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New business formation and employment growth: some evidence for the Spanish manufacturing industry

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Abstract:

This paper explores the effects of new business formation on employment growth in Spanish manufacturing industries. New firms are believed to make an important contribution to economic growth but the extent of this contribution is unclear. We consider time lags of new firm formation as explanatory variables of employment change and identify how long the effect of new firm entries on employment lasts. Our main results show that the effects of new business formation are positive in the short term, negative in the medium term and positive in the long term, thus confirming the existence of indirect supply-side effects found in similar studies for other countries.

Key words: regional growth, firm entry, time lags and Spanish economy
JEL classifications: L00, L60, R11, R12

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1. Introduction

What is the incidence of new business formation (or firm entries) on employment growth? We assume that there is a dynamic relationship between employment growth and firm entries as a result of job creation by entering firms, job destruction by exiting firms and both job creation and job destruction due to the interaction of the effects of entering and exiting firms.

The literature on regional economics provides considerable empirical evidence for understanding the relationship between firm entries and employment growth. Some studies consider the employment effect attributed to new business formation to be a dynamic process that is related to the characteristics of firm turnover. These studies report that new firms can have both positive and negative effects on employment. Recent empirical papers on firm entries therefore suggest the incorporation of time lags in order to capture the various effects of new business formation on employment.

Fritsch and Mueller (2004) stress the importance of considering two types of effects that new firm creation can have on economic development: i.e. direct and indirect effects. First we shall discuss the direct effects. The first effect of new firm formation on employment is the creation of jobs. Later, however, the market begins a firm selection process. Net job formation may therefore be positive or negative and will depend on how the newcomers develop. Two types of exits derive from the entry of new capacities. First, some new firms may have to leave the market after a certain time due to their lack of competitiveness. Second, some incumbents may be forced out of the market by new competitors. With a “survival-of-the-fittest” scenario, and if the overall market volume remains constant, a negative net job creation can be expected from the difference between the creation of employment by new firms and the destruction of employment by exiting firms (both newcomers and incumbents).

The indirect supply-side effects derive from the entry of new firms and the more intense competition this creates. These effects can help to increase the competitiveness of an economy and may stimulate economic growth. Fritsch and Mueller (2004) and Fritsch et al. (2005) point out the following main types of indirect

effects: a greater efficiency of the incumbent firms due to stronger competition from real and potential entrants; a faster structural change, since the turnover of firms leads to the adoption of new technologies; greater innovation, since newcomers are more able than incumbents to introduce radical innovations and are more interested in exploiting the possibilities for potential profit; and innovative entry, which may lead to better-quality and more varied products and a greater probability of finding a better match for customer preferences.

The supply-side effects of new firms are related to increased employment induced by improvements in competitiveness. However, this positive result does not depend on the success of the newcomers: the greater supply could come from both newcomers and incumbents.

The impact of entries on net employment change in the long term is a major issue in industrial organisation because of its implications for industrial policies. If we know how entries affect employment, we can target the most suitable policies for promoting net employment growth and identify what kinds of entries should be promoted. From this point of view a key question is: is it better to promote entries or to help incumbent firms? Audretsch and Fritsch (2002) reviewed the literature on this issue and showed that there are different growth regimes at a regional level and that regional economic development could be caused by both new firms or by incumbent firms. These findings highlight the fact that there are no clear answers as to which kind of development strategies are more suitable—those based on supporting incumbent firms or those based on supporting entries—so more work is needed to understand, for example, the role of new firms in employment growth.

This paper explores the incidence of new business formation (or firm entries) on employment growth in Spanish manufacturing industries. For the Spanish case, there is only some evidence of the incidence of firm entries on productivity growth (Callejón and Segarra, 1999; Fariñas and Ruano, 2004; Martín and Jaumandreu, 2004)[i], though almost nothing is known about the incidence of firm entries on employment change.

The paper is organised as follows. In the second section we present the empirical evidence of firm entry and employment change. In the third section we present the

database and the variables used. In the fourth section we develop the model and econometric estimations and present our main results from these estimations. In the fifth section we discuss our findings and draw some conclusions.

2. Firm entry and employment change at a regional level

The entry of new firms erodes the power of established firms by increasing competition in the market. This leads to a displacement process that causes the least efficient firms to leave (Geroski, 1989). For this reason, the entry and exit of firms are closely related phenomena.

What, then, are the consequences of entries? First, new entries can create a displacement effect (Audretsch, 1995) in which jobs are destroyed as less efficient incumbent firms exit the market due to the greater competitiveness created by the new entrants. Second, the survival rate of new firms is low and most of today's entries are tomorrow's exits. However, not all new entries exit markets immediately, which implies that the effect of new entries on employment is unclear in the short term. In the long term, however, we assume that the more efficient firms survive (these surviving firms have a faster growth pattern) and displace the less efficient firms (incumbents and/or new firms)[ii]. At the same time, however, there is the conical revolving door effect (Audretsch, 1995), by which the turnover of entries and exits is much higher for smaller firms than for larger ones[iii]. This means that the size of entering firms is smaller than the industry average, that many of these firms exit during the first few years, and that those that survive can grow faster than the incumbent firms. Several contributions have analyzed the relationship between the initial size of the firm and the likelihood of survival (Audretsch, 1995; Audretsch and Mahmood, 1995; Dunne and Hughes, 1994; Mata and Portugal, 1995, 1999). The empirical evidence shows that there is a positive relationship between size at start-up and the likelihood of survival[iv]. However, some empirical papers suggest that, if small firms are to survive, they need to grow at a faster rate than their larger counterparts. Thus, Audretsch et al. (1999) point out that the post-entry growth rates of surviving firms are observed to be negatively related to firm size. Agarwal and Audretsch (2001) also find a negative relationship for the mature life-cycle stage.

Despite job destruction in the short term due to adjustment costs, we can assume that there is a job creation process in the long term, though it is not clear (from an empirical point of view) what long term and short term mean i.e. after how many years the entries contribute to an increase in net employment. To know this, we require disaggregated information about the characteristics of entries and exits and changes in market structure due to the turnover process.

The dynamic relationship between employment growth and firm entries suggests a time lag structure. The effects of entries on employment are then a result of job creation by entering firms, job destruction by exiting firms and both job creation and job destruction due to the interaction of the effects of entering and exiting firms. There are some examples of employment growth analysed using lagged variables (see, for instance, Acs and Armington, 2004; Audretsch and Fritsch, 2002; Fölster, 2000; Fritsch et al., 2005; Fritsch and Mueller, 2004; Van Stel and Storey, 2004) but most of research is conducted using no time lags or just a short lag.

3. Data and variables

To model the incidence of new firms on employment growth, we needed to know the gross rate of entry (GRE) and employment change (EC) in the Spanish manufacturing sector. So, the basic relationship to be modelled is:

$$EC = f(GRE)$$

To obtain the data to model this relationship, we considered two statistical sources: the *Encuesta Industrial* (the Industrial Survey; EI) and the *Registro de Establecimientos Industriales* (the Register of Manufacturing Establishments; REI).

The data on employment (number of workers) in Spanish manufacturing industries came from the EI[v], which also provided the number of existing establishments, data on production (gross value added) and the distribution of establishments by size. The number of establishments created every year in the region-sector pairing[vi] came from the REI, which is an administrative register. The variables included in

our database are available for each pairing of industry and region for each year between 1978 and 1996.

Specifically, and to avoid disturbances due to short-term fluctuations, the dependent variable is employment change (EC), which we computed as the growth rate of employment over 2 years, i.e.

$$EC_t = \frac{(Employment_t - Employment_{t-2})}{Employment_{t-2}} \quad (1)$$

Following the labour market perspective[vii], the independent variable (GRE) was calculated by dividing the number of establishments created every year in the region-sector pairing ($Entries_t$) by the initial level of employment ($Employment_{t-1}$), i.e.

$$GRE_t = \frac{Entries_t}{Employment_{t-1}} \quad (2)$$

As Table 1 shows, in the Spanish manufacturing sectors there are substantial differences in the gross rates of entry both at the sectoral and the regional level.

[INSERT TABLE 1 ABOUT HERE]

International empirical evidence shows that, even after controlling for differences in the industrial mix[viii], there are substantial differences in the regional rates of entry (Reynolds et al. 1994, Keeble and Walker 1994). This suggests (dis)economies exist at the regional level that directly affect the decision to enter. In the Spanish case, for example, Segarra et al. (2002a) show that entries are not randomly distributed over the Spanish regions (see also Table 1). Rather, there is a close relationship between economic growth and the rates of entry (positive) and exit (negative). At any rate, the existence of different growth regimes (Fritsch, 2004) suggests that policies that attempt to stimulate growth should take these regional specific growth regimes into account.

[INSERT FIGURE 1 ABOUT HERE]

An analogous behaviour is present in the evolution of the dependent variable, i.e. employment growth over time (EC). Figure 1 summarises the evolution of this variable, which we will attempt to link to business creation. We found that the economic cycles that characterized production (gross added value: GAV) are also present in employment growth. There is therefore a close link between economic growth (recession) and the creation (destruction) of employment.

However, it is also important to consider the cyclical evolution of the Spanish economy during the period analysed. Specifically, between 1978 and 1996, and taking into account the average growth, we can distinguish three stages. The first stage covers the period of readjustment in manufacturing between 1978 and 1985. During this period, the Spanish economy suffered the second energy crisis (1979) and stagnation in industrial production and investment (1979-1982). Also, several economic, political and institutional reforms were implemented to restructure production (1982). One of these was a thorough industrial restructuring with important adjustments in employment. The second stage, which includes the country's integration into the EEC (Economic European Community) in 1986, covers a period of growth that ended in the late 1980s. The third stage covers a period of recession characterized by a decrease in economic activity and employment, followed by a slight recovery at the end of the period.

This cyclical behaviour has had several implications for industrial labour and gross added value in the different Spanish regions, while the various manufacturing sectors have experienced repercussions of different intensities. From a territorial and sectoral point of view, the overall effect between 1978 and 1996 is shown in figures 2 and 3, respectively.

[INSERT FIGURE 2 ABOUT HERE]

Figure 2 analyses the regional effects on industrial labour and gross added value growth. One result that is common to most of the regions as shown in Figure 2, is the destruction of the workforce due to industrial restructuring in the period analysed. However, added value, measured in constant prices, experienced a positive growth in all regions (the only exception being the Canary Islands). These

results therefore show a positive impact on regional productivity in the manufacturing sector.

[INSERT FIGURE 3 ABOUT HERE]

Figure 3 shows that for our sample the average annual growth in gross added value was 3% throughout the 1978–1996 period. This general growth hides several sectoral differences, however. For instance, paper and printing products had the highest average annual growth in added value (4.98 %), while textiles had the lowest (1.0%). Over the same period, labour decreased. Clothing, for example, had the highest decrease (on average, –2.55% per year). Most sectors experienced a destruction of their workforce but also a positive growth in gross added value. These sectors therefore experienced improvements in labour productivity. On the other hand, three sectors suffered a drop in both employment and gross added value. However, as in these sectors the drop in employment was higher than the recession in activity, the effect on labour productivity was positive.

4. Model and results

As stated earlier, we have used data on firm entry to assess the dynamic relationship between firm entries and employment change in the Spanish manufacturing sector. The model we present is similar to the one used by other similar empirical contributions (Fritsch and Mueller, 2004):

$$EC_{it} = \alpha + \beta_0 GRE_{it} + \beta_1 GRE_{it-1} + ... + \beta_s GRE_{it-s} + u_{it} \quad (3)$$

In this model we consider data at both the regional and the temporal level[ix]. Each variable therefore has two subscripts: *i* denotes region and *t* denotes year. The dependent variable is Employment Change (EC), and the independent variables are the current and the past values of the gross rate of entry (GRE). Since the industrial mix varies between regions and the relative importance of new firms and incumbents varies between industries, we used a shift-share procedure to obtain a sector-adjusted measure of new firm start-ups (Audretsch and Fritsch, 2002). This procedure adjusts the data by imposing the same industrial mix on each region.

Notice that, in principle, current and past values of the gross rate of entry affect employment change. Therefore, the number of lags (*s*) determines the number of periods during which the effect of the rate of entry on employment change occurs. To estimate the model (3) we have to give the parameter *s* a value. Since we aim to assess the long-term effect of entries on employment, we set the value *s=7*, i.e. a model with seven lags[x], in accordance with similar studies. Table 2 shows the results of the estimation of (3), including the regressor in levels as well as the first seven time lags. Because the correlation between the covariates is high, which means that there is a problem of multicollinearity[xi], the impact of each regressor lag is also analyzed separately. The estimation technique used was Fixed Effects allowing for both regional and time effects[xii], and the standard error estimates were obtained using the cross-section White method.

[INSERT TABLE 2 ABOUT HERE]

The results of the regression including all gross rates of entry and the separate regressions for each lag of the gross rate of entry are very similar, yielding a positive short-term effect in years t and $t-1$, a negative effect in year $t-2$ and a positive effect in years $t-3$ and $t-4$. In the last years the effect of entries on employment change seems to vanish. The positive short-term effect reflects the direct employment creation caused by the entry of new firms, whereas the negative medium-term effect is likely to be caused by the exit of firms as a result of the previous entry of new firms[xiii]. The positive effect observed for years $t-3$ and $t-4$ is likely to be related to indirect supply-side effects caused by entrants, i.e. improvements in efficiency, structural change and innovation (Fritsch and Mueller, 2004). These lag structures are shown in Figure 4.

[INSERT FIGURE 4 ABOUT HERE]

Models that include several lags of the same variable, as in (3), are likely to suffer from a multicollinearity problem, which makes the interpretation of the coefficients unreliable. To solve this problem, we impose a structure on the lag distribution by applying the polynomial distributed lag model[xiv]. This method solves the problem of multicollinearity in distributed lag models by imposing a structure on the lag

coefficients. We assume that the effects of entries on employment change are distributed over 7 years because the previous results show that in this period the effects have already vanished. Table 3 shows the results of the polynomial distributed lag estimation considering a second, third, fourth and fifth order of the polynomial. In this type of estimation, both regional and time effects are accounted for, and the standard error estimates are obtained, as in the previous estimation, using the cross-section White method. Figure 5 shows the graphical lag structures resulting from the different polynomial orders considered.

[INSERT FIGURE 5 ABOUT HERE]

The lag structure of the second order polynomial is approximately a U-shaped structure, whereas the lag structures of the other polynomial orders (third, fourth and fifth) are quite similar, showing a pattern also found in the previous estimations. These results confirm the interpretation of the lag structure proposed earlier, i.e. the direct effect of entries on employment change is positive in years t and $t-1$, becomes negative in years $t-2$ and $t-3$, and is positive again between $t-4$ and $t-6$. The magnitude of the effect decreases and is negative in the last year ($t-7$). The *F* statistic is significant in all the estimation, so these results can be regarded as reliable.

Our results are similar to those obtained by Fritsch and Mueller (2004) for the German case and Baptista *et al.* (2005) for the Portuguese case, in the sense that entries cause positive indirect effects in the form of increased occupation. These authors, however, consider a longer period of time in their analysis and find that the indirect supply side effects take place later in time. This result might derive from differences in the industrial structure of the countries, but differences in the aggregation and quality of data may also have an influence. These studies also conclude that the indirect supply-side effects of entries contribute to employment growth more than the direct effects associated with jobs created by entrants. These results show that future research must focus on why the lag effects on employment differ between countries. For the British case, for instance, Van Stel and Storey (2004) conclude that the strongest effect on employment growth occurs about five years after firms enter. Fritsch and Mueller (2004) analyse business formation in West German *Kreise* (districts) and emphasize the role of the indirect supply-side

effects of entries, which are more important (in terms of employment growth) than the number of jobs directly created by the new firms. Specifically, they conclude that these are not short-term effects (the exits of previous entrants could actually destroy net employment) but long-term effects. Also for the German case, Audretsch and Fritsch (2002) show that firm entries between 1983 and 1985 could help to explain employment growth between 1993 and 1998. They found that the effects of entrants on employment growth take more than a decade to become evident, though other studies of the German case showed no relation between entries and lagged employment growth (Audretsch and Fritsch, 1996; Fritsch, 1997 and 1996).

5. Discussion and implications

In this paper we have explored the incidence of new business formation on employment growth in the Spanish manufacturing industries. We have specified a distributed lag model where both the gross rate of entry in level and its time lags affect employment change. We have estimated this model by including all the lags from t to $t-7$, then including each lag separately and imposing a structure on the coefficients using the polynomial distributed lag model, which is also known as the Almon lag model. The results from the various estimations are quite similar: a positive short-term effect, a negative medium-term effect and a positive long-term effect. These results are similar to those of other studies that also estimate distributed lag models.

These results are interesting for our analysis of the effectiveness of entry-promoting policies—particularly for determining whether these policies are successful in the short or long term. Also from this point of view, it is important to measure how far new firms contribute to employment growth because the amount of public funds intended for policies aimed at increasing firm entry depend on this contribution. If this is measured according to specific industrial factors or according to individual characteristics of entrants (such as size, capital resources, or the skill level of employees and entrepreneurs), more suitable policies could be designed to concentrate resources on these job-generating start-ups (Fritsch, 1997). The public promotion of firm entries may be justified in order to safeguard the quality of market

selection (Fritsch and Mueller, 2004) and promote gross added value growth and innovation, but, as Fritsch et al. (2005, p. 548) point out, “market exits are necessary elements of market selection and that policy should abstain from subsidizing firms in order to prevent them leaving the market”.

It should be borne in mind, however, that we did not have enough time series data to test the incidence of the business cycle on firm entry and job creation. Further research into the Spanish case should explore the incidence of the business cycle on the lagged effect of firm entry on net job creation. Policy makers need to answer a key question: what are the most efficient entries in terms of lagged job creation—those that correspond to periods of growth or those that correspond to periods of decline?

Despite these conclusions, more work is needed in this area. Here we have worked at a regional level, but this administrative unit is too big to cover real economic areas. Given that space is an important determinant of firm entries, one solution could be to use a more disaggregated area, such as provinces, to also allow spatial econometric techniques to enter this analysis. We could then link the topic analyzed to the location of firms, assess the consequences of agglomeration in terms of employment and productivity, and analyse the role of geography in this phenomenon[xv]. Another future extension of this work should be to take into account specific industry effects. Here we have considered all manufacturing activities but there are some particular effects within industries. On this point, for instance, Acs and Armington (2004) found that the effect of entrepreneurial activity on employment change varies across industries. We should expect to find similar results for the Spanish case.

Since employment change does not describe the full effect of the efficiency provided by new entrants, a more complete analysis should include both the effect of new entrants on employment change and their effect on productivity. This analysis may show that entries are employment-reducing but productivity-enhancing. This would mean that entries introduce labour-saving innovations or take place mainly in capital-intensive sectors. Such results cannot be obtained without considering a measure of productivity. Several papers have tried to assess the effect of firm entry and exit on productivity for the Spanish case. Martín and

Jaumandreu (2004) found that during the 1980s competitive entry accounted for 80% of productivity growth, while Fariñas and Ruano (2004) found that the replacement of exiting firms by entering firms made a positive contribution to the dynamics of Total Factor Productivity growth. If we link these results to those of our paper, we may conclude that, in the long term, entries foster both employment and productivity growth. However, more research is needed to confirm these results.

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Tables

Table 1
Sectoral and Regional Rates of Entry (Average 1980-1994)

Sectors (NACE-25)	**GRE (labour market approach)**
Mineral Products	0,32
Chemical Products	0,14
Metal Products	0,70
Ag./Ind. Machinery	0,41
Electrical Goods	0,26
Transport Equipment	0,10
Food/Bev./Tob.	0,37
Textiles	0,42
Paper/Printing	0,42
Rubber/Plastic	0,44
Other Manufacturing	1,40
Total Manufacturing	*0,43*
Regions (NUTS-2)	
Andalusia	0,65
Aragon	0,45
Asturias	0,40
Balearic Islands	0,72
Canary Islands	0,78
Cantabria	0,29
Castile-Leon	0,42
Castile-la Mancha	0,68
Catalonia	0,32
Valencia	0,65
Galicia	0,40
Madrid	0,40
Murcia	0,65
Navarre	0,24
Basque Country	0,20
La Rioja	0,35
Spain	*0,43*

Source: REI and EI.

Table 2. Fixed Effects Estimation of Equation (3)
Dependent Variable: Employment Change (EC)

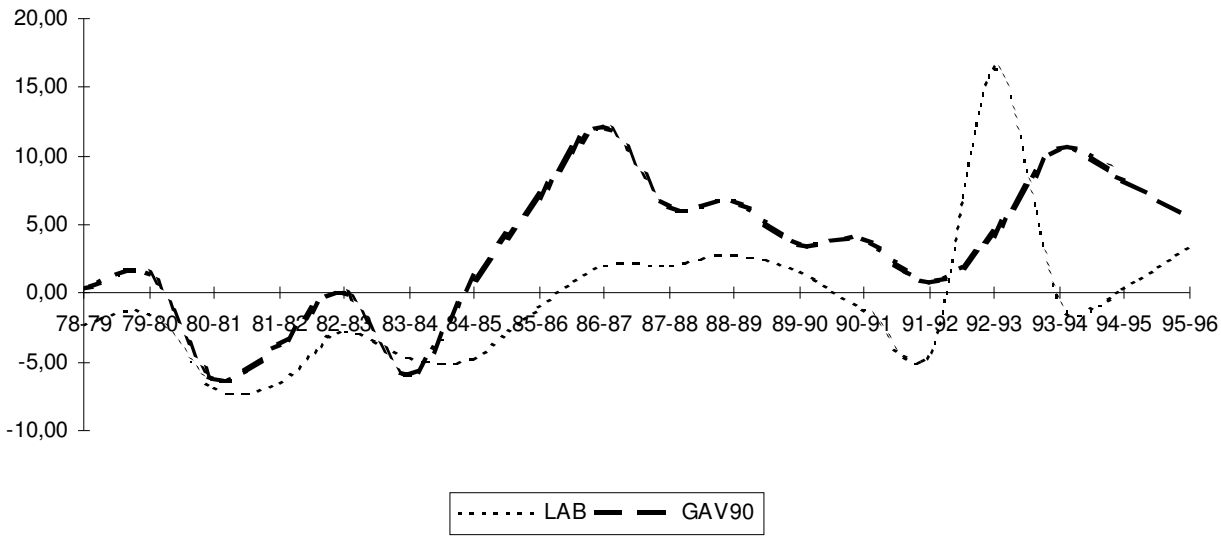
Constant	-0,03	-0.03**	-0.02**	0.02**	-0.03**	-0.02**	0,005	-0.005	0,002
	(0.04)	(0.007)	(0.008)	(0.007)	(0.008)	(0.004)	(0.007)	(0.011)	(0.012)
GRE(t)	4.48**	5.67**							
	(2.22)	(1.74)							
GRE(t-1)	3,56		3.26*						
	(2.37)		(1.84)						
GRE(t-2)	-6.64**			-6.33**					
	(2.54)			(1.59)					
GRE(t-3)	2,75				3.73**				
	(1.94)				(1.89)				
GRE(t-4)	2,42					3.55**			
	(1.93)					(0.99)			
GRE(t-5)	0,28						-2.88*		
	(2.18)						(1.67)		
GRE(t-6)	2,86							-0.04	
	(2.27)							(2.55)	
GRE(t-7)	-3.54								-2.16
	(2.68)								(2.82)
R-Squared	0,44	0,25	0,22	0,28	0,26	0,26	0,29	0,3	0,31
F	3.24**	2.57**	2.08**	2.74**	2,43	2,35	2.58**	2.47**	2.44**
Number of Obs.	160	272	256	240	224	208	192	176	160

Notes: Standard errors appear in brackets. ** and * mean that the estimated coefficients are significant at a 5% and 10% significance level, respectively.

Table 3. Polynomial Distributed Lag Estimation of Equation (3)
Dependent Variable: Employment Change (EC)

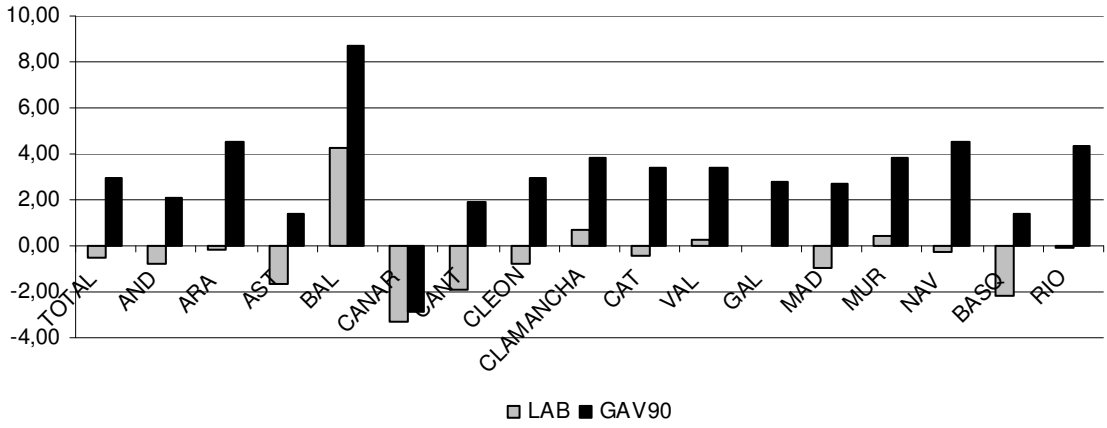
	Almon method assuming a polynomial of:			
	Order 2	**Order 3**	**Order 4**	**Order 5**
Constant	-0,04	-0,04	-0,04	-0,04
	(0.04)	(0.04)	(0.04)	(0.04)
GRE(t)	3.70	6,59	6,59	6,29
GRE(t-1)	2,33	0,41	-0,32	0,25
GRE(t-2)	1,25	-1,41	-1,57	-2.00
GRE(t-3)	0,47	-0,53	-0,09	-0,45
GRE(t-4)	-0,01	1,42	1,83	2,26
GRE(t-5)	-0,21	2,82	2,58	3,05
GRE(t-6)	-0,11	2,01	1,19	0,62
GRE(t-7)	0,27	-2,61	-2,65	-2,29
R-Squared	0,32	0,37	0,37	0,37
F	2.40**	2.75**	2.65**	2.58**
Number of Obs.	160	160	160	160

Notes: Standard errors appear in brackets. ** and * mean that the estimated coefficients are significant at a 5% and 10% significance level, respectively.



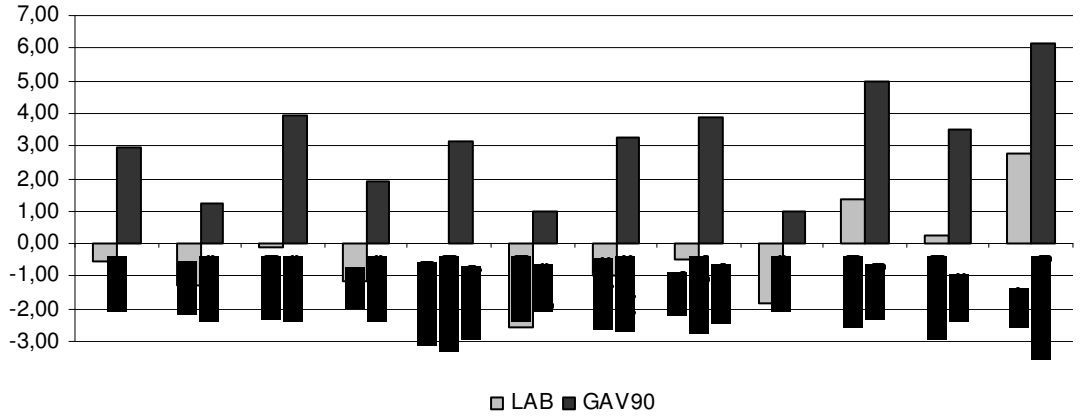
Source: our own with data from the Industrial Survey

Figure 1. Annual growth rates in manufacturing industries: labour and gross added value (base=1990).



Source: our own with data from the Industrial Survey

Figure 2. Average annual growth rates in manufacturing industries in regions: labour and gross added value (base=1990). 1978-1996



Source: our own with data from the Industrial Survey

Figure 3. Average annual growth rates in manufacturing industries: labour and gross added value (base=1990). 1978-1996

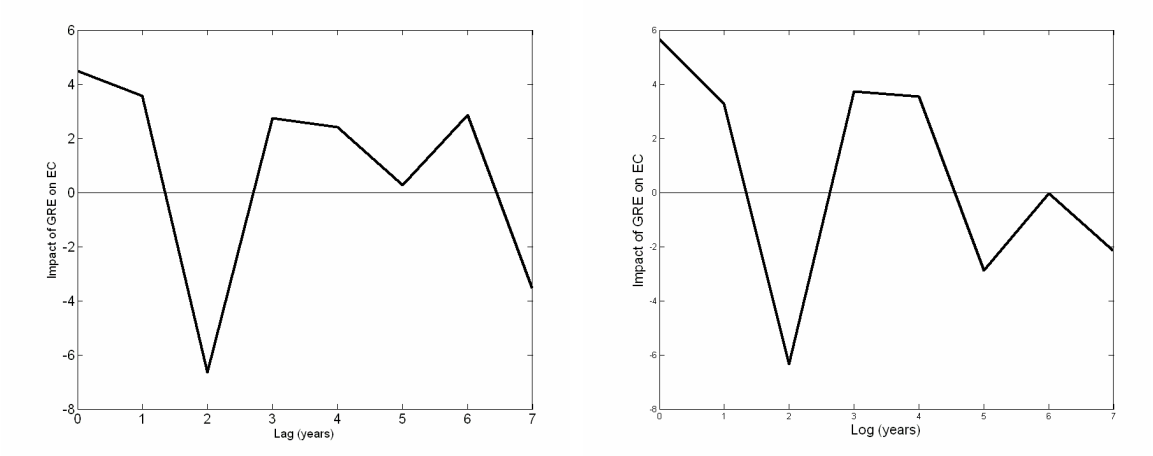


Figure 4. Labour market approach: lag structure of the impact of new business formation on regional employment growth resulting from the joint estimation (left) and from separate estimations (right).

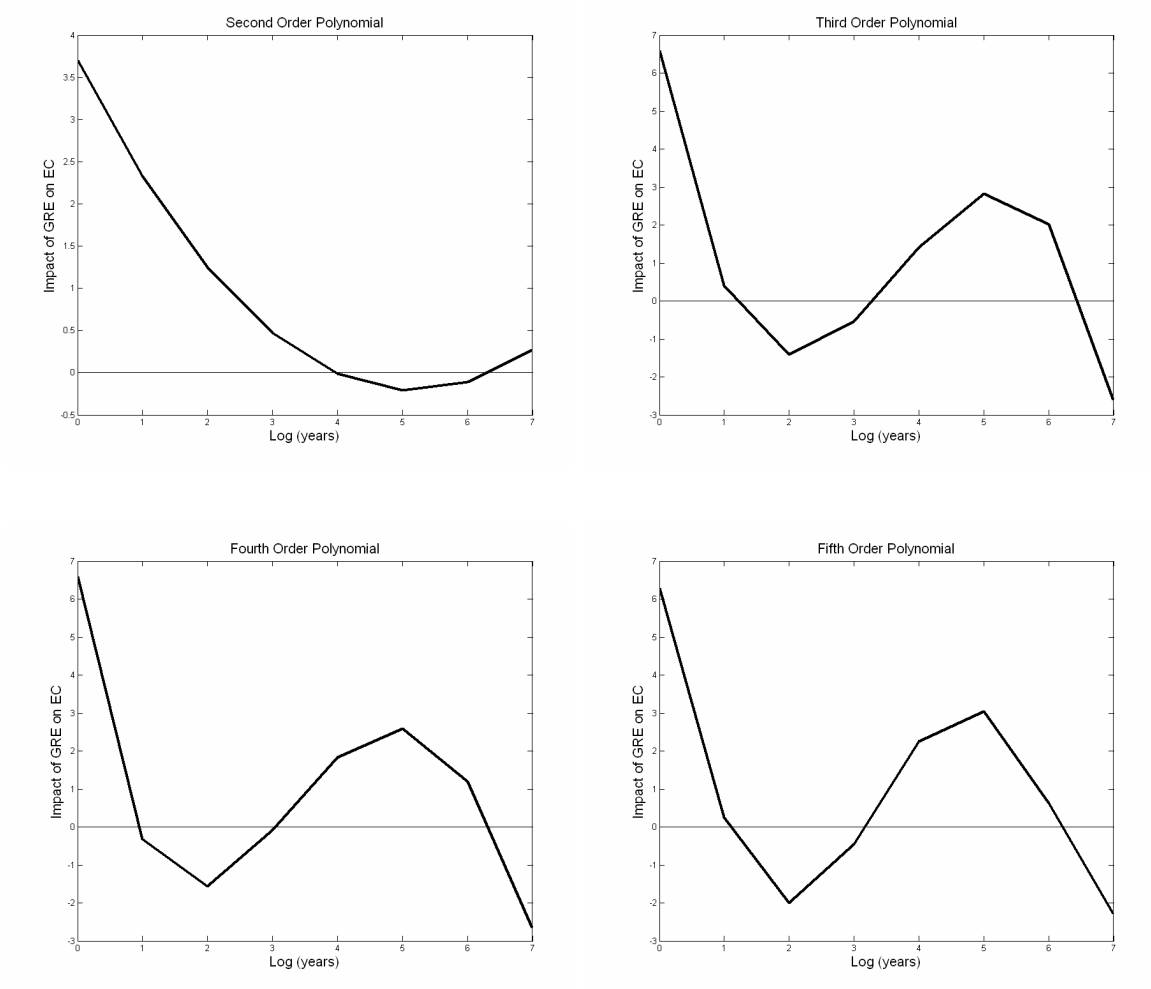


Figure 5. Labour market approach: lag structures of the impact of new business formation on regional employment growth resulting from the Almon lag model estimations.

Notes

[i] Callejón and Segarra (1999) demonstrate that entries contribute positively to the growth of total factor productivity. Fariñas and Ruano (2004) show that incumbent firms are the main contributors to the change in the productivity distribution, while entering firms have lower productivity than incumbent firms. Martín and Jaumandreu (2004) also show that more efficient firms have replaced low productivity firms. Generally speaking, firms that enter the market have higher productivity levels than firms that exit the market. For an overview of the effect of turnover on productivity growth, see Tybout (1996) and Caves (1998). For some empirical evidence in other countries see, among others, Baldwin and Gorecki (1991), Baldwin (1995), Aw et al. (1997) and Geroski (1989).

[ii] See, among others, Dunne et al. (1988), Evans (1987), Hall (1987) and Wagner (1994).

[iii] Most research on the survival of firms shows that the revolving door effect prevails over the displacement effect (Callejón and Segarra, 1999).
[iv] Segarra and Callejón (2002) and Segarra et al. (2002b) show that the survival patterns of new Spanish manufacturing firms are similar to those of other countries.
[v] The interested reader is referred to, for example, Segarra et al. (2002b) and the references therein.
[vi] The REI provides information about all new manufacturing establishments while the EI focuses on those establishments with more than 10 employees (it also includes establishments with less than 10 employees, but only as a sample). See Mompó and Monfort (1989) for further information about the REI.
[vii] The independent variable, i.e. the Gross Rate of Entry (GRE), can be measured in three ways. The first way is known as "labour market perspective", where the number of workers is used to standardize entries. The second way is called the "ecological perspective", because the number of firms is used to standardize entries. The third way of calculating the entry rate is the "population perspective", where the population is used to standardize entries. Given that we assume that agents decide to set up a new firm in the labour market where they come from and where they have previous labour experience (Keeble and Walker, 1994; Ashcroft et al., 1991; Johnson, 1983; Kangasharju, 2000; Storey and Jones, 1987) we have chosen the labour market perspective.
[viii] Some scholars use the shift-share procedure to obtain a sector-adjusted entry rate (see Ashcroft et al., 1991, for a more detailed explanation).
[ix] In this model we are interested in the effect of firm entries on the overall level of industrial employment of a region and do not consider each specific sector.
[x] Although we also tried a larger number of lags, we chose to use seven lags because the results are quite similar. However, the efficiency of the estimation decreases as the number of lags increases.
[xi] In distributed lag models, the problem of multicollinearity is likely to become quite severe, which makes the interpretation of the estimated parameters unreliable.
[xii] For estimation methods of panel data models with two-way error component disturbances, see Baltagi (2001).
[xiii] With regard to this negative effect on the short-term, empirical papers on firm entry suggest that the average size of new firms is smaller than the average size of incumbent firms (the size distribution of new cohorts is more skewed than market structure: see Arauzo and Segarra, 2005, for a detailed analysis of start-up size for the Spanish case). This is why a post-entry size adjustment is very important in manufacturing markets, especially in the first few years when suboptimal size affects a lot of newcomers and selection is very painful.
[xiv] This model is also known as the Almon lag model.
[xv] See Arauzo et al. (2006) for a more detailed analysis on regional determinants of industry dynamics in Spain.