EFFECTS OF PROCESS AND PRODUCT-ORIENTED INNOVATIONS ON EMPLOYEE DOWNSIZING

JOSÉ DAVID VICENTE-LORENTE
JOSÉ ÁNGEL ZÚÑIGA-VICENTE

FUNDACIÓN DE LAS CAJAS DE AHORROS
DOCUMENTO DE TRABAJO
Nº 518/2010
De conformidad con la base quinta de la convocatoria del Programa de Estímulo a la Investigación, este trabajo ha sido sometido a evaluación externa anónima de especialistas cualificados a fin de contrastar su nivel técnico.

La serie DOCUMENTOS DE TRABAJO incluye avances y resultados de investigaciones dentro de los programas de la Fundación de las Cajas de Ahorros. Las opiniones son responsabilidad de los autores.
EFFECTS OF PROCESS AND PRODUCT-ORIENTED INNOVATIONS ON EMPLOYEE DOWNSIZING

José David Vicente-Lorente*
José Ángel Zúñiga-Vicente**

Abstract

This study examines the role played by firm innovation on downsizing, an unexplored matter in the management literature. Drawing on economic and management views, we identify potential differences in firm downsizing behaviour depending on the specific innovation activities performed —process versus product-oriented innovations. The empirical setting is a sample of Spanish manufacturing firms over the period 1994-2006. Results suggest that those process innovations associated with acquiring and deploying new production equipment are positively related to a diminishing probability of carrying out drastic cuts in workforce. However, a negative effect is found when process innovations are linked to the adoption of new methods of organizing the workforce. Regarding product-oriented innovations our findings also show a negative effect of such innovations on the probability of carrying out important reductions in workforce. Our study stresses the need to consider innovation as a key determinant when analyzing the causes of downsizing in future research.

Key words: process and product innovations, downsizing, Spanish manufacturing firms.

JEL classification: J21, J63, L60, M51, O33.

**Corresponding author: José Ángel Zúñiga-Vicente, Dep. Business Economics (Administration, Management and Organization), Faculty of Legal and Social Sciences, Rey Juan Carlos University, Madrid (28032), Spain. Phone: +34914959289, E-mail: joseangel.zuniga@urjc.es

* Dep. Administration and Business Economics, Faculty of Economics and Business, University of Salamanca, Salamanca (37007), Spain. Phone: +34923294400-Ext. 3002, E-mail: josvic@usal.es

Acknowledgements: This study was financially supported by the Spanish Ministry of Science and Innovation (Project ECO2009-10358 and Project SEJ2007-63879) and Catedra Iberdrola for Research in Business Management and Organization at Rey Juan Carlos University.
1. INTRODUCTION

Downsizing is an economic phenomenon that has become very popular in firms around the world over the last two decades (Budros, 1999, 2000, 2004; Datta et al., 2010; Gandolfi, 2005, 2008). Massive layoffs and labour attrition have become ubiquitous in the business world and media. In academic outlets as well, attention to this topic has been extraordinarily important from the end of 1980s until now. However, while in the 1980s and early 1990s firms basically implemented downsizing in response to hard times, since the middle 1990s downsizing is regarded as one of the preferred management strategies to turning around declining firms by cutting costs and increasing organizational outcomes—for instance, in terms of profitability, efficiency and competitiveness—(Gandolfi, 2008: 46; Wilkinson, 2004: 1079). Despite a growing body of research that the short- and long-term consequences of downsizing may be also negative, it has gained legitimacy in Western economies and it is more and more present in Eastern Europe and Asian economies (Datta et al., 2010; Gandolfi, 2008; Magán and Céspedes, 2007; Wilkinson, 2004). Moreover, it can be seen how over the last two years most companies around the world are experiencing significant employee reductions as a result of the economic crisis. As clear evidence of this latter is the great increase in unemployment figures in most economies. Undoubtedly, all this facts help to understand why employee downsizing is viewed “as one of the most far-reaching and significant management issues of the current era” (Datta et al., 2010: 282).

In a comprehensive review on employee downsizing, Datta et al. (2010) identify 91 empirical studies performed between 1988 and 2008 by researchers from different countries. From this review, it can be seen how most researchers have traditionally been interested in examining the consequences of employee downsizing. Yet, it also reveals a growing interest among management scholars in the potential determinants of employee downsizing.

This study adds to the latter research stream by providing new empirical evidence on causes of employee downsizing—defined as a significant reduction of workforce (Bruton et al., 1996; Budros, 1999; Mellahi and Wilkinson, 2009). In particular, our main concern is examining the role of different types of firm innovation on employee downsizing using a sample of manufacturing Spanish firms from 1994 to 2006. Surprisingly, in light of extant evidence on the antecedents of downsizing (see Datta et al., 2010: 285-307), the study of the effect of firm innovation on employee downsizing has received limited attention by management scholars. Thus, our study contributes to fill this gap in management literature.

In any case, it is interesting to note that innovation has been frequently viewed by economic literature as a critical source of employment dynamics (e.g. Alonso-Borrego and

---

1 The number of increasing references to the term ‘downsizing’ provided by Google TM offers an approximate indication of this on growing concern: from 1.4 million references available for the 2000-2004 period to about 1.9 million references from 2005 to 2009.
Collado, 2002; Coad and Rao, 2007; Mastrostefano and Pianta, 2005; Peters, 2004). Initially, economists evaluated the impact of several aspects of innovation on total employment at macroeconomic and industry levels. Nonetheless, in recent years there have been a growing number of firm-level studies (see reviews by Edquist et al., 2001; Pianta 2005 or Spiezia and Vivarelli, 2002). Most of these studies look into the effect of process-related and product-oriented innovation on employment growth rates.

Theoretically, it can be argued that process-oriented innovations are likely to result in job losses as they are usually aimed at producing the same amount of output —product— with less input —jobs. Drastic cuts in the workforce can also take place as consequence of the need to carry out important organizational changes (displacement effect). However, improved or new processes can also lead to hiring more employees as firms can pass on the cost reductions to product prices and, then, a higher demand should be expected (compensation effect). On the other hand, product innovations are mostly oriented to increasing the quality and variety of the firm’s product portfolio which will presumably enhance the products’ added value and/or attract new customers. As a result, product innovations should be linked to increasing rates of employment (compensation effect). Yet such innovations are sometimes highly uncertain and expensive activities and are exposed to a considerable risk of failure (displacement effect) (e.g. Greenan, 2003; Mastrostefano and Pianta, 2005; Peters, 2004).

From past research, it can be inferred that employee downsizing will be closely linked to the specific type of innovation adopted by firms, but such an effect needs to be empirically determined. Drawing on economic and management views, we assess the potential positive or negative effect of different types of processes (i.e. new technology via the introduction of new equipment as well as new methods of organizing the workforce) and product innovations (i.e. number of innovations) on employee downsizing. Therefore, our research is aimed at empirically detecting potential differences in firm downsizing behaviour depending on their innovation activities i.e., process-oriented versus product-related innovations.

Our study can contribute to the literature on employee downsizing in a number of significant ways. Firstly, we make an effort to provide alternative explanations about why firms downsize as it analyzes different types of process and product innovations whose effects on employment (and, thus, downsizing) do not seem to be clear. Most importantly, we shed insights on the potential effect of two distinct process innovations in nature: new equipment and new methods of organizing the workforce. To our knowledge, this is a neglected matter by past research. Secondly, we examine this phenomenon in Spain during a recent time period, 1994-2006. There are many empirical studies on causes and effects of employee downsizing carried out by researchers in different countries —including Spain (e.g.
Magán and Céspedes, 2007; Suárez-González, 2001; Vicente-Lorente and Suárez-González, 2007) in the last ten years. Yet, there are few empirical studies analyzing downsizing with recent firm data (see Datta et al., 2010). Finally, unlike prior research which primarily examined large firms, our sample includes firms of very different sizes (small, medium and large-sized firms), although there is a great proportion of small and medium-sized ones. Furthermore, our empirical setting can provide representative findings about the downsizing behaviour of firms belonging to an economy where unemployment rates are especially high. The sample size used is an unbalanced panel of 2,366 manufacturing firms, selected from the Survey on Firm Strategies (“Encuesta de Estrategias Empresariales”). Lastly, we think the consideration of all these issues can help researchers to have a more complete view of the downsizing phenomenon.

The study is organized as follows. The next section presents the theoretical framework regarding the effects of different process and product-oriented innovations on employee downsizing. The third section describes the methodology used to test this framework. The empirical findings are presented in the following section. The last section discusses the main results and concludes with some suggestions for future research.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Figure 1 illustrates the theoretical framework and hypotheses which will be empirically tested in this study. As depicted in this framework, we assume that there is a relationship between innovation and employee downsizing.

Figure 1: Relationships between different types of innovation and employee downsizing

In line with past research from the economics and management fields, we argue that such a relationship will basically depend on two types of innovation —process and products. In particular, we will test two alternative hypotheses in the case of process-oriented
innovations ($H1$ and $H2$). These hypotheses respectively refer to the potential effect of the adoption of process innovations related and not related to the acquisition of complementary production assets on employee downsizing. In this regard, we posit that the first type of innovation is more likely to be associated to the introduction of new equipment while the latter one to the adoption of new methods of organizing the workforce. It will allow us to see which specific effect (compensation versus displacement) is more relevant when explaining the impact of each process innovation on downsizing. On the other hand, we will test two opposing hypotheses for product innovations ($H3a$ and $H3b$). Both hypotheses will permit us to test which specific effect (compensation or displacement) is more important when explaining the effect of the number of product innovations on downsizing. We begin by analyzing the effect of process-oriented innovations on employee downsizing. Next, we discuss the potential effect of product-oriented innovations.

2.1. The Effect of Process-Oriented Innovations on Downsizing: New Equipment and New Methods of Organizing the Workforce

The development of a global economy over the last few decades has led firms in most industries around the world to raise their productivity levels (efficiency) to continue to be competitive and to ensure organizational survival. The adoption (or development) of innovations in productive processes via the introduction of new technology—for instance, new machines and equipment—is a traditional way of achieving greater efficiency when manufacturing a product. As a direct result of this fact, firms can reduce production unit costs (Harrison et al., 2005; Peters, 2004; Pianta, 2005; Porter, 1980; Üçdogruk, 2006). In many cases, an immediate outcome of an increase in a firm productivity is the elimination of headcount and the reduction of the overall number of workers. This negative effect of new technology on workforce is called by economists a displacement effect (see Peters, 2004; Harrison et al., 2005; Pianta, 2005). Since new efficient technology can allow firms to operate with fewer workers, it is logical to think that firms that make a large investment in efficient technologies will have higher employee downsizing rates than ones that make a smaller investment in such technologies (Budros, 1999: 74; Gandolfi, 2005: 59).

But while this new technology-employee downsizing relationship seems logical, there is an alternative way of viewing the relationship. Anecdotal evidence and most researchers also suggest that more innovative firms can pass on the cost reduction to product prices which can result in a higher demand for a product in the market. This higher demand can lead firms to increase their production and employment levels as well as their market sales. Obviously, this effect will depend on the amount of price reduction and the degree of competitive rivalry among different firms (Harrison et al., 2005; Peters, 2004; Porter, 1980; Üçdogruk, 2006). In
this sense, it can be argued that the more intense the competition in the product market, the higher the extent to which cost reductions will be passed to product prices and, hence, the higher the probability of producing and selling a greater amount of product (Peters, 2004: 3). Lastly, the subsequent increase in firm production and market sales usually entails the need for hiring new personnel. This positive effect of new technology on workforce is called by economists a compensation effect (see Harrison et al., 2005; Peters, 2004 or Pianta, 2005). Therefore, from this view, it can also be inferred that firms that make large investments in efficient technologies can undergo lower employee downsizing rates than ones that make smaller investments in such technologies.

On the other hand, from a management perspective, it is interesting to underline how in most firms the introduction of new technology is accompanied by the need to introduce some relevant organizational changes (Brynjolfsson and Hitt, 2000; Brynjolfsson et al., 2002; Caroli, 2001; Greenan, 2003). Anecdotal evidence shows how it frequently implies adopting new methods of organizing the workforce. Given that such methods may have a direct impact on the way of doing things or producing a firm product, they can also be conceived as process innovations. The elimination of some jobs but also the creation of new jobs in a firm is a likely outcome of introducing these management practices and methods. This is why it usually encompasses activities such as abolishing some functions and creating other new ones, creation of new skilled work teams, consolidating new organizational units or redesigning different tasks. Thus, the introduction of new methods of organizing can be associated, in some situations, to layoffs while in other cases it can imply the need to hire more personnel. Lastly, as occurred with new technology, the study of the effect of introducing new management practices and methods on downsizing is an empirical issue as it may be positive or negative.

Overall, it can be asserted that existing empirical evidence on the relationship between process-oriented innovations (mainly, via new technology) and employment (or workforce) is far from having provided a conclusive answer. Certainly, from many studies a negative impact of process innovations on employee downsizing can be deduced. This is what can be gleaned from the study by Doms et al. (1995). These authors, analysing data on US manufacturing establishments, observe that the use of advanced manufacturing technology has a positive effect on workforce growth. Relatedly, Blanchflower and Burgess (1998) find a positive relation between process innovations and employment growth in UK firms in 1990 and in Australian firms in 1989/1990. Greenan and Guellec (2000), using data from French manufacturing firms during the period 1986-90, find a positive relationship between process innovation and total workforce. Likewise, Smolny (1998), analyzing data of German firms from 1980 to 1992, shows a positive effect of process innovations on workforce. Alonso-
Borrego and Collado (2002), examining a sample of Spanish manufacturing firms during the period 1990-1997, obtain that the indicator of process innovations also has a positive and significant effect on job creation. In a similar vein, Greenan (2003), in a study on a large representative sample of French firms that introduced advanced manufacturing systems in 1988-93, finds that firms innovating in technologies created more jobs than non-innovators. Results by Mastrostefano and Pianta (2005), using data on 11 industrial sectors and ten European countries also show that employment change is explained by positive effects of process innovations. Fung (2006), using a sample of the top 100 bank holding companies during the period 1992-2003, finds that new technology has a positive impact on firm-level employment. The study by Üçdogruk (2006) on a sample of Turkish manufacturing industries over the periods 1995-1997 and 1998-2000 reveals that the employment growth rates of process innovators are positive. Recently, Zimmermann (2008), in a research study on small and medium-sized German firms in the years 2003, 2005 and 2006, finds that the introduction of new or improved processes has a positive impact on total employment growth.

However, from other studies it is also possible to infer the existence of a potential positive effect of such process innovations on employee downsizing. This is what can be drawn from the study by Taimaz (1996). He finds that technological change has a negative but weak impact on workforce growth in a sample of Turkish manufacturing industries over the period 1985-1992. Likewise, Rottmann and Ruschinski (1997) carry out analyses with German firms and find significantly negative effects of process innovations on employment growth. Findings of the study by Blechinger et al. (1998) suggest that the introduction of new production technologies led to a reduction in workforce in manufacturing firms in Western Germany in the mid nineties —the effect being more pronounced in larger firms. Jaumandreu (2003) also finds some indication that the net outcome of process innovation is employment displacement in the Spanish service sector during the years 1998-2000. In a similar vein, results by Peters (2004) reveal that displacement effects outweigh compensation effects in process innovations, resulting in negative employment effects in the German manufacturing firms between 1998 and 2000. Using data of manufacturing and service firms from 4 European countries (France, Germany, Spain and the UK) in 1998 and 2000, Harrison et al. (2005) show that process innovations have a negative effect on workforce, although the authors recognize that this effect may be attenuated (or even reversed) through compensation effects.

After reviewing the empirical literature, we can conclude that the role of process-oriented innovations on job creation is far from being conclusive since it appears to be contingent on contextual and organizational factors. Clearly, the potential sources of heterogeneous
empirical outcomes are numerous. The institutional environment as concerns labour market regulation in terms of the available ways of hiring and firing employees, access to a supply of skilled employees and the spread of technological knowledge and public support to both innovation and employment can pose significant differences in the link between process innovation and downsizing across different countries.

From our view, another unexplored source of the inconclusive findings described above arises from the type of process innovation since improvements in the productive process might differ in nature. The incorporation of new equipment in a process usually requires additional investments in tangible (e.g. machines) and intangible assets (e.g. employee training, use of licensed/patented proprietary knowledge, among others). From an economic perspective, this growth in physical and knowledge capital would increase the firm’s labour productivity as a result of the augmented capital-to-labour ratio, and therefore an increase on labour demand might be expected. Alternatively, process innovations consisting of the mere adoption of new work methods and/or the internal reorganization of production need not be accompanied by a significant amount of investment and hence their effect on the capital-to-labour ratio is undetermined. There are also significant differences in terms of the goals and expected gains related to the type of process innovations. Efficiency losses derived from excess capacity, redundant jobs, and ineffective hierarchical structures can be easily overcome by redesigning methods and procedures of work with no need of capital investment. Consequently, these changes in processes are presumably aimed at rationalizing jobs and work flows and, therefore, they would exhibit a straightforward and positive effect on employment cuts. Conversely, the existence of complementary investments can reveal an actual commitment of managers to realize growth market opportunities by, for example, increasing the capacity and quality of productive processes. In other words, we suggest that the role played by a process innovation in a firm’s downsizing choice depends heavily upon the existence/lack of complementary investment in production assets: process innovation accompanied by actual (by no) investment in new equipment will be related to a lower (higher) downsizing proclivity. These conclusions lead us to posit the following hypotheses:

**H1:** Firms that adopt process innovations related to the acquisition of complementary production assets have a lower probability of downsizing than those that do not innovate.

**H2:** Firms that adopt process innovations not related to the acquisition of complementary production assets have a higher probability of downsizing than those that do not innovate.
2.2. The Effect of Product-Oriented Innovations on Downsizing

The new challenging and rapidly changing business environment is also forcing most firms around the world to continuously introduce innovations in their product(s) to continue being competitive and surviving. In this context, firm managers feel obliged to make decisions on product innovations to increase the quality and variety of their products (Planta, 2005). According to some recent estimations, on average, more than 35% of firm revenues are generated from products that did not exist five years ago (Berkowitz et al., 2007).

Generally, it is argued that employee downsizing effects of product-oriented innovations are highly likely to depend on the degree of product novelty (Peters, 2004). The product life cycle theory (Vernon, 1966, 1979), which states that each product or sector follows a specific life cycle, provides one interesting explanation regarding the potential effect of product innovation on employee downsizing. By definition, market novelties can initiate the cycle of one specific product (or even industry). According to this approach, firms introducing new products may experience higher demand increases as consumers are not yet well equipped (Greenan and Guellec, 2000; Peters, 2004). As a consequence, successful market novelties might, ceteris paribus, result in higher production and sales levels of the product in question and, thus, prompt workforce growth by means of hiring of new personnel. Evidently, the amount and sustainability of this positive effect on workforce will depend on the nature of competition and the delay with which rival firms react to the introduction of new products and/or can imitate them (Garcia et al., 2002; Harrison et al., 2005; Peters, 2004). Thus, the positive effect of product innovation on firm’s employment demand should be more likely in the initial phases of the product life cycle as a result of the low degree of rivalry among firms.

An alternative explanation for this compensation effect can be provided from the competitive advantage approach (Porter, 1980), which posits that firms can follow different competitive strategies linked to products. Two of the most popular ones are cost leadership and product differentiation. While the former is associated with the possibility of producing with low unit cost (efficiency view), the second one is precisely based on the possibility of providing highly innovative products. Firms following a differentiation strategy provide products which are perceived as distinct by consumers so they are prepared to pay higher prices for them. From this standpoint, these firms can find it easier both to maintain and/or increase their sales. This may occur because, as Coucke et al. (2007: 171) point out, competitive pressure may be less severe in firms following a product differentiation strategy and, thus, the probability of restructuring and downsizing may, on average, be lower. Specifically, these authors find from a sample of Belgium firms between 1990 and 1999 that firms following a product differentiation strategy have less chances of undergoing drastic cuts in their workforce.
Reviewing past empirical research which especially focuses on the potential impact of product innovations on employment growth, it can be noted that the majority of studies find a stimulating effect of such innovations. Therefore, these studies provide some preliminary support for a negative impact of product-oriented innovations on employee downsizing. This is resulted from the study by Entorf and Pohlmeier (1990). These authors, investigating German manufacturing firms in 1984, find a positive effect of product innovation on total employment growth. Brouwer et al. (1993) find the same effect for Dutch firms in the 1980s. Results obtained by Van Reenen (1997), analyzing UK manufacturing firms over the period 1979-1982, also show that product innovations are associated with higher firm level employment. In a similar vein, Pianta (2001), using data for five European countries (Denmark, Italy, Germany, The Netherlands and Norway) between 1989 and 1993, finds that product innovations have a positive impact on employment changes. The study by Meriküll (2008), analyzing data on Estonian firms in two periods (1998-2000 and 2002-2004), suggests that product innovations have a strong positive effect on employment growth. The same results are confirmed by Greenan and Guellec (2000), Rottmann and Ruschinski (1997), Smolny (1998), Jaumandreu (2003), Harrison et al. (2005) and Mastrostefano and Pianta (2005).

Additionally, there is an opposing way of viewing the relationship between product-oriented innovations and employee downsizing. Such a view is based on the potential influence of the degree of substitutability between the old and new products as well as the uncertainty and failure associated with market novelties (Edquist et al., 1998; Harrison et al., 2005; Peters, 2004). On the one hand, new products can (totally or partially) replace old ones. In this setting, market sales of new or improved products may cannibalise some proportion of the firm’s current sales (Harrison et al., 2005: 5). Consequently, the need for workers for old products may decrease so that the overall effect on firm workforce is not clear (i.e. it could be negative, positive or neutral). On the other hand, new products can also be associated with a higher uncertainty and a higher risk of failure. New products are unknown to consumers and thus, they are exposed to a high rate of failure. Anecdotal empirical evidence is quite categorical on this matter by showing a failure rate of new products between 40 and 75% (Stevens and Burley, 2003; Joshi and Sharma, 2004). Therefore, it is logical to think that firms with failing products may be forced to restructure and thus resort to layoffs (displacement effect) since they can experience significant reductions in production and market sales.

In light of all the prior theoretical arguments and empirical research, we posit two opposing hypotheses relating to product-oriented innovations and downsizing:
H3a: Firms that introduce more product innovations will have a lower probability of downsizing than ones that introduce fewer innovations.

H3b: Firms that introduce more product innovations will have a higher probability of downsizing than ones that introduce fewer innovations.

3. METHODS

3.1. Data

We performed the empirical analysis using data from the Survey on Firm Strategies. This data base is the outcome of a panel survey conducted by a research foundation (Fundación SEPI) and financially supported by the Spanish Ministry of Industry, Tourism and Commerce. The survey provides micro data of a sample of Spanish manufacturing firms from the early 1990s to 2006. The reference population of the sample comprises Spanish manufacturing firms with ten or more employees. The available data are the result of a random stratified sampling and are updated yearly in order to minimize their decay over time. All these procedures are mainly oriented to preserving the sample representativeness. Information available from this survey includes a broad set of variables related to markets, employment, and innovation activities, among others. Along with these advantageous characteristics, this database also has some restrictions. Anonymity of surveyed firms is assured and they are free to provide or omit at will the information requested by the questionnaire. This fact precludes, in some cases, the completion of missing data and implies a substantial reduction of the sample size when using some items with a low response rate.

The whole available raw data base includes information from 4,357 firms over the period 1990 to 2006 on a yearly basis. This implies a maximum potential sample size of 56,641 cases (firm x year observations). However, there is a number of missing data owing to (1) eventual entry/exit of companies in the survey, and (2) the absence of firms' responses to some variables or questionnaire items. For instance, the number of cases (year x firm observations) with a valid response to the variable number of total employees is 22,737. Cases/observations are also lost when computing some variables (described in the next section) such as the rates of sales and employment growth. An additional loss in sample size stems from the fact that all explanatory variables (except for ‘year’ and ‘industry’ dummy controls) are one year lagged with respect to the dependent binary variable in order to control for the endogeneity/simultaneity problem. We also detect some anomalous (abnormally large) values in the ratio of R&D expenditures over net sales for two firms: 3,266% and 98.9%, respectively. All cases of these firms were removed. As a result, the final sample size used for estimation is an unbalanced panel of 2,366 firms and 15,004 cases (firm x year).
The aforementioned database meets certain valuable requirements as the empirical setting for the research targets of this study. On the one hand, a number of items are able to capture detailed information on the sources (R&D investments) and outcomes (type and/or number of innovations) of the firm's innovative activity within a highly representative sample of Spanish firms. On the other hand, the Spanish economy exhibits one of the largest and sustained rates of unemployment within the OECD countries and thus, our empirical results could be useful to identify common and/or peculiar patterns of downsizing phenomena when comparing to extant or future evidence from other countries.

3.2. Definition and Measure of Variables

3.2.1. Dependent variable: Downsizer

We consider that a firm has downsized during a given year if the growth rate of total employees is less than -0.05 (-5%). This threshold attempts to distinguish short-term cycle adjustments in workforce markets and firms' policies from those size reductions due to long-lasting restructuring decisions and it has been proposed in many previous empirical studies (e.g. Cascio et al., 1997, Cascio and Young, 2003; Guthrie and Datta, 2008; Osterman, 2000; Said et al., 2007). The resulting dichotomous variable, Downsizer, takes a value of 1 if a firm has downsized during a given year and 0 otherwise, and its statistical distribution approximates the probability/frequency of downsizing.

3.2.2. Independent variables

Our data base offers potential useful information about the output indicators of innovation activities. In particular, the survey includes data about the specific type of innovation in productive processes as well as the number of product innovations. We used this data to build three variables addressed to estimating and comparing the different effects of the type of innovation upon the probability of downsizing. Process innovation is approximated by two binary variables that take a value of 1 if the innovation is related to the acquisition/improvement of new equipment (Process Innovation by New Equipment) or if it is related to the implementation of new methods and/or the reorganization of the workforce (Process Innovation by New Methods). Both variables are respectively used to see to what extent process innovations are related or not to the acquisition of complementary production assets. The variable Number of Product Innovations which ranges from 0 to 950 for the firms within the sample and approximates the aggregate absolute intensity in product innovation.

---

2 In 1994 (the former year of analysis in our study) the unemployment rate in Spain was of 24.8%, 6.1% in the US, 2.9% in Japan and 14% in the European Union. In 2006 (the latter year of analysis) the unemployment rates were of 8.1% in Spain, 4.6% in the US, 4.4% in Japan and a bit more than 8% in the EU countries.
3.2.3. Control variables

All estimated models incorporate a set of control variables in order to minimize the risk of the omitted variable bias. R&D Intensity is defined by the percentage of total R&D investments over net sales. This variable is available for a large number of the companies within the sample but with little or no informative content about the outcome of the innovation activity (i.e., product or process innovation). In essence, the ratio of R&D intensity can be viewed as a composite input-based indicator of the innovation activities of the firm (see Burton et al., 1996; Peters, 2004 or Pianta, 2005). There are several reasons to include R&D intensity as an explanatory variable: (1) R&D activities can generate outcomes different from product and/or process innovations (e.g., access to new knowledge with no straightforward application); and (2) R&D intensity has been used as a proxy for a firm’s intangible assets and/or growth opportunities (see Deeds, 2001; Heunks, 1998; Stam and Wennberg, 2009).

Prior evidence on the downsizing antecedents reveals a number of potential determinants that should be taken into account in the empirical research. Substantial changes in the organization, property and firm structure are commonly associated with workforce reallocations that make jobs reductions more likely (see Budros 2002; Conyon et al., 2002 or Letho and Bockerman, 2008). We approximate these kinds of events by a binary variable (M&A) that takes a value of 1 if the firm has been engaged in a merger and/or acquisition process. The role of demand changes in employment variation is a well-proved empirical regularity (see Baumol et al., 2003; Filatochev et al., 2000 or Wagar, 1997); thus, we consider the rate of sales variation (Sales Growth) as an additional control. Firm Size is also included as a control variable since it is usually argued that downsizing is more prevalent among larger firms (see Budros, 1997, 1999; Coucke et al., 2007 or Wagar 1997). It is measured as the natural logarithm of total sales. A better financial performance enhances the firm’s options for growth and signals the advantageous competitive position of the firm (see Ahmadjian and Robinson, 2001; Baumol et al., 2003; Budros, 2002, 2004 or Coucke et al., 2007). Thus we approximate profitability using the Gross Margin, which is defined as the percentage of operative profit over net sales. We include the share of foreign ownership in the firm equity (Foreign Ownership) since previous evidence suggests that domestic investors are less prone to adopt drastic employment reductions (see Vicente-Lorente and Suárez-González, 2007). Solvency problems and/or the limited ability to raise funds can also be a serious restriction that may lead firms to downsize when their financial autonomy is compromised (see Gittell et al., 2006 or Hillier et al., 2006). The percentage of total equity over total funds is used to define the variable Capital Structure. Downsizing is often motivated by market share declines (see Ahmadjian and Robinson, 2001 or Budros...
Market Share is measured as the perceived market share (in percentage) of the firm’s main market.

We also included two additional control variables whose role remains unexplored in previous studies on the downsizing determinants: Internationalization computed as the ratio of total value of exports over total sales, and the breadth of product portfolio (Number of Products) measured as the number of products manufactured by the company (ranging from one to six products). We propose these indicators in order to test the significance of factors related to the firm’s corporate strategy. Given the lack of previous evidence, estimates of the effect these variables will be useful as an exploratory insight as well as for control purposes. Finally, commonly used industry and time dummy variables are used in all estimations.

All the aforementioned independent and control variables are lagged one year with respect to the dependent variable (Downsizer) in order to control for potential endogeneity/simultaneity problems.

3.3. Preliminary Findings from the Descriptive Analysis

Before proceeding further with the description of the empirical method employed in this study, we summarize some remarkable stylized facts regarding our research target by examining some of the main descriptive statistics of the above variables (see table 1).

First, the workforce reduction is not a rare but a quite common event in the Spanish context over the period considered: nearly a quarter (23.4%) of the cases (firm x year) are representative of workforce reductions equal or larger than a 5%. This fact is remarkable since these data comprise a period of sustained growth of the Spanish Gross Domestic Product (i.e. 1994-2006). Second, the sign of the co-variation (i.e. correlation) between the occurrence of downsizing and the type of innovation reveals meaningful differences. Whilst Process Innovations by New Methods is positively correlated to workforce reductions, Process Innovations by New Equipment and Number of Product Innovations show an inverse linear correlation to downsizing events. We also find that Process Innovations by New Equipment is nearly three times more frequent (14.1%) than Process Innovations by New Methods (4.2%), and that both types of process innovation exhibit a strong and negative correlation (-0.084). Finally, both types of process innovation and the Number of Product Innovations are positively correlated although the linear relationship between Process Innovations by New Methods and Number of Product Innovations is substantially weaker (0.005).
### Table 1: Descriptive Statistics: Mean, Standard Deviation, and Correlations

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Std. D.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Downsizer</td>
<td>0.234</td>
<td>0.003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2  Process Innovations by New Equipment</td>
<td>0.141</td>
<td>0.003</td>
<td>-0.050</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3  Process Innovations by New Methods</td>
<td>0.042</td>
<td>0.002</td>
<td>0.012</td>
<td>-0.084</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4  Number of Product Innovations</td>
<td>2.768</td>
<td>0.175</td>
<td>-0.020</td>
<td>0.038</td>
<td>0.005</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5  R&amp;D Intensity</td>
<td>0.693</td>
<td>0.018</td>
<td>-0.035</td>
<td>0.046</td>
<td>0.062</td>
<td>0.075</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6  M&amp;A</td>
<td>0.022</td>
<td>0.001</td>
<td>0.002</td>
<td>0.006</td>
<td>0.037</td>
<td>0.000</td>
<td>0.042</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7  Sales Growth</td>
<td>0.127</td>
<td>0.026</td>
<td>-0.010</td>
<td>0.000</td>
<td>-0.003</td>
<td>-0.001</td>
<td>-0.002</td>
<td>0.024</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8  Firm Size</td>
<td>15.782</td>
<td>0.017</td>
<td>-0.074</td>
<td>0.087</td>
<td>0.049</td>
<td>0.056</td>
<td>0.186</td>
<td>0.157</td>
<td>0.015</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9  Gross Margin</td>
<td>9.478</td>
<td>0.109</td>
<td>-0.069</td>
<td>0.086</td>
<td>-0.002</td>
<td>0.000</td>
<td>-0.020</td>
<td>0.016</td>
<td>0.006</td>
<td>0.118</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Capital Structure</td>
<td>57.219</td>
<td>0.188</td>
<td>0.008</td>
<td>-0.009</td>
<td>0.011</td>
<td>-0.013</td>
<td>-0.021</td>
<td>0.011</td>
<td>0.013</td>
<td>-0.110</td>
<td>-0.178</td>
<td></td>
</tr>
<tr>
<td>11 Internationalization</td>
<td>0.188</td>
<td>0.002</td>
<td>-0.018</td>
<td>0.036</td>
<td>0.025</td>
<td>0.056</td>
<td>0.157</td>
<td>0.037</td>
<td>0.024</td>
<td>0.427</td>
<td>0.014</td>
<td>-0.046</td>
</tr>
<tr>
<td>12 Foreign Ownership</td>
<td>18.824</td>
<td>0.307</td>
<td>-0.029</td>
<td>0.016</td>
<td>0.028</td>
<td>0.015</td>
<td>0.086</td>
<td>0.114</td>
<td>0.001</td>
<td>0.512</td>
<td>0.050</td>
<td>-0.068</td>
</tr>
<tr>
<td>13 Market Share</td>
<td>12.119</td>
<td>0.164</td>
<td>-0.018</td>
<td>0.054</td>
<td>0.020</td>
<td>0.017</td>
<td>0.036</td>
<td>0.050</td>
<td>-0.002</td>
<td>0.345</td>
<td>0.114</td>
<td>-0.135</td>
</tr>
<tr>
<td>14 Number of Products</td>
<td>1.148</td>
<td>0.004</td>
<td>-0.012</td>
<td>0.023</td>
<td>0.014</td>
<td>-0.009</td>
<td>0.002</td>
<td>0.023</td>
<td>-0.002</td>
<td>0.088</td>
<td>-0.009</td>
<td>0.003</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 Foreign Ownership</td>
<td>0.308</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Market Share</td>
<td>0.095</td>
<td>0.217</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Number of Products</td>
<td>0.027</td>
<td>0.016</td>
<td>0.044</td>
<td></td>
</tr>
</tbody>
</table>
The above preliminary facts are compatible with several interpretations. The negative correlation between both types of process innovation (new equipment and new methods) may reflect that there are, to some extent, alternative or substitutive for a given company. Alternatively, innovations by new equipment could require additional investments only feasible for large and/or profitable companies whilst the introduction of new methods could be implemented by those small and less profitable companies that accounts for a more limited resource budget. The correlations of process innovation related-variables and other ones like *Firm Size* and *Gross Margin* provide a rough support to this conjecture. Anyway, the examination of descriptive statistics only provide a preliminary and approximate explanations based upon uni- or bivariate analysis that should be interpreted cautiously given the potential overlapping effects of other relevant variables. In this sense, a more rigorous and accurate identification of the isolated effects of explanatory variables should include a complementary multivariate analysis. Consequently, we opt for formulating a multivariate econometric specification that is described in the next section.

3.4. Empirical Model

We employ probit models for panel data as an empirical tool. This statistical method offers estimates of the effects of the proposed explanatory variables upon a binary dependent variable. Given the characteristics of the sample, we opt for estimating the empirical models with panel data specifications since this technique allows us to control for unobserved or unmeasured heterogeneity of individuals within the sample. The model can be represented as follows:

\[
Pr \ (Y=1 \mid X) = \Phi (X'\beta),
\]

where \( Pr \) denotes probability and \( \Phi \) is the cumulative distribution function of the standard normal distribution. The vector of estimates is \( \beta \) and \( X \) is the vector of explanatory variables. In our case, \( Y=1 \) represents the event of downsizing at year \( t \), and \( X \) is the set of independent and control variables valued at year \( t-1 \). Individual unmeasured effects are considered random and the \( \beta \) parameters are estimated by maximum likelihood.

4. DISCUSSION OF RESULTS

We have estimated four models to examine the effect of different types of innovation considered on employee downsizing. Results are illustrated in table 2. Model 1 incorporates only the control variables. Models 2 and 3 consider process-related and product-related innovation variables, respectively (i.e. the independent variables of interest in this study), and Model 4 includes all explanatory variables (i.e. independent and control variables).
Table 2. Probit Estimates for Panel Data (Dependent Variable: Downsizer)

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D Intensity</td>
<td>-0.0157**</td>
<td>-0.0155**</td>
<td>-0.0146**</td>
<td>-0.0144**</td>
</tr>
<tr>
<td>M&amp;A</td>
<td>0.1761**</td>
<td>0.1693**</td>
<td>0.1747**</td>
<td>0.1680**</td>
</tr>
<tr>
<td>Sales Growth</td>
<td>-0.0570**</td>
<td>-0.0551**</td>
<td>-0.0569**</td>
<td>-0.0551**</td>
</tr>
<tr>
<td>Firm Size</td>
<td>-0.0514***</td>
<td>-0.0502***</td>
<td>-0.0503**</td>
<td>-0.0491***</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>-0.0049***</td>
<td>-0.0048***</td>
<td>-0.0050***</td>
<td>-0.0048***</td>
</tr>
<tr>
<td>Capital Structure</td>
<td>-0.0001</td>
<td>-0.0002</td>
<td>-0.0002</td>
<td>-0.0002</td>
</tr>
<tr>
<td>Internationalization</td>
<td>0.0861</td>
<td>0.0902</td>
<td>0.0892</td>
<td>0.0932</td>
</tr>
<tr>
<td>Foreign Ownership</td>
<td>0.0005</td>
<td>0.0005</td>
<td>0.0005</td>
<td>0.0005</td>
</tr>
<tr>
<td>Market Share</td>
<td>0.0012*</td>
<td>0.0013**</td>
<td>0.0012*</td>
<td>0.0013*</td>
</tr>
<tr>
<td>Number of Products</td>
<td>-0.0086</td>
<td>-0.0077</td>
<td>-0.0095</td>
<td>-0.0085</td>
</tr>
<tr>
<td>Process Innovation by New Equipment</td>
<td>-0.1306***</td>
<td>-0.1287***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process Innovation by New Methods</td>
<td>0.1080*</td>
<td>0.1088**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Product Innovations</td>
<td>-0.0017**</td>
<td>-0.0016**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of firms</td>
<td>2,366</td>
<td>2,366</td>
<td>2,366</td>
<td>2,366</td>
</tr>
</tbody>
</table>

\(^{a}\)Wald χ² test (d.f)
\(^{b}\)Likelihood test p=0

<table>
<thead>
<tr>
<th></th>
<th>277.4***</th>
<th>296.2***</th>
<th>281.6***</th>
<th>300.0***</th>
</tr>
</thead>
<tbody>
<tr>
<td>(d.f)</td>
<td>(39)</td>
<td>(41)</td>
<td>(40)</td>
<td>(42)</td>
</tr>
<tr>
<td></td>
<td>43.5***</td>
<td>38.5***</td>
<td>43.3***</td>
<td>38.4***</td>
</tr>
</tbody>
</table>

Estimates of Industry and Year (not shown in the table) are jointly significant at the 99% level of confidence.

* p-value<0.10; ** p-value<0.05; *** p-value<0.01;

\(^{a}\) Goodness of fit test.

\(^{b}\) Likelihood ratio χ² test of lack of individual random effects.

We find significant and robust effects on downsizing probability depending upon the type of process innovation (see Models 2 and 4 of table 2). Improvements in the productive process associated with acquiring and deploying new equipment is strongly related to a diminishing probability of carrying out drastic cuts in employment. On the contrary, we find the opposite (positive) effect when the innovation in processes is linked to the adoption and implementation of new methods of organizing the workforce. These findings strongly support hypotheses H1 and H2. Thus, it can be inferred that firms adopting process innovations related to the acquisition of complementary production assets exhibit lower downsizing rates than those do not innovate (H1). On the other hand, it could be deduced that firms adopting process innovations not related to the acquisition of such assets have higher downsizing rates than those that do not innovate (H2).
Although we do not appraise remarkable collinearity problems in our multivariate model, it is also certain that the bivariate correlation between innovation-related variables detected and described in prior section can raise some doubts on the overlapping and/or interacting effects between those explanatory variables that could lead to a misleading interpretation of the estimates. In order to assure the robustness of our findings, we estimated additional empirical models (not shown in the paper) including the whole set of control variables and all potential combinations of the three variables of interest (i.e. Process Innovations by New Equipment, Process Innovations by New Methods and Number of Product Innovations). The estimates of these models did not differ substantially in terms of coefficients signs and significance from those shown in table 2. Additionally we also test the relevance of all potential interactions between the three innovation-related variables. Such interactions terms turned to be far from being statistically significant at the usual levels of confidence.

Prior results have several implications. First, the impact of process innovation on a firm’s employment is complex and deserves a more detailed examination in light of our results. The nature and goals of process innovation can explain the significant differences in its role as an enhancing or inhibiting factor of a firm’s employment decision. Second, these differences could partially clarify the prior contradictory evidence on the link between process innovation and job creation at firm level. At this point, additional efforts are needed to propose new and more fine-grained definitions and typologies of process innovations. From our view, the usual measures of process innovation could offer mixed evidence derived from a measurement problem. Third, the estimated effect of process innovation provides indirect evidence for assessing the relevance of the displacement and compensation effects of this type of innovation upon employment change at firm level. Our evidence on this matter would suggest that the displacement effect of process innovation dominates over the compensation effect when such innovations are related to or accompanied by complementary production investments. On the contrary, the absence of these investments favours the dominance of the displacement effect.

In other words, process innovative companies can meet favourable conditions to translate efficiency gains into a higher labour demand. This finding is in line with some previous evidence (e.g. Blanchflower and Burgess, 1998; Doms *et al*., 1995; Fung, 2006; Greenan, 2003; Greenan and Guellec, 2000 or Zimmermann, 2008), but this is only true when complementary productive assets are acquired and deployed. Otherwise the improved process can help firms to cut costs but their growth opportunities might remain unaffected or even worsened. This latter context would justify that the process improvement in terms of managerial practices and new methods of organizing work can spark off relevant
organizational changes (Brynjolfsson and Hitt, 2000; Brynjolfsson et al., 2002; Caroli, 2001), and that these changes can ultimately lead firm managers to dismiss a significant number of employees.

The negative and significant effect of the number of product-oriented innovations (see Models 3 and 4 of table 2) strongly supports hypothesis H3a and, consequently, leads us to reject the competing hypothesis H3b. Therefore, it can be stated that firms that introduce more product innovations have lower downsizing rates than ones that introduce fewer innovations. This evidence seems consistent with the view that continuous and/or intense efforts aimed at improving existing products and/or developing new ones are likely to boost the firm’s competitiveness and to enhance growth opportunities. In this sense, it can be expected that the successful exploitation of these growth opportunities will be associated with the need to hire new personnel. In some way, this finding is in line with past empirical research from the economic field which mostly finds a positive link between product innovations and employment growth (e.g. Greenan and Guellec, 2000; Rottmann and Ruschinski, 1997; Smolny, 1998; Jaumandreu, 2003; Harrison et al., 2005 or Mastrostefano and Pianta, 2005).

The effect of most of the control variables appears to be consistent with previous research on the relevance of environmental and organizational factors in the downsize choice. So, the positive and significant effect of the variable M&A confirms that companies engaged in mergers and spin-off processes tend to be more plausible downsizers. In addition, Firm Size, the pressure of an increasing demand (Sales Growth) and the advantage of a profitable position (Gross Margin) seem to prompt firms to increase their workforce and thus, inhibit layoffs. Finally, we find that the share of the firm’s main market (Market Share) makes downsizing decisions more likely. We venture two feasible explanations for this fact. First, as the level of competitiveness in output markets lowers, firms tend to adopt a more defensive behaviour in the inputs market (i.e. hire fewer and/or fire more employees). Another potential explanation is that data on market share depend heavily on how the respondents define their reference markets (i.e. the set of “closest” competitors) and it is plausible that firms with poor growth opportunities and/or worse competitive positions tend to redefine the boundaries of their market in narrower terms.

With respect to the negative effect of R&D intensity on employee downsizing, our findings show that firms more intensive in R&D are more likely to generate new knowledge. And, since new knowledge usually translates into a higher firm creativity, it is highly likely that such creativity ultimately fosters a firm success and growth and, thus, the need to hire new personnel. It is interesting to note that the estimated impact of R&D intensity is negative and
robust for every model estimated. The statistical significance of this variable decreases when additional explanatory variables are added but even in those models including the ‘output-based’ indicators of the innovation activities (i.e. type of process innovation and number of product innovations) this estimate still remains highly significant (at the 95% level).

Neither the share of foreign ownership (Foreign Ownership) nor the financial structure of the firm (Capital Structure) achieves statistical significance. The relative importance of foreign markets (Internationalization) appears to increase the probability of downsizing even though the estimated effect is not statistically significant at the usual levels of confidence. Finally, there is no distinctive downsizing behaviour either depending upon the breadth of the firm’s product portfolio (Number of Products).

5. CONCLUSIONS

This study has provided empirical evidence on the relationship between firm innovation and downsizing in a sample of Spanish manufacturing firms from 1994 to 2006. Our findings add new evidence to this relatively unexplored matter in the management field whose concerns have usually been focused on examining the reverse relationship (e.g. Bruton et al., 1996; Dougherty and Bowman, 1995 or Espahbodi et al., 2000). Specifically, we have analysed how different types of process and product-oriented firm innovations affect the probability of performing drastic cuts in the workforce. To this end, we have formulated a set of hypotheses on the impact of process and product related innovations on downsizing probability for a sample of Spanish manufacturing firms.

Our empirical study reveals that the effect of process-oriented innovations on downsizing is strongly dependent on the specific type of innovation being introduced by firm managers. Specifically, our results suggest that those firms that make investments in complementary production assets when the process innovations occur have significantly lower downsizing rates than ones that do not make such investments. As far as product-oriented innovations are concerned, our results reflect the existence of a negative and significant effect of the role played by the number of product innovations on the probability of carrying out drastic reductions in workforce.

Nevertheless, our findings also highlight that the probability of carrying out drastic reductions of workforce in the sample of Spanish manufacturing firms depends on some other relevant factors. This is, for example, what occurs with R&D intensity, M&A, Sales Growth, Firm Size, Gross Margin and Market Share. We find a negative and robust effect in the case of R&D Intensity, Sales Growth, Firm Size and Gross Margin on the probability of downsizing, while a positive and significant effect is found for M&A and Market Share.
Some relevant implications for managers and policy makers can be derived from our results. Nowadays, it is widely acknowledged by managers, politicians, economists and management scholars that innovation is one of the main pillars of a country and firm’s growth and competitiveness and, ultimately, employment creation. Our findings suggest that managers could play a significant role in employment creation, especially when they carry out process innovations related to the acquisition of complementary production assets and market highly innovative products. Even though significant employee reductions can be justified in the case of some innovative activities, managers should be cautious when they carry out them since downsizing might also have negative effects on the future innovative capability of firms they manage (see Mellahi and Wilkinson, 2009).

Policy makers might also contribute to diminish the potential number of employees affected by firms’ downsizing strategies by designing, for instance, public subsidies systems that deliberately prompt both types of innovations. In this regard it is interesting to note that many governments around the world are currently devoting large amounts of public funds to encourage innovative activities carried out by private firms. Our findings suggest that policy makers should be selective when they fund to private firms since there may be some innovative activities that not prevent significant employee reductions.

The current limitations of our study also bring forth some fruitful and possible avenues for future research that might be considered in relation to the phenomenon of study. In line with much of the past research our study does not distinguish the effect of innovation on downsizing decisions taking into account its effect on different types of employees —for instance, in terms of more skilled workers versus less skilled ones, or ‘strategic’ versus ‘nonstrategic’ employee groups (e.g. Datta et al., 2010; Lepak and Snell, 1999). Consequently, it could be very interesting to explore this important matter in future research. In this sense, there is empirical evidence highlighting that, in general, downsizing can negatively affect the innovation ability of a firm (e.g. Hoffman et al., 1998; Mellahi and Wilkinson, 2009; Shah, 2000). In our view, the consideration of such a distinction could shed new light on this latter relationship.

On the other hand, our study analyzes the effect of innovation on employee downsizing in a sample of manufacturing firms. Therefore, our findings should be interpreted in light of this fact. In this context, it could be very interesting to examine the same matter in future research, but also using samples of service firms. It is widely known that new information technologies are playing a pivotal role in revolutionising the way in which most of the ‘traditional’ services are generated, traded and delivered, as well as offering opportunities for the generation of new activities in many service industries (e.g. Evangelista and Savona,
2003). Such an empirical analysis could also allow researchers to test to what extent the findings found on the impact of firm innovation on downsizing may be dependent on their pertaining to the manufacturing or services industries.
6. REFERENCES
Alonso-Borrego, C., and Collado, D. (2002). Innovation and job creation and destruction:
Berkowitz, D., Wren, B. M., and Grant, E. S. (2007). Predicting new product success or
evidence from a two country study. *Economics of Innovation and New Technology*, 5:
109-138.
Brynjolfsson, E., and Hitt, L. M. (2000). Beyond computation: information technology,
Budros, A. (1997). The new capitalism and organizational rationality: the adoption of
Budros, A. (2000). Organizational types and organizational innovation: downsizing among


<table>
<thead>
<tr>
<th>Número</th>
<th>Título y Autor(ores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>159/2000</td>
<td>Participación privada en la construcción y explotación de carreteras de peaje. Ginés de Rus, Manuel Romero y Lourdes Trujillo</td>
</tr>
<tr>
<td>160/2000</td>
<td>Errores y posibles soluciones en la aplicación del <em>Value at Risk</em>. Mariano González Sánchez</td>
</tr>
<tr>
<td>161/2000</td>
<td>Tax neutrality on saving assets. The spahish case before and after the tax reform. Cristina Ruza y de Paz-Curbera</td>
</tr>
<tr>
<td>163/2000</td>
<td>El control interno del riesgo. Una propuesta de sistema de límites riesgo neutral. Mariano González Sánchez</td>
</tr>
<tr>
<td>164/2001</td>
<td>La evolución de las políticas de gasto de las Administraciones Públicas en los años 90. Alfonso Utrilla de la Hoz y Carmen Pérez Esparrells</td>
</tr>
<tr>
<td>165/2001</td>
<td>Bank cost efficiency and output specification. Emili Tortosa-Ausina</td>
</tr>
<tr>
<td>167/2001</td>
<td>Efectos redistributivos y sobre el bienestar social del tratamiento de las cargas familiares en el nuevo IRPF. Nuria Badenes Plá, Julio López Laborda, Jorge Onrubia Fernández</td>
</tr>
<tr>
<td>168/2001</td>
<td>The Effects of Bank Debt on Financial Structure of Small and Medium Firms in some European Countries. Mónica Melle-Hernández</td>
</tr>
<tr>
<td>169/2001</td>
<td>La política de cohesión de la UE ampliada: la perspectiva de España. Ismael Sanz Labrador</td>
</tr>
<tr>
<td>170/2002</td>
<td>Riesgo de liquidez de Mercado. Mariano González Sánchez</td>
</tr>
<tr>
<td>171/2002</td>
<td>Los costes de administración para el afiliado en los sistemas de pensiones basados en cuentas de capitalización individual: medida y comparación internacional. José Enrique Devesa Carpio, Rosa Rodriguez Barrera, Carlos Vidal Meliá</td>
</tr>
<tr>
<td>172/2002</td>
<td>La encuesta continua de presupuestos familiares (1985-1996): descripción, representatividad y propuestas de metodología para la explotación de la información de los ingresos y el gasto. Llrenc Pou, Joaquín Alegre</td>
</tr>
<tr>
<td>173/2002</td>
<td>Modelos paramétricos y no paramétricos en problemas de concesión de tarjetas de crédito. Rosa Puertas, María Bonilla, Ignacio Olmeda</td>
</tr>
<tr>
<td>Year</td>
<td>Title</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>2002</td>
<td>Mercado único, comercio intra-industrial y costes de ajuste en las manufacturas españolas.</td>
</tr>
<tr>
<td>2003</td>
<td>La Administración tributaria en España. Un análisis de la gestión a través de los ingresos y de los gastos.</td>
</tr>
<tr>
<td>2003</td>
<td>Effects of ATMs and Electronic Payments on Banking Costs: The Spanish Case.</td>
</tr>
<tr>
<td>2003</td>
<td>Factors explaining the interest margin in the banking sectors of the European Union.</td>
</tr>
<tr>
<td>2003</td>
<td>Los planes de stock options para directivos y consejeros y su valoración por el mercado de valores en España.</td>
</tr>
<tr>
<td>2003</td>
<td>The Euro effect on the integration of the European stock markets.</td>
</tr>
<tr>
<td>2004</td>
<td>In search of complementarity in the innovation strategy: international R&amp;D and external knowledge acquisition.</td>
</tr>
<tr>
<td>2004</td>
<td>Fijación de precios en el sector público: una aplicación para el servicio municipal de suministro de agua.</td>
</tr>
<tr>
<td>2004</td>
<td>Estimación de la economía sumergida en España: un modelo estructural de variables latentes.</td>
</tr>
<tr>
<td>2004</td>
<td>Causas políticas y consecuencias sociales de la corrupción.</td>
</tr>
<tr>
<td>2004</td>
<td>Loan bankers’ decisions and sensitivity to the audit report using the belief revision model.</td>
</tr>
<tr>
<td>2004</td>
<td>El modelo de Black, Derman y Toy en la práctica. Aplicación al mercado español.</td>
</tr>
<tr>
<td>2004</td>
<td>Does market competition make banks perform well?.</td>
</tr>
<tr>
<td>2004</td>
<td>Efficiency differences among banks: external, technical, internal, and managerial</td>
</tr>
</tbody>
</table>
190/2004 Una aproximación al análisis de los costes de la esquizofrenia en España: los modelos jerárquicos bayesianos  
F. J. Vázquez-Polo, M. A. Negrín, J. M. Cavasés, E. Sánchez y grupo RIRAG

191/2004 Environmental proactivity and business performance: an empirical analysis  
Javier González-Benítez y Óscar González-Benítez

192/2004 Economic risk to beneficiaries in national defined contribution accounts (NDCs)  
Carlos Vidal-Meliá, Inmaculada Domínguez-Fabian y José Enrique Devesa-Carpio

193/2004 Sources of efficiency gains in port reform: non parametric malmquist decomposition tfp index for Mexico  
Antonio Estache, Beatriz Tovar de la Fé y Lourdes Trujillo

194/2004 Persistencia de resultados en los fondos de inversión españoles  
Alfredo Ciriaco Fernández y Rafael Santamaría Aquilué

195/2004 El modelo de revisión de creencias como aproximación psicológica a la formación del juicio del auditor sobre la gestión continuada  
Andrés Guiral Contreras y Francisco Esteso Sánchez

196/2005 La nueva financiación sanitaria en España: descentralización y prospectiva  
David Canteraro Prieto

197/2005 A cointegration analysis of the Long-Run supply response of Spanish agriculture to the common agricultural policy  
José A. Mendez, Ricardo Mora y Carlos San Juan

198/2005 ¿Refleja la estructura temporal de los tipos de interés del mercado español preferencia por la liquidez?  
Magdalena Massot Perelló y Juan M. Nave

199/2005 Análisis de impacto de los Fondos Estructurales Europeos recibidos por una economía regional: Un enfoque a través de Matrices de Contabilidad Social  
M. Carmen Lima y M. Alejandro Cardenete

200/2005 Does the development of non-cash payments affect monetary policy transmission?  
Santiago Carbó Valverde y Rafael López del Paso

201/2005 Firm and time varying technical and allocative efficiency: an application for port cargo handling firms  
Ana Rodríguez-Álvarez, Beatriz Tovar de la Fé y Lourdes Trujillo

202/2005 Contractual complexity in strategic alliances  
Jeffrey J. Reuer y Africa Ariño

203/2005 Factores determinantes de la evolución del empleo en las empresas adquiridas por opa  
Nuria Alcalde Fradejas y Inés Pérez-Soba Aguilar

Elena Olmedo, Juan M. Valderas, Ricardo Gimeno and Lorenzo Escot
205/2005 Precio de la tierra con presión urbana: un modelo para España
Esther Decimavilla, Carlos San Juan y Stefan Sperlich

206/2005 Interregional migration in Spain: a semiparametric analysis
Adolfo Maza y José Villaverde

207/2005 Productivity growth in European banking
Carmen Murillo-Melchor, José Manuel Pastor y Emili Tortosa-Ausina

Santiago Carbó Valverde, David B. Humphrey y Rafael López del Paso

209/2005 La elasticidad de sustitución intertemporal con preferencias no separables intratemporalmente: los casos de Alemania, España y Francia.
Elena Márquez de la Cruz, Ana R. Martinez Cañete y Inés Pérez-Soba Aguilar

210/2005 Contribución de los efectos tamaño, book-to-market y momentum a la valoración de activos: el caso español.
Begoña Font-Belaire y Alfredo Juan Grau-Grau

211/2005 Permanent income, convergence and inequality among countries
José M. Pastor and Lorenzo Serrano

212/2005 The Latin Model of Welfare: Do 'Insertion Contracts' Reduce Long-Term Dependence?
Luis Ayala and Magdalena Rodriguez

213/2005 The effect of geographic expansion on the productivity of Spanish savings banks
Manuel Illueca, José M. Pastor and Emili Tortosa-Ausina

214/2005 Dynamic network interconnection under consumer switching costs
Ángel Luis López Rodríguez

215/2005 La influencia del entorno socioeconómico en la realización de estudios universitarios: una aproximación al caso español en la década de los noventa
Marta Rahona López

216/2005 The valuation of spanish ipos: efficiency analysis
Susana Álvarez Otero

217/2005 On the generation of a regular multi-input multi-output technology using parametric output distance functions
Sergio Perelman and Daniel Santín

218/2005 La gobernanza de los procesos parlamentarios: la organización industrial del congreso de los diputados en España
Gonzalo Caballero Miguez

219/2005 Determinants of bank market structure: Efficiency and political economy variables
Francisco González

220/2005 Agresividad de las órdenes introducidas en el mercado español: estrategias, determinantes y medidas de performance
David Abad Diaz
221/2005  Tendencia post-anuncio de resultados contables: evidencia para el mercado español
Carlos Forner Rodríguez, Joaquín Marhuenda Fructuoso y Sonia Sanabria García

222/2005  Human capital accumulation and geography: empirical evidence in the European Union
Jesús López-Rodriguez, J. Andrés Faíña y Jose Lopez Rodriguez

223/2005  Auditors' Forecasting in Going Concern Decisions: Framing, Confidence and Information Processing
Waymond Rodgers and Andrés Guiral

José Ramón Cancelo de la Torre, J. Andrés Faíña and Jesús López-Rodriguez

225/2005  The effects of ownership structure and board composition on the audit committee activity: Spanish evidence
Carlos Fernández Méndez and Rubén Arrondo García

226/2005  Cross-country determinants of bank income smoothing by managing loan loss provisions
Ana Rosa Fonseca and Francisco González

Alejandro Estellér Moré

228/2005  Region versus Industry effects: volatility transmission
Pilar Soriano Felipe and Francisco J. Climent Diranzo

Daniel Vázquez-Bustelo and Sandra Valle

Alfonso Palacio-Vera

231/2005  Reconciling Sustainability and Discounting in Cost Benefit Analysis: a methodological proposal
M. Carmen Almansa Sáez and Javier Calatrava Requena

232/2005  Can The Excess Of Liquidity Affect The Effectiveness Of The European Monetary Policy?
Santiago Carbó Valverde and Rafael López del Paso

Miguel Angel Barberán Lahuerta

Víctor M. González

Waymond Rodgers, Paul Pavlou and Andres Guiral.

Francisco J. André, M. Alejandro Cardenete y Carlos Romero.

238/2006 Trade Effects Of Monetary Agreements: Evidence For Oecd Countries. Salvador Gil-Pareja, Rafael Llorca-Vivero y José Antonio Martínez-Serrano.


240/2006 La interacción entre el éxito competitivo y las condiciones del mercado doméstico como determinantes de la decisión de exportación en las Pymes. Francisco García Pérez.

241/2006 Una estimación de la depreciación del capital humano por sectores, por ocupación y en el tiempo. Inés P. Murillo.


244/2006 Did The European Exchange-Rate Mechanism Contribute To The Integration Of Peripheral Countries?. Salvador Gil-Pareja, Rafael Llorca-Vivero y José Antonio Martínez-Serrano.


252/2006 “The momentum effect in the Spanish stock market: Omitted risk factors or investor behaviour?”. Luis Muga and Rafael Santamaria.

José M. Pastor, Empar Pons y Lorenzo Serrano

255/2006 Environmental implications of organic food preferences: an application of the impure public goods model.
Ana María Aldanondo-Ochoa y Carmen Almansa-Sáez

José Félix Sanz-Sanz, Desiderio Romero-Jordán y Santiago Álvarez-García

257/2006 La internacionalización de la empresa manufacturerá española: efectos del capital humano genérico y específico.
José López Rodríguez

María Martínez Torres

259/2006 Efficiency and market power in Spanish banking.
Rolf Färe, Shawna Grosskopf y Emili Tortosa-Ausina.

Helena Chuliá y Hipòlit Torró.

José Antonio Ortega.

262/2006 Accidentes de tráfico, víctimas mortales y consumo de alcohol.
José Mª Arranz y Ana I. Gil.

263/2006 Análisis de la Presencia de la Mujer en los Consejos de Administración de las Mil Mayores Empresas Españolas.
Ruth Mateos de Cabo, Lorenzo Escot Mangas y Ricardo Gimeno Nogués.

Ignacio Álvarez Peralta.

Jaime Vallés-Giménez y Anabel Zárate-Marco.

266/2006 Health Human Capital And The Shift From Foraging To Farming.
Pablo Rungo.

Juan Luis Jiménez y Jordi Perdiguero.

Desiderio Romero-Jordán y José Félix Sanz-Sanz.

269/2006 Banking competition, financial dependence and economic growth
Joaquín Maudos y Juan Fernández de Guevara

270/2006 Efficiency, subsidies and environmental adaptation of animal farming under CAP
Werner Kleinhans, Carmen Murillo, Carlos San Juan y Stefan Sperlich
A. García-Lorenzo y Jesús López-Rodríguez

272/2006 Riesgo asimétrico y estrategias de momentum en el mercado de valores español
Luís Muga y Rafael Santamaría

273/2006 Valoración de capital-riesgo en proyectos de base tecnológica e innovadora a través de la teoría de opciones reales
Gracia Rubio Martín

274/2006 Capital stock and unemployment: searching for the missing link
Ana Rosa Martínez-Cañete, Elena Márquez de la Cruz, Alfonso Palacio-Vera and Inés Pérez-Soba Aguilar

275/2006 Study of the influence of the voters’ political culture on vote decision through the simulation of a political competition problem in Spain
Sagrario Lantarón, Isabel Lillo, Mª Dolores López and Javier Rodrigo

276/2006 Investment and growth in Europe during the Golden Age
Antonio Cubel and Mª Teresa Sanchis

277/2006 Efectos de vincular la pensión pública a la inversión en cantidad y calidad de hijos en un modelo de equilibrio general
Robert Meneu Gaya

278/2006 El consumo y la valoración de activos
Elena Márquez y Belén Nieto

279/2006 Economic growth and currency crisis: A real exchange rate entropic approach
David Matesanz Gómez y Guillermo J. Ortega

280/2006 Three measures of returns to education: An illustration for the case of Spain
María Arrazola y José de Hevia

281/2006 Composition of Firms versus Composition of Jobs
Antoni Cunyat

282/2006 La vocación internacional de un holding tranviario belga: la Compagnie Mutuelle de Tramways, 1895-1918
Alberte Martínez López

283/2006 Una visión panorámica de las entidades de crédito en España en la última década.
Constantino García Ramos

Alberte Martínez López

285/2006 Los intereses belgas en la red ferroviaria catalana, 1890-1936
Alberte Martínez López

286/2006 The Governance of Quality: The Case of the Agrifood Brand Names
Marta Fernández Barcala, Manuel González-Díaz y Emmanuel Raynaud

287/2006 Modelling the role of health status in the transition out of malthusian equilibrium
Paolo Rungo, Luis Currais and Berta Rivera

288/2006 Industrial Effects of Climate Change Policies through the EU Emissions Trading Scheme
Xavier Labandeira and Miguel Rodríguez
<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>Globalisation and the Composition of Government Spending: An analysis for OECD countries</td>
<td>Norman Gemmell, Richard Kneller and Ismael Sanz</td>
</tr>
<tr>
<td>2006</td>
<td>La producción de energía eléctrica en España: Análisis económico de la actividad tras la liberalización del Sector Eléctrico</td>
<td>Fernando Hernández Martínez</td>
</tr>
<tr>
<td>2006</td>
<td>Further considerations on the link between adjustment costs and the productivity of R&amp;D investment: evidence for Spain</td>
<td>Desiderio Romero-Jordán, José Félix Sanz-Sanz and Inmaculada Álvarez-Ayuso</td>
</tr>
<tr>
<td>2006</td>
<td>Una teoría sobre la contribución de la función de compras al rendimiento empresarial</td>
<td>Javier González Benito</td>
</tr>
<tr>
<td>2006</td>
<td>Testing the parametric vs the semiparametric generalized mixed effects models</td>
<td>María José Lombardía and Stefan Sperlich</td>
</tr>
<tr>
<td>2006</td>
<td>Nonlinear dynamics in energy futures</td>
<td>Mariano Matilla-García</td>
</tr>
<tr>
<td>2006</td>
<td>Estimating Spatial Models By Generalized Maximum Entropy Or How To Get Rid Of W</td>
<td>Esteban Fernández Vázquez, Matías Mayor Fernández and Jorge Rodriguez-Valez</td>
</tr>
<tr>
<td>2006</td>
<td>Optimización fiscal en las transmisiones lucrativas: análisis metodológico</td>
<td>Félix Domínguez Barrero</td>
</tr>
<tr>
<td>2006</td>
<td>La situación actual de la banca online en España</td>
<td>Francisco José Climent Diranzo y Alexandre Momparler Pechuán</td>
</tr>
<tr>
<td>2006</td>
<td>Estrategia competitiva y rendimiento del negocio: el papel mediador de la estrategia y las capacidades productivas</td>
<td>Javier González Benito and Isabel Suárez González</td>
</tr>
<tr>
<td>2006</td>
<td>A Parametric Model to Estimate Risk in a Fixed Income Portfolio</td>
<td>Pilar Abad and Sonia Benito</td>
</tr>
<tr>
<td>2007</td>
<td>Análisis Empírico de las Preferencias Sociales Respecto del Gasto en Obra Social de las Cajas de Ahorros</td>
<td>Alejandro Esteller-Moré, Jonathan Jorba Jiménez y Albert Solé-Ollé</td>
</tr>
<tr>
<td>2007</td>
<td>Assessing the enlargement and deepening of regional trading blocs: The European Union case</td>
<td>Salvador Gil-Pareja, Rafael Llorca-Vivero y José Antonio Martínez-Serrano</td>
</tr>
<tr>
<td>2007</td>
<td>¿Es la Franquicia un Medio de Financiación?: Evidencia para el Caso Español</td>
<td>Vanesa Solís Rodríguez y Manuel González Díaz</td>
</tr>
<tr>
<td>2007</td>
<td>Spain is Different: Relative Wages 1989-98</td>
<td>José Antonio Carrasco Gallego</td>
</tr>
</tbody>
</table>
306/2007 Poverty reduction and SAM multipliers: An evaluation of public policies in a regional framework
Francisco Javier De Miguel-Vélez y Jesús Pérez-Mayo

307/2007 La Eficiencia en la Gestión del Riesgo de Crédito en las Cajas de Ahorro
Marcelino Martínez Cabrera

308/2007 Optimal environmental policy in transport: unintended effects on consumers' generalized price
M. Pilar Socorro and Ofelia Betancor

Roberto Ezcurra, Belen Iráizoz, Pedro Pascual and Manuel Rapún

310/2007 Long-run Regional Population Divergence and Modern Economic Growth in Europe: a Case Study of Spain
María Isabel Ayuda, Fernando Collantes and Vicente Pinilla

311/2007 Financial Information effects on the measurement of Commercial Banks’ Efficiency
Borja Amor, María T. Tascón and José L. Fanjul

312/2007 Neutralidad e incentivos de las inversiones financieras en el nuevo IRPF
Félix Domínguez Barrero

313/2007 The Effects of Corporate Social Responsibility Perceptions on The Valuation of Common Stock
Waymond Rodgers, Helen Choy and Andres Guiral-Contreras

314/2007 Country Creditor Rights, Information Sharing and Commercial Banks’ Profitability Persistence across the world
Borja Amor, María T. Tascón and José L. Fanjul

315/2007 ¿Es Relevante el Déficit Corriente en una Unión Monetaria? El Caso Español
Javier Blanco González y Ignacio del Rosal Fernández

316/2007 The Impact of Credit Rating Announcements on Spanish Corporate Fixed Income Performance: Returns, Yields and Liquidity
Pilar Abad, Antonio Díaz and M. Dolores Robles

317/2007 Indicadores de Lealtad al Establecimiento y Formato Comercial Basados en la Distribución del Presupuesto
César Augusto Bustos Reyes y Óscar González Benito

318/2007 Migrants and Market Potential in Spain over The XXth Century: A Test Of The New Economic Geography
Daniel A. Tirado, Jordi Pons, Elisenda Paluzie and Javier Silvestre

319/2007 El Impacto del Coste de Oportunidad de la Actividad Emprendedora en la Intención de los Ciudadanos Europeos de Crear Empresas
Luis Miguel Zapico Aldeano

320/2007 Los belgas y los ferrocarriles de vía estrecha en España, 1887-1936
Alberte Martínez López

321/2007 Competición política bipartidista. Estudio geométrico del equilibrio en un caso ponderado
Isabel Lillo, Mª Dolores López y Javier Rodrigo

322/2007 Human resource management and environment management systems: an empirical study
Mª Concepción López Fernández, Ana Mª Serrano Bedía and Gema García Piñeres
Wood and industrialization. evidence and hypotheses from the case of Spain, 1860-1935. Iñaki Iriarte-Goñi and María Isabel Ayuda Bosque

New evidence on long-run monetary neutrality. J. Cunado, L.A. Gil-Alana and F. Perez de Gracia

Monetary policy and structural changes in the volatility of us interest rates. Juncal Cuñado, Javier Gomez Biscarri and Fernando Perez de Gracia

The productivity effects of intrafirm diffusion. Lucio Fuentelsaz, Jaime Gómez and Sergio Palomas

Unemployment duration, layoffs and competing risks. J.M. Arranz, C. García-Serrano and L. Toharia

El grado de cobertura del gasto público en España respecto a la UE-15 Nuria Rueda, Begoña Barruso, Carmen Calderón y Mª del Mar Herrador

The Impact of Direct Subsidies in Spain before and after the CAP'92 Reform Carmen Murillo, Carlos San Juan and Stefan Sperlich

Determinants of post-privatisation performance of Spanish divested firms Laura Cabeza García and Silvia Gómez Ansón

¿Por qué deciden diversificar las empresas españolas? Razones oportunistas versus razones económicas Almudena Martínez Campillo

Dynamical Hierarchical Tree in Currency Markets Juan Gabriel Brida, David Matesanz Gómez and Wiston Adrián Risso

Los determinantes sociodemográficos del gasto sanitario. Análisis con microdatos individuales Ana María Angulo, Ramón Barberán, Pilar Egea y Jesús Mur

Why do companies go private? The Spanish case Inés Pérez-Soba Aguilar

The use of gis to study transport for disabled people Verónica Cañal Fernández

The long run consequences of M&A: An empirical application Cristina Bernad, Lucio Fuentelsaz and Jaime Gómez

Las clasificaciones de materias en economía: principios para el desarrollo de una nueva clasificación Valentín Edo Hernández

Reforming Taxes and Improving Health: A Revenue-Neutral Tax Reform to Eliminate Medical and Pharmaceutical VAT Santiago Álvarez-García, Carlos Pestana Barros y Juan Prieto-Rodriguez

Impacts of an iron and steel plant on residential property values Celia Bilbao-Terol

Firm size and capital structure: Evidence using dynamic panel data Víctor M. González and Francisco González
¿Cómo organizar una cadena hotelera? La elección de la forma de gobierno
Marta Fernández Barcala y Manuel González Díaz

Análisis de los efectos de la decisión de diversificar: un contraste del marco teórico “Agencia-Stewardship”
Almudena Martínez Campillo y Roberto Fernández Gago

Selecting portfolios given multiple eurostoxx-based uncertainty scenarios: a stochastic goal programming approach from fuzzy betas
Enrique Ballestero, Blanca Pérez-Gladish, Mar Arenas-Parra and Amelia Bilbao-Terol

“El bienestar de los inmigrantes y los factores implicados en la decisión de emigrar”
Anastasia Hernández Alemán y Carmelo J. León

Andrea Martínez-Noya and Esteban García-Canal

Diferencias salariales entre empresas públicas y privadas. El caso español
Begoña Cueto y Nuria Sánchez- Sánchez

Effects of Fiscal Treatments of Second Home Ownership on Renting Supply
Celia Bilbao Terol and Juan Prieto Rodríguez

Auditors’ ethical dilemmas in the going concern evaluation
Andres Guiral, Waymond Rodgers, Emiliano Ruiz and Jose A. Gonzalo

Convergencia en capital humano en España. Un análisis regional para el periodo 1970-2004
Susana Morales Sequera y Carmen Pérez Esparrells

Socially responsible investment: mutual funds portfolio selection using fuzzy multiobjective programming
Blanca Mª Pérez-Gladish, Mar Arenas-Parra, Amelia Bilbao-Terol and Mª Victoria Rodríguez-Uría

Persistencia del resultado contable y sus componentes: implicaciones de la medida de ajustes por devengo
Raúl Iñiguez Sánchez y Francisco Poveda Fuentes

Wage Inequality and Globalisation: What can we Learn from the Past? A General Equilibrium Approach
Concha Betrán, Javier Ferri and Maria A. Pons

Eficacia de los incentivos fiscales a la inversión en I+D en España en los años noventa
Desiderio Romero Jordán y José Félix Sanz Sanz

Convergencia regional en renta y bienestar en España
Robert Meneu Gaya

Tributación ambiental: Estado de la Cuestión y Experiencia en España
Ana Carrera Poncela

Salient features of dependence in daily us stock market indices
Luis A. Gil-Alana, Juncal Cuñado and Fernando Pérez de Gracia

La educación superior: ¿un gasto o una inversión rentable para el sector público?
Inés P. Murillo y Francisco Pedraja
358/2007 Effects of a reduction of working hours on a model with job creation and job destruction
Emilio Domínguez, Miren Ullibarri y Idoya Zabaleta

359/2007 Stock split size, signaling and earnings management: Evidence from the Spanish market
José Yagüe, J. Carlos Gómez-Sala and Francisco Poveda-Fuentes

360/2007 Modelización de las expectativas y estrategias de inversión en mercados de derivados
Begoña Font-Belaire

361/2008 Trade in capital goods during the golden age, 1953-1973
Mª Teresa Sanchis and Antonio Cubel

362/2008 El capital económico por riesgo operacional: una aplicación del modelo de distribución de pérdidas
Enrique José Jiménez Rodríguez y José Manuel Feria Domínguez

363/2008 The drivers of effectiveness in competition policy
Joan-Ramon Borrell and Juan-Luis Jiménez

364/2008 Corporate governance structure and board of directors remuneration policies: evidence from Spain
Carlos Fernández Méndez, Rubén Arrondo García and Enrique Fernández Rodríguez

365/2008 Beyond the disciplinary role of governance: how boards and donors add value to Spanish foundations
Pablo De Andrés Alonso, Valentín Azofra Palenzuela y M. Elena Romero Merino

366/2008 Complejidad y perfeccionamiento contractual para la contención del oportunismo en los acuerdos de franquicia
Vanessa Solís Rodríguez y Manuel González Díaz

367/2008 Inestabilidad y convergencia entre las regiones europeas
Jesús Mur, Fernando López y Ana Angulo

368/2008 Análisis espacial del cierre de explotaciones agrarias
Ana Aldanondo Ochoa, Carmen Almansa Sáez y Valero Casanovas Oliva

369/2008 Cross-Country Efficiency Comparison between Italian and Spanish Public Universities in the period 2000-2005
Tommaso Agasisti and Carmen Pérez Esparrells

370/2008 El desarrollo de la sociedad de la información en España: un análisis por comunidades autónomas
María Concepción García Jiménez y José Luis Gómez Barroso

371/2008 El medioambiente y los objetivos de fabricación: un análisis de los modelos estratégicos para su consecución
Lucía Avella Camarero, Esteban Fernández Sánchez y Daniel Vázquez-Bustelo

372/2008 Influence of bank concentration and institutions on capital structure: New international evidence
Víctor M. González and Francisco González

373/2008 Generalización del concepto de equilibrio en juegos de competición política
Mª Dolores López González y Javier Rodrigo Hitos

374/2008 Smooth Transition from Fixed Effects to Mixed Effects Models in Multi-level regression Models
Maria José Lombardía and Stefan Sperlich
375/2008 A Revenue-Neutral Tax Reform to Increase Demand for Public Transport Services
Carlos Pestana Barros and Juan Prieto-Rodriguez

376/2008 Measurement of intra-distribution dynamics: An application of different approaches to the European regions
Adolfo Maza, María Hierro and José Villaverde

377/2008 Migración interna de extranjeros y ¿nueva fase en la convergencia?
María Hierro y Adolfo Maza

378/2008 Efetos de la Reforma del Sector Eléctrico: Modelización Teórica y Experiencia Internacional
Ciro Eduardo Bazán Navarro

379/2008 A Non-Parametric Independence Test Using Permutation Entropy
Mariano Matilla-García and Manuel Ruiz Marín

380/2008 Testing for the General Fractional Unit Root Hypothesis in the Time Domain
Uwe Hassler, Paulo M.M. Rodrigues and Antonio Rubia

381/2008 Multivariate gram-charlier densities
Esther B. Del Brio, Trino-Manuel Ñíguez and Javier Perote

382/2008 Analyzing Semiparametrically the Trends in the Gender Pay Gap - The Example of Spain
Ignacio Moral-Arce, Stefan Sperlich, Ana I. Fernández-Sainz and Maria J. Roca

383/2008 A Cost-Benefit Analysis of a Two-Sided Card Market
Santiago Carbó Valverde, David B. Humphrey, José Manuel Liñares Zegarra and Francisco Rodríguez Fernandez

384/2008 A Fuzzy Bicriteria Approach for Journal Deselection in a Hospital Library
M. L. López-Avello, M. V. Rodríguez-Uría, B. Pérez-Gladish, A. Bilbao-Terol, M. Arenas-Parra

385/2008 Valoración de las grandes corporaciones farmaceúticas, a través del análisis de sus principales intangibles, con el método de opciones reales
Gracia Rubio Martin y Prosper Lamothe Fernández

386/2008 El marketing interno como impulsor de las habilidades comerciales de las pymes españolas: efectos en los resultados empresariales
Mª Leticia Santos Vijande, Mª José Sanzo Pérez, Nuria García Rodríguez y Juan A. Trespalacios Gutiérrez

387/2008 Understanding Warrants Pricing: A case study of the financial market in Spain
David Abad y Belén Nieto

388/2008 Aglomeración espacial, Potencial de Mercado y Geografía Económica: Una revisión de la literatura
Jesús López-Rodríguez y J. Andrés Faiña

389/2008 An empirical assessment of the impact of switching costs and first mover advantages on firm performance
Jaime Gómez, Juan Pablo Maícas

390/2008 Tender offers in Spain: testing the wave
Ana R. Martínez-Cañete y Inés Pérez-Soba Aguilar
La integración del mercado español a finales del siglo XIX: los precios del trigo entre 1891 y 1905
Mariano Matilla García, Pedro Pérez Pascual y Basilio Sanz Carnero

Cuando el tamaño importa: estudio sobre la influencia de los sujetos políticos en la balanza de bienes y servicios
Alfonso Echazarra de Gregorio

Una visión cooperativa de las medidas ante el posible daño ambiental de la desalación
Borja Montaño Sanz

Efectos externos del endeudamiento sobre la calificación crediticia de las Comunidades Autónomas
Andrés Leal Marcos y Julio López Laborda

Technical efficiency and productivity changes in Spanish airports: A parametric distance functions approach
Beatriz Tovar & Roberto Rendeiro Martín-Cejas

Network analysis of exchange data: Interdependence drives crisis contagion
David Matesanz Gómez & Guillermo J. Ortega

Explaining the performance of Spanish privatised firms: a panel data approach
Laura Cabeza García and Silvia Gomez Anson

Technological capabilities and the decision to outsource R&D services
Andrea Martínez-Noya and Esteban García-Canal

Hybrid Risk Adjustment for Pharmaceutical Benefits
Manuel García-Goñi, Pere Ibern & José María Inoriza

The Team Consensus–Performance Relationship and the Moderating Role of Team Diversity
José Henrique Dieguez, Javier González-Benito and Jesús Galende

The institutional determinants of CO₂ emissions: A computational modelling approach using Artificial Neural Networks and Genetic Programming
Marcos Álvarez-Díaz, Gonzalo Caballero Miguez and Mario Soliño

Alternative Approaches to Include Exogenous Variables in DEA Measures: A Comparison Using Monte Carlo
José Manuel Cordero-Ferrera, Francisco Pedraja-Chaparro and Daniel Santín-González

Efecto diferencial del capital humano en el crecimiento económico andaluz entre 1985 y 2004: comparación con el resto de España
Mª del Pópulo Pablo-Romero Gil-Delgado y Mª de la Palma Gómez-Calero Valdés

Análisis de fusiones, variaciones conjurales y la falacia del estimator en diferencias
Juan Luis Jiménez y Jordi Perdigueru

Política fiscal en la uem: ¿basta con los estabilizadores automáticos?
Jorge Uxó González y Mª Jesús Arroyo Fernández

Papel de la orientación emprendedora y la orientación al mercado en el éxito de las empresas
Óscar González-Benito, Javier González-Benito y Pablo A. Muñoz-Gallego

La presión fiscal por impuesto sobre sociedades en la unión europea
Elena Fernández Rodríguez, Antonio Martínez Arias y Santiago Álvarez García
The environment as a determinant factor of the purchasing and supply strategy: an empirical analysis
Dr. Javier González-Benito y MS Duilio Reis da Rocha

Cooperation for innovation: the impact on innovatory effort
Gloria Sánchez González and Liliana Herrera

Spanish post-earnings announcement drift and behavioral finance models
Carlos Forner and Sonia Sanabria

Decision taking with external pressure: evidence on football manager dismissals in Argentina and their consequences
Ramón Flores, David Forrest and Juan de Dios Tena

Comercio agrario latinoamericano, 1963-2000: aplicación de la ecuación gravitacional para flujos desagregados de comercio
Raúl Serrano y Vicente Pinilla

Voter heuristics in Spain: a descriptive approach elector decision
José Luis Sáez Lozano and Antonio M. Jaime Castillo

Análisis del efecto área de salud de residencia sobre la utilización y acceso a los servicios sanitarios en la Comunidad Autónoma Canaria
Ignacio Abásolo Alessón, Lidia García Pérez, Raquel Aguilar Ibáñez y Asier Amador Robayna

Impact on competitive balance from allowing foreign players in a sports league: an analytical model and an empirical test
Ramón Flores, David Forrest & Juan de Dios Tena

Organizational innovation and productivity growth: Assessing the impact of outsourcing on firm performance
Alberto López

Value Efficiency Analysis of Health Systems
Eduardo González, Ana Cárcaba & Juan Ventura

Equidad en la utilización de servicios sanitarios públicos por comunidades autónomas en España: un análisis multinivel
Ignacio Abásolo, Jaime Pinilla, Miguel Negrín, Raquel Aguilar y Lidia García

Piedras en el camino hacia Bolonia: efectos de la implantación del EEES sobre los resultados académicos
Carmen Florido, Juan Luis Jiménez e Isabel Santana

The welfare effects of the allocation of airlines to different terminals
M. Pilar Socorro and Ofelia Betancor

How bank capital buffers vary across countries. The influence of cost of deposits, market power and bank regulation
Ana Rosa Fonseca and Francisco González

Analysing health limitations in Spain: an empirical approach based on the European Community household panel
Marta Pascual and David Cantarero
423/2008 Regional productivity variation and the impact of public capital stock: an analysis with spatial interaction, with reference to Spain
Miguel Gómez-Antonio and Bernard Fingleton

424/2008 Average effect of training programs on the time needed to find a job. The case of the training schools program in the south of Spain (Seville, 1997-1999).
José Manuel Cansino Muñoz-Repiso and Antonio Sánchez Braza

425/2008 Medición de la eficiencia y cambio en la productividad de las empresas distribuidoras de electricidad en Perú después de las reformas
Raúl Pérez-Reyes y Beatriz Tovar

426/2008 Acercando posturas sobre el descuento ambiental: sondeo Delphi a expertos en el ámbito internacional
Carmen Almansa Sáez y José Miguel Martínez Paz

427/2008 Determinants of abnormal liquidity after rating actions in the Corporate Debt Market
Pilar Abad, Antonio Díaz and M. Dolores Robles

428/2008 Export led-growth and balance of payments constrained. New formalization applied to Cuban commercial regimes since 1960
David Matesanz Gómez, Guadalupe Fugarolas Álvarez-Ude and Isis Mañalich Gálvez

429/2008 La deuda implícita y el desequilibrio financiero-actuarial de un sistema de pensiones. El caso del régimen general de la seguridad social en España
José Enrique Devesa Carpio y Mar Devesa Carpio

430/2008 Effects of the descentralización fiscal sobre el precio de los carburantes en España
Desiderio Romero Jordán, Marta Jorge García-Inés y Santiago Álvarez García

431/2008 Euro, firm size and export behavior
Silviano Esteve-Pérez, Salvador Gil-Pareja, Rafael Llorca-Vivero and José Antonio Martinez-Serrano

432/2008 Does social spending increase support for free trade in advanced democracies?
Ismael Sanz, Ferran Martinez i Coma and Federico Steinberg

433/2008 Potencial de Mercado y Estructura Espacial de Salarios: El Caso de Colombia
Jesús López-Rodríguez y María Cecilia Acevedo

434/2008 Persistence in Some Energy Futures Markets
Juncal Cunado, Luis A. Gil-Alana and Fernando Pérez de Gracia

435/2008 La inserción financiera externa de la economía francesa: inversores institucionales y nueva gestión empresarial
Ignacio Álvarez Peralta

436/2008 ¿Flexibilidad o rigidez salarial en España?: un análisis a escala regional
Ignacio Moral Arce y Adolfo Maza Fernández

437/2009 Intangible relationship-specific investments and the performance of r&d outsourcing agreements
Andrea Martínez-Noya, Esteban García-Canal & Mauro F. Guillén

438/2009 Friendly or Controlling Boards?
Pablo de Andrés Alonso & Juan Antonio Rodríguez Sanz
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>439/2009</td>
<td>La sociedad Trenor y Cia. (1838-1926): un modelo de negocio industrial en la España del siglo XIX</td>
<td>Amparo Ruiz Llopis</td>
</tr>
<tr>
<td>440/2009</td>
<td>Continental bias in trade</td>
<td>Salvador Gil-Pareja, Rafael Llorca-Vivero &amp; José Antonio Martínez Serrano</td>
</tr>
<tr>
<td>441/2009</td>
<td>Determining operational capital at risk: an empirical application to the retail banking</td>
<td>Enrique José Jiménez-Rodriguez, José Manuel Feria-Dominguez &amp; José Luis Martín-Marín</td>
</tr>
<tr>
<td>442/2009</td>
<td>Costes de mitigación y escenarios post-kyoto en España: un análisis de equilibrio general para España</td>
<td>Mikel González Ruiz de Eguino</td>
</tr>
<tr>
<td>443/2009</td>
<td>Las revistas españolas de economía en las bibliotecas universitarias: ranking, valoración del indicador y del sistema</td>
<td>Valentín Edo Hernández</td>
</tr>
<tr>
<td>444/2009</td>
<td>Convergencia económica en España y coordinación de políticas económicas. un estudio basado en la estructura productiva de las CC.AA.</td>
<td>Ana Cristina Mingorance Arnáiz</td>
</tr>
<tr>
<td>445/2009</td>
<td>Instrumentos de mercado para reducir emisiones de co2: un análisis de equilibrio general para España</td>
<td>Mikel González Ruiz de Eguino</td>
</tr>
<tr>
<td>446/2009</td>
<td>El comercio intra e inter-regional del sector Turismo en España</td>
<td>Carlos Llano y Tamara de la Mata</td>
</tr>
<tr>
<td>447/2009</td>
<td>Efectos del incremento del precio del petróleo en la economía española: Análisis de cointegración y de la política monetaria mediante reglas de Taylor</td>
<td>Fernando Hernández Martínez</td>
</tr>
<tr>
<td>449/2009</td>
<td>Global Economy Dynamics? Panel Data Approach to Spillover Effects</td>
<td>Gregory Daco, Fernando Hernández Martínez &amp; Li-Wu Hsu</td>
</tr>
<tr>
<td>450/2009</td>
<td>Pricing levered warrants with dilution using observable variables</td>
<td>Isabel Abínzano &amp; Javier F. Navas</td>
</tr>
<tr>
<td>452/2009</td>
<td>A Detailed Comparison of Value at Risk in International Stock Exchanges</td>
<td>Pilar Abad &amp; Sonia Benito</td>
</tr>
<tr>
<td>453/2009</td>
<td>Understanding offshoring: has Spain been an offshoring location in the nineties?</td>
<td>Belén González-Díaz &amp; Rosario Gandoy</td>
</tr>
<tr>
<td>454/2009</td>
<td>Outsourcing decision, product innovation and the spatial dimension: Evidence from the Spanish footwear industry</td>
<td>José Antonio Belso-Martínez</td>
</tr>
</tbody>
</table>
Does playing several competitions influence a team’s league performance? Evidence from Spanish professional football
Andrés J. Picazo-Tadeo & Francisco González-Gómez

Does accessibility affect retail prices and competition? An empirical application
Juan Luis Jiménez and Jordi Perdiguero

Cash conversion cycle in smes
Sonia Baños-Caballero, Pedro J. García-Teruel and Pedro Martínez-Solano

Un estudio sobre el perfil de hogares endeudados y sobreendeudados: el caso de los hogares vascos
Alazne Mujika Alberdi, Iñaki García Arrizabalaga y Juan José Gibaja Martins

Imposing monotonicity on outputs in parametric distance function estimations: with an application to the spanish educational production
Sergio Perelman and Daniel Santín

Key issues when using tax data for concentration analysis: an application to the Spanish wealth tax
José Mª Durán-Cabré and Alejandro Esteller-Moré

¿Se está rompiendo el mercado español? Una aplicación del enfoque de feldstein –horioka
Saúl De Vicente Queijeiro, José Luis Pérez Rivero y María Rosalía Vicente Cuervo

Financial condition, cost efficiency and the quality of local public services
Manuel A. Muñiz & José L. Zafrá

Including non-cognitive outputs in a multidimensional evaluation of education production: an international comparison
Marián García Valiñas & Manuel Antonio Muñiz Pérez

A political look into budget deficits. The role of minority governments and oppositions
Albert Falcó-Gimeno & Ignacio Jurado

La simulación del cuadro de mando integral. Una herramienta de aprendizaje en la materia de contabilidad de gestión
Elena Urquía Grande, Clara Isabel Muñoz Colomina y Elisa Isabel Cano Montero

Análisis histórico de la importancia de la industria de la desalinización en España
Borja Montaño Sanz

The dynamics of trade and innovation: a joint approach
Silviano Esteve-Pérez & Diego Rodríguez

Measuring international reference-cycles
Sonia de Lucas Santos, Inmaculada Álvarez Ayuso & Mª Jesús Delgado Rodríguez

Measuring quality of life in Spanish municipalities
Eduardo González Fidalgo, Ana Cárcaba García, Juan Ventura Victoria & Jesús García García

¿Cómo se valoran las acciones españolas: en el mercado de capitales doméstico o en el europeo?
Begoña Font Belaire y Alfredo Juan Grau Grau

Patterns of e-commerce adoption and intensity. evidence for the european union-27
María Rosalía Vicente & Ana Jesús López
472/2009 On measuring the effect of demand uncertainty on costs: an application to port terminals
Ana Rodríguez-Álvarez, Beatriz Tovar & Alan Wall

473/2009 Order of market entry, market and technological evolution and firm competitive performance
Jaime Gómez, Gianvito Lanzolla & Juan Pablo Maicas

474/2009 La Unión Económica y Monetaria Europea en el proceso exportador de Castilla y León (1993-2007): un análisis de datos de panel
Almudena Martínez Campillo y Mª del Pilar Sierra Fernández

475/2009 Do process innovations boost SMEs productivity growth?
Juan A. Mañez, María E. Rochina Barrachina, Amparo Sanchis Llopis & Juan A. Sanchis Llopis

476/2009 Incertidumbre externa y elección del modo de entrada en el marco de la inversión directa en el exterior
Cristina López Duarte y Marta Mª Vidal Suárez

477/2009 Testing for structural breaks in factor loadings: an application to international business cycle
José Luis Cendejas Bueno, Sonia de Lucas Santos, Inmaculada Álvarez Ayuso & Mª Jesús Delgado Rodríguez

478/2009 ¿Esconde la rigidez de precios la existencia de colusión? El caso del mercado de carburantes en las Islas Canarias
Juan Luis Jiménez y Jordi Perdiguer

479/2009 The poni test with structural breaks
Antonio Aznar & María-Isabel Ayuda

480/2009 Accuracy and reliability of Spanish regional accounts (CRE-95)
Verónica Cañal Fernández

481/2009 Estimating regional variations of R&D effects on productivity growth by entropy econometrics
Esteban Fernández-Vázquez y Fernando Rubiera-Morollón

482/2009 Why do local governments privatize the provision of water services? Empirical evidence from Spain
Francisco González-Gómez, Andrés J. Picazo-Tadeo & Jorge Guardiola

483/2009 Assessing the regional digital divide across the European Union-27
María Rosalía Vicente & Ana Jesús López

484/2009 Measuring educational efficiency and its determinants in Spain with parametric distance functions
José Manuel Cordero Ferrera, Eva Crespo Cebada & Daniel Santín González

485/2009 Spatial analysis of public employment services in the Spanish provinces
Patricia Suárez Cano & Matías Mayor Fernández

486/2009 Trade effects of continental and intercontinental preferential trade agreements
Salvador Gil-Pareja, Rafael Llorca-Vivero & José Antonio Martínez-Serrano

487/2009 Testing the accuracy of DEA for measuring efficiency in education under endogeneity
Salvador Gil-Pareja, Rafael Llorca-Vivero & José Antonio Martínez-Serrano

488/2009 Measuring efficiency in primary health care: the effect of exogenous variables on results
José Manuel Cordero Ferrera, Eva Crespo Cebada & Luis R. Murillo Zamorano
489/2009 Capital structure determinants in growth firms accessing venture funding
Marina Balboa, José Martí & Álvaro Tresierra

490/2009 Determinants of debt maturity structure across firm size
Víctor M. González

491/2009 Análisis del efecto de la aplicación de las NIIF en la valoración de las salidas a bolsa
Susana Álvarez Otero y Eduardo Rodríguez Enríquez

492/2009 An analysis of urban size and territorial location effects on employment probabilities: the spanish case
Ana Viñuela-Jiménez, Fernando Rubiera-Morollón & Begoña Cueto

493/2010 Determinantes de la estructura de los consejos de administración en España
Isabel Acero Fraile y Nuria Alcalde Fradejas

494/2010 Performance and completeness in repeated inter-firm relationships: the case of franchising
Vanesa Solís-Rodríguez & Manuel Gonzalez-Diaz

495/2010 A Revenue-Based Frontier Measure of Banking Competition
Santiago Carbó, David Humphrey & Francisco Rodríguez

496/2010 Categorical segregation in social networks
Antoni Rubí-Barceló

497/2010 Beneficios ambientales no comerciales de la directiva marco del agua en condiciones de escasez: análisis económico para el Guadalquivir
Julia Martin-Ortega, Giacomo Giannoccaro y Julio Berbel Vecino

498/2010 Monetary integration and risk diversification in eu-15 sovereign debt markets
Juncal Cuñado & Marta Gómez-Puig

José Antonio Carrasco Gallego

500/2010 The role of learning in firm R&D persistence
Juan A. Mañez, María E. Rochina-Barrachina, Amparo Sanchis-Llopis & Juan A. Sanchis-Llopis

501/2010 Is venture capital more than just money?
Marina Balboa, José Martí & Nina Zieling

502/2010 On the effects of supply strategy on business performance: do the relationships among generic competitive objectives matter?
Javier González-Benito

503/2010 Corporate cash holding and firm value
Cristina Martínez-Sola, Pedro J. García-Teruel & Pedro Martínez-Solano

504/2010 El impuesto de flujos de caja de sociedades: una propuesta de base imponible y su aproximación contable en España
Lourdes Jerez Barroso y Joaquín Texeira Quirós

505/2010 The effect of technological, commercial and human resources on the use of new technology
Jaime Gómez & Pilar Vargas
<table>
<thead>
<tr>
<th>Página</th>
<th>Título del Artículo</th>
<th>Autor(es)</th>
</tr>
</thead>
<tbody>
<tr>
<td>506/2010</td>
<td>¿Cómo ha afectado la fiscalidad a la rentabilidad de la inversión en vivienda en España? Un análisis para el periodo 1996 y 2007</td>
<td>Jorge Onrubia Fernández y María del Carmen Rodado Ruiz</td>
</tr>
<tr>
<td>507/2010</td>
<td>Modelización de flujos en el análisis input-output a partir de la teoría de redes</td>
<td>Ana Salomé García Muñiz</td>
</tr>
<tr>
<td>508/2010</td>
<td>Export-led-growth hypothesis revisited. A balance of payments approach for Argentina, Brazil, Chile and Mexico</td>
<td>David Matesanz Gómez &amp; Guadalupe Fugarolas Álvarez-Ude</td>
</tr>
<tr>
<td>509/2010</td>
<td>Realised hedge ratio properties, performance and implications for risk management: evidence from the spanish ibex 35 spot and futures markets</td>
<td>David G McMillan &amp; Raquel Quiroga García</td>
</tr>
<tr>
<td>510/2010</td>
<td>Do we sack the manager... or is it better not to? Evidence from Spanish professional football</td>
<td>Francisco González-Gómez, Andrés J. Picazo-Tadeo &amp; Miguel Á. García-Rubio</td>
</tr>
<tr>
<td>511/2010</td>
<td>Have Spanish port sector reforms during the last two decades been successful? A cost frontier approach</td>
<td>Ana Rodríguez-Álvarez &amp; Beatriz Tovar</td>
</tr>
<tr>
<td>512/2010</td>
<td>Size &amp; Regional Distribution of Financial Behavior Patterns in Spain</td>
<td>Juan Antonio Maroto Acín, Pablo García Estévez &amp; Salvador Roji Ferrari</td>
</tr>
<tr>
<td>513/2010</td>
<td>The impact of public reforms on the productivity of the Spanish ports: a parametric distance function approach</td>
<td>Ramón Núñez-Sánchez &amp; Pablo Coto-Millán</td>
</tr>
<tr>
<td>514/2010</td>
<td>Trade policy versus institutional trade barriers: an application using “good old” ols</td>
<td>Laura Márquez-Ramos, Inmaculada Martinez-Zarzoso &amp; Celestino Suárez-Burguet</td>
</tr>
<tr>
<td>515/2010</td>
<td>The “Double Market” approach in venture capital and private equity activity: the case of Europe</td>
<td>Marina Balboa &amp; José Martí</td>
</tr>
<tr>
<td>516/2010</td>
<td>International accounting differences and earnings smoothing in the banking industry</td>
<td>Marina Balboa, Germán López-Espinosa &amp; Antonio Rubia</td>
</tr>
<tr>
<td>517/2010</td>
<td>Convergence in car prices among European countries</td>
<td>Simón Sosvilla-Rivero &amp; Salvador Gil-Pareja</td>
</tr>
<tr>
<td>518/2010</td>
<td>Effects of process and product-oriented innovations on employee downsizing</td>
<td>José David Vicente-Lorente &amp; José Ángel Zúñiga-Vicente</td>
</tr>
</tbody>
</table>