPOS_t$ and $JNEG_t$ represent lower bounds on gross job creation and destruction.

To measure gross job flows in the industrial sector of Catalonia, we exploit the Industrial Survey of Catalonia (ISC) ("Encuesta Industrial de Empresas") of 1996. The ISC is conducted annually by the Catalan Statistical Office (IDESCAT) and covers around 6500 plants that compose a representative cross-section of Catalan plants. The basic unit of analysis is the firm with at least 1 employee and the level of observation is the plant. The main objective of the ISC is to obtain detailed economic and financial information of firms and plants, but it also facilitates information about employment in 1996 and 1995 that allow us to estimate job flows. Plants that came into being or ceased to exist during the period are excluded from the ISC and for this reason, our sample represents the population of continuing plants. Due to statistical secret, the IDESCAT has suppressed 3 industries (extraction of energetic products and refined petroleum products; production, collection and distribution of electricity; and gas and water) and an important firm of the industry: transport equipment. The suppression of these registers does not affect the global representativity of the sample, but we have to interpret the results very carefully in the industries affected by the suppression of data.

Finally, we think the job creation and destruction measures may understate the true magnitude of overall gross job flows because our dataset does not provide information

on plant births and deaths, and because the ISC only covers firms employing at least 1 worker.

3. Gross Job Flows by Industry, Plant Size, Salary and Juridical Form of the Firm

This section describes how job creation and destruction vary among industries, size of plant, wages and juridical form of the firm. Table 1 reports gross and net flows of employment for the Catalan Industry in 1996, the shares of employment and firms in each industry and the percentage of jobs created and destroyed in each industry. The overall job creation rate is 6.1 percent while the overall job destruction rate is 3.4 percent. This implies an overall job reallocation rate of 9.5 percent and an overall net employment growth of 2.8 percent.

Table 1 also shows net and gross job flow rates by 14 industries in 1996[2]. The gross job reallocation rate varies between 12.31 percent in "Office and Instruments" and 7.44 percent in "Manufacturing not Elsewhere Classified". Thus, there is considerable cross-industry variation in the gross job reallocation rate. Even within narrowly defined sectors, there exists a substantial amount of job creation and job destruction, showing the heterogeneity of incumbent plants. There is a substantial difference between shares of overall employment and shares of overall job creation and destruction. For example, the industry "Food Products, Beverages and Tobacco" accounts for a 12.81 percent of employment but it is responsible for 16.26 percent of job creation and 16.82 percent of job destruction. We also observe that job reallocation rates are much higher than net creation rates in all industries, and especially in "Office and instruments" and "Food Products, Beverages and Tobacco" industries.

The great heterogeneity of gross job reallocation begs the question whether this job reallocation process reflects sectoral shifts or job reallocations within any industry. To answer this question, we propose two different analysis. First, we construct the index of intra-industry job reallocation proposed by Konings (1995), which is defined as follows. $IRI = 1 - \frac{\sum_{\forall s} |Net_s|}{\sum_{\forall s} Jr_s}$; where s is the industry. If IRI equals 0, then job flows reflect shifts

occurring entirely across sectors, while a value of 1 reflects shifts occurring entirely within sectors. Second, we have disaggregated gross job reallocation into three components using the methodology proposed by Klette and Mathiassen (1996). The first component is the job reallocation due to *net changes in total employment*. The second component reflects the job reallocation required to accommodate changes in employment *between industries*. The third component is the reallocation of jobs between plants *within the same industry*. We have considered each of these components as a share of gross job reallocation. Table 3 reports the values of IRI and the decomposition of job reallocation by 14 and 52 industries. IRI index shows a value of 0.72 for 14 industries and 0.78 for 52 industries, and reflects shifts occurring mainly within sectors. These values are greater than the ones calculated by Dolado and Gómez (1995b) for Spain. The decomposition of job reallocation shows a very similar result. 28 percent of gross job reallocation is accounted for by changes in total employment. Another 2 percent is accounted for by changes in employment between (14 industries) industries. After we have considered these two components, we are left with 70 percent of gross job reallocation (14 industries). To sum up, for the Catalan industry in 1996, about three-quarters of job creations and destructions reflect job reallocation between plants within the same industry.

We have estimated net and gross job flow rates by employer size. This allows us to study the importance of small units in creating jobs. The literature and the policy debate has paid a good deal of attention on the role of small units in the process of job creation and this evidence is frequently presented as a justification for tax incentives, regulatory policies, and other government programs that favour the small business sector. Birch (1979) has been the first author to identify small units as job generators. OCDE (1994) presents an international comparison of results. Davis et al. (1993 and 1996a) give a review of the debate and evidence for the US and discuss the many pitfalls that can arise when interpreting the evidence on job creation in small versus large firms. The evidence for Spain and Catalonia supports the hypothesis that small units are more relevant in the process of job creation[3]. If some economic policy objectives are based in the capacity of the firms to create jobs, then it must be determined a priori which size category creates the majority of jobs.

In Table 2 we report gross and net job flow rates by plant size. We have measured plant size by the average level of employment for the years 1995 and 1996. We have also calculated gross and net job flows by firm size; the results are very similar to the ones reported in Table 2 and are available upon request. Considering job creation, there is a clear tendency for higher job creation rates for the smaller plants. If we turn to job destruction, smaller plants also have a higher job destruction rate than larger plants. Considering both job creation and destruction rates it is evident that the amount of gross job reallocation of jobs is sharply decreasing with plant size. There is net job creation in all size categories except for plants with more than 250 employees and we also observe a decreasing relationship between net employment growth and size. When we also consider that employment shares are larger for smaller plants, it is clear that smaller units are more relevant than larger units in the job creation process. More than 50 percent of jobs are created in plants between 1 and 19 employees and, on the other hand, about 25% of jobs are destroyed in plants with more than 250 employees. However, we must be very cautious with this conclusion because from the dataset we use, we cannot say whether this conclusion is a structural characteristic of the Catalan industrial sector. To shed more light in this conclusion, we need a longitudinal database.

Table 5 reports gross and net job flow rates by wage classes. It is difficult to find papers in the literature that studies the relationship between wages and job flows. Only Davis et al (1996a) and Leonard and Jacobson (1990) have found a strong inverse relationship between wages and job flows. Human capital theory offers a coherent explanation for the inverse relationship between wages and job flows (see Davis et al., 1996a). To carry out the investigation we define the variable wage per hour, which is the quotient between the total wage paid to the employees of the plant, divided by the total hours worked by the employees of the plant. Then, we sort plants into five groups defined by quintiles of the distribution of plants. Table 4 shows the results of the recodification of the variable wage per hour. Next, we compute job flows rates for each wage group. Gross job creation, reallocation and net employment change rates falls with the relative level of plant wages. Gross job destruction rate shows a slightly positive relationship with wage groups. We also observe that plants with very high salary per hour create about 55 percent of jobs and destroy about 30 percent of jobs. This result can be explained by the fact that 44 percent of the employment is located in this wage per hour group.

Finally, Table 6 displays gross and net job flows among juridical forms of the firm. We observe a great heterogeneity in gross and net job flows among juridical forms of the firm. We highlight the importance of the anonymous companies (AC) because it is a juridical form very common in the Catalan industrial sector; about 30 percent of the firms are AC and they employ about 65 percent of the total employment. Gross job creation rate for AC is 4.53 percent (the lowest of all categories) and gross job destruction rate is 3.57 percent (the lowest of all categories). Consequently, the gross job reallocation rate is also the lowest (8.11 percent). That means AC are the least dynamic juridical form of the Catalan industrial sector in terms of job creation and destruction. We believe that this is caused by the fact that AC are, on average, bigger companies.

4. Determinants of Job Reallocation

In the preceding sections, we have defined gross job reallocation (JR) as the sum of the gross job creation and the gross job destruction rates: it is thus a measure of the total job mobility in a sector. As Blanchflower and Burgess (1996) pointed out, the large magnitude of JR indicates a high degree of heterogeneity in employment growth. We have no strong theoretical reasons for supposing that more job reallocation is better than less, or vice versa. In the absence of a theoretical framework that could shed light on the determinants of JR and the welfare implications of more or less JR, it is difficult to evaluate welfare effects of policy measures that influence JR. Despite this, we believe that the analysis of the determinants of JR can give a departure point in order to develop theoretical considerations. There does not seem to be much multivariate analysis of the determinants of JR; the previous results are based upon unconditional, bivariate tabulations (for example, Garibaldi et al., 1997; and Dolado et al., 1997). Only Blanchflower and Burgess (1996), Salvanes (1997), Klette and Forre (1998) and García-Serrano and Malo (1997a) have used multivariate regressions of the determinants of JR.

The main objective of this section is to study the determinants of JR and the effects of labour and product market regulations on JR. We want to establish a formal econometric model where g_{et}, the plant-level employment growth rate, is assumed to

depend on a set of covariates, X_{et}. Note that g_{et} is the plant-level analogue to the job reallocation rate and is defined between -2 and 2, where -2 stands for plant exits and 2 stands for plants births. In order to account for the statistical properties of g_{et}, we have used the following transformation as the dependent variable[4]. Define $\tilde{g}_{et} = \ln\left[c + g_{et}\right]$, where c is some number larger than 2. We have arbitrarily chosen c=4, but also experimented with other values (we have used c=3 and c=5 and the results does not change significantly).

The more general model we have considered can be stated as:

$$\tilde{g}_{et} = \alpha + \beta' x_{et} + u_{et} \qquad \text{(E 3)}$$

where $\tilde{g}_{et}$ is the dependent variable; α is a constant; x_{et} is a vector of characteristics of the plant and other characteristics of the industry the plant is in; β is a vector of parameters to estimate; and u_{et} is a random perturbation. We have estimated three different models by OLS using as dependent variable $\tilde{g}_{et}$. The first model uses all the variables of the dataset; the second model uses plants that have created jobs and the third model uses plants that have destroyed employment. We present results from the unweighted regressions but the results from weighted regressions are quite similar to those presented below. The model in equation 3 (E3) is only a descriptive framework and not a model with a structural content.

In Table 7, we show the definition of the covariates used in the regression analysis and their data source. We classify the covariates into three groups. The first group includes two covariates related to the product market: "Herfindahl" and "Public Subsidies". The second group of covariates are related to the labour market: "Compensation", "Strike", "Working Loss", "Bargained Wage Increase" and "Fixed-Term Contracts". The rest of covariates are plant-level variables with no specific classification: "Log[E(t-1)]", "I+D" and "Export". The classifications presented above allow us to test the significance of the estimated effects of product and labour market covariates on job reallocation. In Table 8 we display descriptive statistics of these explanatory variables.

In Table 9, we report the results of OLS regressions on job growth rate in 1996, for firms with 20 and more employees. We have selected this sub-sample because the

information provided by some explanatory variables are restricted to firms with 20 and more employees. We also report detailed information of the statistics of the models and the significance of the estimated parameters. In reading the table, note that in column (1) we have selected all the plants, in column (2) we have selected plants that have created employment, and in column (3) plants that have destroyed employment.

The negative coefficient on the lagged employment level ("Log[E(t-1)]") in (1) and (2) supports the general idea that, in a multivariate context, job reallocation and job creation is lower among bigger plants. Investments in R&D ("I+D") is only significant in explaining job reallocation. The variable "Export" is significant in the model for job creation and job destruction.

We have also tested the join effects of industry dummies, product market covariates and labour market covariates on explaining the dependent variable. The evidence is presented in Table 10. Product market covariates are jointly statistical significant in the three models considered. Labour market covariates are important in explaining job reallocation and job destruction, but not in explaining job creation. Finally, industry dummies are not significant in modelling job destruction. That means job destruction is uniform among industries; this can be explained by the fact that restrictions to destroy jobs are the same in all the industries considered. The results presented in Table 10 support the idea that not only labour market rigidities but also product market imperfections are important in explaining job creation and destruction.

5. National and International Comparisons of Results

In this section, we will compare our results with other studies from Spain and other countries. Such comparisons are a very interesting aspect of this research field, as they might throw some light on idiosyncratic aspects of the Catalan economy. In addition, cross-country comparison offer a valuable opportunity to discover the role played in affecting job shifts by laws, collective bargaining structures, and market institutions that differ across countries.

Nevertheless, several measurement problems and conceptual differences hamper easy comparisons of gross job flows across studies and countries. We will just mention some

of the problems that should be kept in mind: First, the *sampling interval* differs across studies. This is a very important limitation in our case because the job flows estimated for Catalonia corresponds to 1996 while the job flows estimated for the rest of the studies corresponds to an average value among various years. Also, a lot of studies (for example, Garibaldi et al., 1997) have reported that job reallocation rates are highly sensitive to the phase of the cycle the economy is in. That means that to obtain meaningful comparisons, the economies have to be either in about the same phase of the cycle over the same period or the period has to be long enough to average across cycles. Second, the *unit of observation* varies between job flow studies. As Davis and Haltiwanger (1999) pointed out, plant-level data are preferred on both conceptual and measurement grounds. Firm-level data will not capture the job flows between plants of the same firm. In addition, accurate longitudinal linkages are more difficult to achieve with firm level data because of sometimes complicated changes in ownership and organisation. Third, *sampling selection* vary markedly across datasets. A number of studies are based on samples that are not representative for the whole population of plants/firms. The main problem is often that plants/firms below a certain threshold (e.g., 20 employees) are excluded. Fourth, *the definition of jobs and business* units differs among datasets. Most studies calculate job flows from point-in-time changes for all workers, while some studies use changes in time-averaged employment measures.

Table 11 and Table 12 shows national and international evidence on gross job flows. In order to make the comparisons as homogeneous as possible with our study, we have selected job flows from continuing firms or plants for the manufacturing or industrial sector only. The studies differ in time period, sampling interval and definition of business unit and jobs. Table 11 gives the gross job flows for Spain and Catalonia. The comparison shows the following results: first, Catalonia has the highest rate of gross job creation; second, Catalonia has a low rate of gross job destruction and third, Catalonia and Spain have a very similar rate of gross job reallocation. Table 12 shows a selection of international evidence on job flows. Some clear patterns emerge: first, the rate of gross job creation for Catalonia is similar to the average of the international evidence; second, Catalonia has the lowest rate of gross job destruction; an third, Catalonia has a below-average rate of job reallocation.

6. Conclusions

The results that emerge from this study are striking. We report an annual job creation rate of 6.1 percent, an annual job destruction rate of 3.4 percent and an annual job reallocation rate of 9.5 percent. We also report separate results by industry, size of plant, juridical form of the firm, and wage per hour. The main results of the descriptive analysis are the following. *First*, we find great heterogeneity in job flows between 2-digit industries. *Second*, we find evidence of an inverse relationship between size and job creation, job reallocation and net employment growth. There is no statistically significant relationship between size and job destruction. *Third*, we report great heterogeneity in job flows among different juridical forms. *Fourth*, there is an inverse relationship between wages and job creation, job destruction and net employment growth.

We have used the rich information provided by our dataset to analyse, in a multivariate context, the determinants of job reallocation, job creation and job destruction, and to investigate why some plants create jobs and why some plants destroy them. Previously, statements such as "job reallocation decreases with size" have been based on simple bivariate cross-tabulations over groups of plants. The analysis is extended using new explanatory variables from the product and labour markets. The results of the analysis shows that product market covariates, labour market covariates and other structural variables should be taken in account in explaining the behaviour of plants in the process of job creation and job destruction.

Finally, we have compared the estimated gross and net job flows for Catalonia with other national and international studies. The national comparison of results has showed that the rate of job creation is very high in Catalonia, and the rate of job destruction is very low. The international comparison has showed, first of all, that the rate of gross job creation for Catalonia is similar to the average of the international evidence; and second, that Catalonia has a below-average rate of job reallocation and job destruction.

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Final Notes

[1] This growth rate measure is symmetric about zero, and lies in the closed interval [-2,2] with deaths (births) corresponding to the left (right) endpoint. A virtue of this growth rate measure is that it facilitates an integrated treatment of births, deaths, and continuing plants in empirical analysis. See Davis and Haltiwanger (1990, 1992) for a discussion of the properties of this growth measure.

[2] We have also calculated gross job flows by 52 industries. The results are available upon request.

[3] The evidence for Spain and Catalonia supports the hypothesis that small units are relevant in the job creation process. See, for example, Calvo et al. (1994), Diaz-Moreno et al. (2000), Ruano (2000) for Spain, and Caixa Catalunya (1999) for Catalonia. Only the paper of Dolado et al. (1997) does not support this hypothesis; they defend that firms between 100 and 500 employees are more relevant in the job creation process, but we believe that this paper present several limitations linked to the data samples used.

[4] Other approaches have been used in the literature in order to define the dependent variable. Blanchflower and Burgess (1996) use as dependent variable the absolute value of the growth employment rate, $|g_{et}|$. Salvanes (1997) and Garcia-Serrano et al. (1997a) use the growth employment rate, g_{et}. Klette and Forre (1998) use the following transformation: $\hat{g}_{et} = \ln\left[\frac{c + g_{et}}{c - g_{et}}\right]$. In our opinion, the transformation presented in this paper has two advantages. First, it allows us to take logarithms of the dependent variable. This is very important because we have noticed that g_{et} is not

normally distributed. Second, $\tilde{g}_{et}$ has better statistical properties than the rest of dependent variables used in the literature; using the transformation we propose we get a less leptocurtic variable and a less non-normally distributed variable.

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Table 1: Gross Job Flows. 14 Industries. Continuing Plants.

	14 Industries	Job Creation	Job Destruction	Job Reallocation	Net Employment Growth	% Employment	% Plants	% Job Creation	% Job Destruction
1	Extraction of Non-Energetic Minerals	0.0888	0.0218	0.1106	0.0671	0.42	0.48	0.60	0.27
2	Food Products, Beverages and Tobacco	0.0776	0.0442	0.1218	0.0334	12.81	12.21	16.26	16.82
3	Textiles, Dress-Making, Leather and Footwear	0.0501	0.0301	0.0802	0.0199	16.51	18.49	13.60	14.87
4	Wood and Cork	0.0778	0.027	0.1048	0.0509	2.91	6.83	3.67	2.31
5	Paper, Publishing, Printing and Reproduction	0.0544	0.0402	0.0946	0.0142	9.24	10.12	8.30	11.13
6	Chemicals	0.0423	0.0379	0.0803	0.0044	9.98	3.20	7.00	11.40
7	Rubber and Plastic Products	0.0519	0.0384	0.0903	0.0135	5.73	4.26	4.90	6.60
8	Other Non-Metallic Mineral Products	0.0461	0.0331	0.0792	0.0131	4.06	4.15	3.10	4.03
9	Basic Metals and Fabricated Metals Products	0.0728	0.024	0.0968	0.0488	12.78	18.04	15.09	9.04
10	Machinery and Equipment	0.0768	0.0257	0.1025	0.0511	7.77	7.85	9.67	5.89
11	Office and Instruments	0.0445	0.0786	0.1231	-0.0341	1.65	1.30	1.24	3.97
12	Electrical and Electronic Machinery and Apparatus	0.0736	0.0318	0.1055	0.0418	6.06	3.39	7.26	5.70
13	Transport Equipment (a)	0.0604	0.0306	0.091	0.0297	5.15	1.72	5.09	4.69
14	Manufacturing not Elsewhere Classified	0.0521	0.0224	0.0744	0.0297	4.94	7.93	4.21	3.28
	Weighted Average (1-14)	0.061	0.034	0.095	0.028	100	100	100	100
	Standard Deviation (1-14)	0.015	0.014	0.015	0.025				

(a) It excludes one important firm.

Table 2: Gross Job Flows by Plant Size. Continuing Plants.

	Plant Size (3)	Job Creation	Job Destruction	Job Reallocation	Net Employment Growth	% Employment	% Plants	% Job Creation	% Job Destruction
1	1-10	0.0975	0.0251	0.1227	0.0724	24.43	75.08	38.18	17.86
2	11-19	0.0647	0.0349	0.0997	0.0298	13.39	13.11	14.19	13.89
3	20-49	0.0539	0.0326	0.0865	0.0213	17.13	7.87	15.16	16.66
4	50-99	0.0446	0.0409	0.0855	0.0037	10.17	2.06	7.52	12.53
5	100-249	0.0500	0.0343	0.0843	0.0157	14.42	1.30	11.88	14.79
6	250+	0.0385	0.0394	0.0779	-0.0009	20.45	0.59	13.07	24.28
	Weighted Average (1-6)	0.061	0.034	0.095	0.028	100	100	100	100
	Standard Deviation (1-6)	0.021	0.006	0.016	0.026				

(3) Plant size is defined as the average of its employment in t-1 and t

Table 3: The Importance of Within-industry Job Flows.

	14 Industries	52 Industries
Index of Intra-industry Job Reallocation (a)	0.72	0.78
Decomposition of Job Reallocation		
Net change in total employment	28	28
Between Industries	2	8
Within Industries	70	64

(a) Konings (1995)

(b) Klette y Mathiassen (1996). The values are in percentages.

Table 4: Hourly Wage Classes.

	Hourly Wage Class	HW(a)	% Plants	% Employment
1	Very Low	0 - 791.5	19.8	8.24
2	Moderately Low	791.5 - 1005.6	20.2	11.06
3	Average	1005.6 - 1247	20	14.93
4	Mederately High	1247 - 1657	20	21.91
5	Very High	1657+	20	43.86

(a) HW is expressed in pesetas per hour

Table 5: Gross Job Flows by Wages. Continuing Plants.

	Hourly Wage Class	Job Creation	Job Destruction	Job Reallocation	Net Employment Growth	% Job Creation	% Job Destruction
1	Very Low	0.1108	0.0255	0.1363	0.0853	14.53	6.06
2	Moderately Low	0.0786	0.0194	0.0979	0.0592	14.00	6.26
3	Average	0.0862	0.0279	0.114	0.0583	20.75	12.16
4	Mederately High	0.0565	0.0309	0.0874	0.0256	20.29	20.13
5	Very High	0.0418	0.042	0.0838	-0.0002	30.42	55.39

Table 6: Gross Job Flows by Juridical Form of the Firm. Continuing Plants.

	Juridical Form of the firm	Job Creation	Job Destruction	Job Reallocation	Net Employment Growth	% Employment	% Plants	% Job Creation	% Job Destruction
1	Personal Company	0.0733	0.027	0.1003	0.0464	7.48	26.55	8.90	5.94
2	Anonimous Company	0.0453	0.0357	0.0811	0.0096	66.09	27.38	49.52	70.84
3	Limited Company	0.0957	0.0275	0.1232	0.0683	22.33	38.98	34.32	17.87
4	Cooperatives	0.0739	0.0554	0.1292	0.0185	2.31	2.75	2.80	3.81
5	Other Juridical Forms	0.1591	0.0303	0.1894	0.1288	1.79	4.35	4.44	1.54
	Weighted Average (1-5)	0.061	0.034	0.095	0.028	100	100	100	100
	Standard Deviation (1-5)	0.043	0.012	0.041	0.048				

Table 7: Definition of the Covariates Used in the Regression Analysis.

Variable	Level of the Variable	Definition	Source
Log[E(t-1)]	Plant	Logarithm of the number of employees in 1995.	ISC-1996
I+D	Plant	R&D investments. Dummy variable.	ISC-1996
Export	Plant	Exports outside Spain. Dummy Variable.	ISC-1996
Herfindahl	52 Industries	Herfindahl Index.	ISC-1996
Public Subsidies	Plant	Plant with Public Subsidies. Dummy Variable.	ISC-1996
Compensation	Plant	Sum of Compensations/ Number of Employees.	ISC-1996
Strike	19 Industries	Number of strikes.	DTGC-1996
Working Loss	19 Industries	Number of working hours lost due to strikes.	DTGC-1996
Bargained Wage Increase	22 Industries	Bargained Wage Increase.	DTGC-1996
Fixed-Term Contracts	13 Industries	Percentage of Fixed-Term Contracts.	EES-1995

Notes:
ISC-1996 is the Industrial Survey of Catalonia. IDESCAT.
DTGC-1996 is the Labour Department of the Catalan Government.
EES-1995 is the Salarial Estructure Survey for the year 1995. INE. The variable we have used is the percentage of fixed-term contracts for men in the private sector of Catalonia in 1995.

Table 8: Descriptive Statistics. Covariates.

	Log[E(t-1)]	I+D	Export	Herfindahl	Public Subsidies	Compensation	Strike	Working Loss	Bargained Wage Increase	Fixed-Term Contracts
Mean	3.83	0.24	0.60	0.03	0.32	0.46	2.96	11539.77	3.59	15.8841
Median	3.66	0	1	0.02	0	0	4	937	3.55	16.23
Maximum	8.19	1	1	0.38	1	1	6	75108	4.59	33.1
Minimum	0	0	0	0	0	0	0	0	2.91	6.72
Std. Dev.	0.96	0.43	0.49	0.04	0.47	0.50	2.35	23601.86	0.34	4.774624
Skewness	0.32	1.19	-0.42	4.27	0.78	0.17	-0.02	2.24	0.00	0.313712
Kurtosis	4.68	2.42	1.18	27.78	1.61	1.03	1.38	6.25	2.73	5.213583
Jarque-Bera	565.41	1046.77	702.68	119715.50	762.29	697.31	459.13	5344.24	12.46	922.6324
Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Observations	4183	4183	4183	4183	4183	4183	4183	4183	4183	4183

Table 9: OLS Regressions of Job Growth Rate. 1996.

Dependent Variable: y=log(4+g)	Job Reallocation (1)	Job Creation (2)	Job Destruction (3)
Estimation Results			
Covariates			
Constant	1.432 ***	1.466 ***	1.337 ***
Log[E(t-1)]	-0.005 ***	-0.009 ***	0.003 ***
I+D	0.004 ***	0.001	0.001
Export	0.001	-0.004 ***	0.005 ***
Product Market Covariates			
Herfindahl	-0.002	1.70E-02	-0.005
Public Subsidies	0.004 ***	0.003 **	0.004 **
Labor Market Covariates			
Compensation	-2.39E-08 ***	4.62E-10	-1.48E-08 ***
Strike	-0.001 **	-0.001	-5.29E-04
Working Loss	6.06E-08	1.58E-08	9.40E-08 ***
Bargained Wage Increase	-0.004	-0.004	0.004
Fixed-Term Contracts	0.000	1.95E-04	-2.10E-04
7 Industry Dummies			
Textiles and Extraction of Non-Energetic Minerals	-0.006	-0.012 ***	
Wood, Cork and Basic Metals	0.001	-0.007	
Paper and other Manufacturing	-0.007 *	-0.012 ***	
Chemicals and Transport Equipment	0.005 *	-0.001	
Rubber, Plastic and other Non-Metallic Mineral Products	0.004	0.002	
Machinery, Equipment, Electrical and Electronic	0.004	-0.003	
Statistics			
Adjusted R^2	0.053	0.121	0.056
F-Statistic (c)	15.55 (0.00)	17.07 (0.00)	8.18 (0.00)
WHT (d)	128.40 (0.00)	83.88 (0.00)	21.27 (0.21)
Observations	4183	1873	1384

Notes: (a) Unweighted regressions. Firms with 20 and more employees. Baseline categories are as follows: "No I+D", "No Export", "No Public Subsidies", "Food Products, Beverages, Tobacco, Office and Instruments".
(b) White heterocedasticity-consistent standard errors in (1) and (2).
(c) F-Statistic. Significance level in parenthesis.
(d) WHT=White-Heteroskedasticity Test without cross terms. We show the n*R^2 statistic and the significance level (in parenthesis).
* Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level (two-tailed tests).

Table 10: Hypothesis Testing.

Redundant Variables	Job Reallocation (1)	Job Creation (2)	Job Destruction (3)
Product Market Covariates	12.07 (0.00) ***	6.24 (0.04)**	4.97 (0.08) *
Labor Market Covariates	89.78 (0.00)***	7.52 (0.18)	40.41 (0.00)***
Industry Dummies	29.98 (0.00) ***	21.80 (0.00)***	3.67 (0.72)

Notes: (a) We show the Log-Likelihood Ratio Test and the significance level (in parenthesis).
(b) Product Market Covariates: Herfindahl and Public Subsidies.
(c) Labor Market Covariates: Compensation, Strike, Working Loss, Bargained Wage Increase and Fixed-Term Contracts.
* Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level (two-tailed tests).

Table 11: National Comparison of Job Flows. Continuing Firms or Plants.

Country	Data		Sector	Sampling Unit	Period	Source	Job Creation	Job Destruction	Job Reallocation	Net Growth
A. Spain versus Catalonia. Several years										
Spain	CBBE	Annual	Manufacturing	Firm	1983-1992	Dolado et al. (1997)	3.1	4.0	7.1	-1.0
Spain	ECL	Quarterly	Industrial	Firm	1993-1996	Garcia et al. (1997b)	1.1	2.1	3.2	-1.0
Spain	ESEE	Annual	Manufacturing	Firm	1990-1997	Ruano (2000)	4.2	8.5	12.7	-4.3
Spain	FCSS	Annual	Manufacturing	Plant	1993-1994	Diaz-Moreno et al. (2000)	4.7	7.4	12.1	-2.6
Catalonia	EI	Annual	Industrial	Plant	1996	Camacho (1999)	6.1	3.4	9.5	2.7
B. Spain versus Catalonia. 1996										
Spain	ESEE	Annual	Manufacturing	Firm	1996	Ruano (2000)	3.8	7.0	10.8	-3.2
Catalonia	EI	Annual	Industrial	Plant	1996	Camacho (1999)	6.1	3.4	9.5	2.7

Definition of databases: Dolado et al. (1997) uses the CBBE ("Central de Balances del Banco de España"), a database of big firms; García et al. (1997b) uses the ECL ("Encuesta de Coyuntura Laboral"), and selects firms with 500 or more workers; Ruano (2000) uses firms with 10 or more workers from the ESEE ("Encuesta sobre Estrategias Empresariales"); Diaz-Moreno et al (2000) uses plants with more than 5 workers from the FCSS ("Fichero de Cuentas de la Seguridad Social").

Table 12: International Comparison of Results. Continuing Firms or Plants.

Country	Data	Sector	Sampling Unit	Period	Source	Job Creation	Job Destruction	Job Reallocation	Net Growth
Australia	Quarterly	Industrial	Plant	1984-1985	OCDE (1996)	7.1	4.6	11.7	2.5
Ireland	Quarterly	Industrial	Plant	1984-1985	OCDE (1996)	6.1	8.1	14.1	-2.0
Norway	Annual	Manufacturing	Plant	1977-1992	Salvanes (1997)	5.7	7.0	12.7	-1.3
USA	Annual	Manufacturing	Plant	1973-1988	Davis et al. (1996)	9.1	10.3	19.4	-1.1
Canada	Annual	Manufacturing	Plant	1973-1986	Baldwin et al. (1994)	10.6	10.0	20.5	0.6
Japan	Annual	Industrial	Plant	1991-1995	Genda (1998)	4.2	3.9	8.1	0.3
UK	Annual	Manufacturing	Firm	1973-1986	Konings (1995)	1.6	5.6	7.2	-3.9
Israel	Annual	Manufacturing	Firm	1970-1994	Gronau et al. (1997)	6.6	5.7	12.3	0.8
Netherlands	Annual	Manufacturing	Firm	1979-1993	Broesma et al. (1997)	3.4	4.4	7.9	-1.0
Denmark	Annual	Manufacturing	Plant	1980-1991	Albaek et al. (1998)	12.0	11.5	23.5	0.5
Michigan	Annual	Manufacturing	Firm	1972-1988	Foote (1998)	8.9	11.0	19.9	-2.0
Catalonia	Annual	Industrial	Plant	1996	Camacho (1999)	6.1	3.4	9.5	2.7