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

Alberto López*
Universidad Complutense de Madrid
September 2008

Abstract

It is widely accepted that innovation is a primary source of productivity growth. This paper is aimed at analyzing the relationship between organizational innovation and productivity. I focus on the role of one of the most relevant organizational methods, outsourcing. Specifically, this paper deals with outsourcing at the firm level and focuses on the role of contracting out of manufacturing activities. To address it, I develop and estimate a simple theoretical framework justifying the addition of outsourcing measures to the specification of a "traditional" production function. Using an unbalanced panel of Spanish manufacturing firms, I find that for manufacturing as a whole, both the outsourcing decision and its intensity have a positive effect on productivity. When analyzing industry level results, I find that outsourcing intensity has a positive effect on productivity, mainly for firms belonging to light industries, while the decision of starting (stopping) outsourcing has the expected positive (negative) effect on productivity.

Key words: Organizational innovation, outsourcing, productivity growth
JEL Classification: D24, D21, L60

---

* I would like to thank Jordi Jaumandreu for his valuable suggestions and discussion. I also wish to acknowledge useful comments by the audiences at 32nd EARIE meeting, XX Jornadas de Economía Industrial and IX Encuentro de Economía Aplicada. I acknowledge support from project SEJ2004-02525/ECON and from Fundación Banco Herrero. Errors are mine.

* Dpto. de Fundamentos del Análisis Económico I. Universidad Complutense de Madrid. email: alberto.lopez@ccee.ucm.es.
1. Introduction

It is widely accepted that innovation is a primary source of productivity growth. Literature on this topic has focused on the impact of investment on knowledge and the role of technological innovations. Since Griliches (1979), many empirical studies have focused on the link between R&D and productivity\(^1\) and on the role of technological process and product innovations as productivity shifters\(^2\).

However, as it is pointed out in the Oslo Manual (OECD, 2005): “In order to identify the full range of changes that firms undertake to improve performance and their success in improving economic outcomes, a framework broader than technological product and process innovation is needed. Including marketing and organizational innovations gives a more complete framework that is better able to capture the changes that affect firm performance and contribute to the accumulation of knowledge”.

Organizational innovations can have an important effect on productivity on their own. In this sense, organizational innovations can increase the quality and efficiency of work and improve the information sharing and the ability of the firm to use new technologies, as such increasing the productivity of investment in knowledge. Years ago, Feenstra (1998) argued that trade in intermediate inputs has an impact on employment and wages that is “observationally equivalent” to the changes induced by technological innovation.

Broadly speaking, an organizational innovation is defined as the adoption of a new idea or behavior by an organization (see Daft, 1978). More precisely, and following the Oslo Manual (OECD, 2005) “organizational innovations refer to the implementation of new organisational methods. These can be changes in business practices, in workplace organisation or in the firm’s external relations”. Among the most relevant organizational methods in firms’ external relations is outsourcing.

Outsourcing is a make or buy decision and implies the modification of the boundaries of the firm. It must be seen as part of the organizational innovation process, carried out in the search for increasing flexibility and efficiency.

---

1 See Griliches (1995) for a survey.
2 Crépon et al. (1998) propose a structural model that describes the link between R&D expenditure, innovation output and productivity. This model, widely used, has been recently applied by Griffith et al. (2006) using internationally comparable firm-level data from four major European countries, France, Germany, Spain and the UK.
Since Williamson (1985) and Grossman and Hart (1986), a body of literature has focused on the role of transaction costs, asset specificity, and incomplete contracts in the make or buy decision. Most of this literature has treated the industry environment as given and has focused on the relation between a single producer and a potential supplier (see, among others, Kamien, Li and Samet, 1989; Lewis and Sappington, 1991; and Spiegel, 1993). Recently, Grossman and Helpman (2002) developed a model in which integration and outsourcing are treated as equilibrium phenomena (taking into account the interdependence among the firms' choices). These authors focus on the trade-off between the costs of running a larger and less specialized firm and the costs of search frictions and imperfect contracting. Subsequently, Grossman and Helpman (2003) develop a model in which firms in an industry choose their organization structures and the location of their suppliers, and Grossman and Helpman (2005) study the determinants of the location of subcontracted activity in a general equilibrium model of outsourcing and trade.

There is no standardized definition of the term outsourcing. A general definition of outsourcing refers to those material inputs or services necessary to produce a final output obtained outside the firm. One strand of literature focuses on the outsourcing of materials. In this sense, McMillan (1995) enumerates the main changes introduced by U.S. firms in their supplier relationships. Among the most relevant changes is the increment in the contracting out of manufacturing activities or production subcontracting. Several papers analyze the evolution of material outsourcing. See, for example, Feenstra and Hanson (1996), Campa and Goldberg (1997), Hummels et al. (2001), Yeats (2001), Hanson et al. (2004), and Borga and Zeile (2004). In another strand of literature, several papers address the substantial growth in service outsourcing. See, among others, Abraham and Taylor (1996), Goodman and Steadman (2002), Abramovsky et al. (2004) and Amiti and Wei (2005).

In addition, outsourcing can be local (an external supplier in the domestic market) or international (a leading example is the outsourcing by firms in developed countries to firms located in low-wage countries).

What is more, from an empirical perspective outsourcing is too broad a concept. In this sense, outsourcing has been measured in many different ways and using different perspectives. Most of the measures collect information at the industry level and from input-output tables, rather than firm-level data. Moreover, many of them are rough measures.
Among the most used measures of outsourcing is Feenstra and Hanson's (1996) approach. These authors define outsourcing share for each industry as the share of imported intermediate inputs (services) over total non-energy inputs. Other measures of outsourcing used are, among others, imported intermediate inputs within each industry obtained from input-output tables, expenditure on a number of specific services purchased on the market, fraction of the work in business services contracted out, material inputs relative to internal labor costs and external contract work.

The aim of this paper is to analyze the relationship between organizational innovation and productivity. In doing this, I focus on the role of one of the most relevant organizational methods: outsourcing. Specifically, this paper deals with outsourcing at the firm level and focuses on the role of contracting out of manufacturing activities (production subcontracting). I adopt an econometric approach, i.e., I focus on the econometric estimation of production functions. In this sense, firstly, I introduce a simple framework that specifies a production function considering the possibility of production subcontracting. The framework developed leads to the estimation of a production function depending on traditional inputs (labor, capital and materials) and an index of production subcontracting. Specifically, both the effect of first-time outsourcing on productivity and the effect of the intensity of production subcontracting can be analyzed.

Estimation is carried out using an unbalanced panel survey of Spanish manufacturing firms. The main equation is estimated using a sample of 1,728 firms, observed during the period 1990-1999. This sample is representative of the manufacturing population of firms.

The contribution of this paper to the empirical literature on outsourcing and productivity is three-fold. First, I analyze both the effect of the decision to outsource and the effect of outsourcing intensity. In doing this, I develop a simple theoretical framework justifying the addition of outsourcing measures to the estimation of a “traditional” production function. Second, my analysis is performed at the firm level and uses panel data. Panel data allows us to account for unobserved heterogeneity and analyze temporal effects. Third, I use a “direct” measure for outsourcing of manufacturing activities. In this sense, I have information on firms’ purchases of elaborated products and customized components from external suppliers. Outsourcing

---

3 For example, see Feenstra and Hanson (1999), Amiti and Wei (2005, 2006), and Canals (2006a, 2006b).
of intermediate inputs takes on greater importance when the products being exchanged are not raw materials, but have some degree of elaboration. In this case, it is plausible that outsourcing of manufacturing activities implies the externalization of stages of the production process (potentially increasing flexibility and efficiency). But this practice will also involve the costs of finding a suitable supplier and imperfect contracting.

The rest of the paper is organized as follows. Section 2 deals with the related literature. Section 3 introduces the theoretical framework. Section 4 details the econometric equation to be estimated. Section 5 introduces the data set and the variables, and describes the main facts about production subcontracting for Spanish manufacturing firms during the 1990s. Section 6 presents the empirical results and Section 7 concludes. Appendix A gives details on the variables employed. Appendix B reports the details on the industry breakdown used to define industry dummies.

2. Related literature

This section focuses on two strands of empirical literature: (i) Literature studying the effect of (the broad concept of) organizational innovation on productivity, and (ii) Literature focused on productivity effects of outsourcing.

Organizational innovation and productivity growth

There are an increasing number of studies that suggest a significant and positive effect of various measures of organizational innovation on productivity. A strand of literature focuses on the effect of the adoption of alternative human resource management practices, such as flexible job definitions, training, work teams, and incentive pay. Most of these studies find that the adoption of a coherent system of human resource management practices results in substantially higher levels of productivity than more traditional human resource management practices. Moreover, the existence of synergies among workplace practices is also found.

Black and Lynch (2001, 2004) also examine the impact of workplace practices on the productivity of firms. These authors define organizational innovation as including human resource management practices such as organizing workers in teams, job

---

4 See Ichniowski and Shaw (2003) for a recent review of this literature.
rotation, training for non-managerial workers, and re-engineering. They find for the manufacturing sector that implementing these organizational innovations in a unionized setting resulted in higher productivity than doing the same thing in a non-unionized setting. They also find that what is more important for productivity is the diffusion of a practice inside an organization rather than the simple adoption of the practice.

Most interesting, Black and Lynch (2004) use the estimates of the impact of organizational innovation on productivity in a growth accounting framework to see how much of the growth in output from 1993-1996 in US manufacturing might be accounted for by organizational practices. It appears that workplace practices and re-engineering efforts accounted for as much as 30 percent of output growth over this period of time.

Using firm level data from the U.S., Bresnahan et al. (2002) find that investments in certain specific types of work organization\(^5\) are associated with high measured productivity. Moreover, these authors find that information technology, complementary workplace reorganization and human capital are positively correlated.

Gera and Gu (2004), using micro data from Canada, find that three organizational changes (the restructuring of production processes, human resource management practices and product/service quality-related practices) are positively related to productivity performance.

Finally, a large body of literature focuses on the "indirect" effect of organizational changes on firm performance through investment in information technology. In this sense, Brynjolfsson and Hitt (2000) review the evidence on how organizational innovations (such as new business processes, new skills or new organizational structures) are major drivers of the contribution of information technology to productivity.

**Outsourcing and productivity growth**

Although it has not received much attention, outsourcing and its productivity effect is a growing research topic. Heshmati (2003) and Olsen (2006) present detailed surveys of recent contributions to the relationship between outsourcing and productivity growth in manufacturing and services.

\(^5\) Variables measuring organization are related to team-based work organization (for example, use of self-managing teams, use of team-building activities) and individual decision authority (who decides the pace of work and who decides the method of work).
Therefore, at this point, and given the existence of these surveys, I just stress the main issues and findings in this literature. First, the empirical literature has traditionally focused on productivity effects at the industry and country levels (see, among others, Baumol (1967), Siegel and Griliches (1992), Feenstra and Hanson (1996), Fixler and Siegel (1999), Ten Raa and Wolff (2001), Amiti and Wei (2006)). Evidence on the relationship between outsourcing and productivity growth is not conclusive. For example, Siegel and Griliches (1992), in assessing whether outsourcing leads to an overstatement of manufacturing productivity growth, find a weak correlation in the use of selected purchased services during the 1980s. Meanwhile, Ten Raa and Wolff (2001) find a positive association between the rate of outsourcing and productivity growth in the goods sector. And Amiti and Wei (2006) find that both service outsourcing and material outsourcing have a positive and significant effect on productivity in the U.S. and that the effect of service outsourcing is greater in magnitude.

Second, some of the earliest papers estimating the relationship between outsourcing and productivity use firm-level data. Using a panel data of German manufacturing firms, Görzig and Stephan (2002) estimate the effect of three measures of outsourcing on firm performance (measured by both the returns per employee and the returns on sales). The three measures of outsourcing are: (i) material inputs relative to internal labor costs, (ii) external contract work relative to internal labor costs, and (iii) other costs not related to production relative to internal labor costs. These authors find a positive and significant effect of all three measures of outsourcing on returns per employee, and a negative effect on returns on sales.

Another example of firm-level evidence is Girma and Görg (2004). These authors use manufacturing establishment level data for the U.K. and define outsourcing as the cost of industrial services\(^6\) received by an establishment. They find that an establishment's outsourcing intensity is positively related to its labor productivity and total factor productivity growth.

Thirdly, existing empirical literature on outsourcing deals in good part with other topics. Many papers focus on labor market issues (see, among others, Feenstra and Hanson (1995, 1996, 1999), Estevao and Lach (1999), Anderton and Brenton (1999), Falk and Koebel (2000)), while another strand of literature analyzes the determinants of

---

\(^6\) These industrial services includes activities such as processing of inputs which are then sent back to the establishment for final assembly or sales, maintenance of production machinery, and engineering or drafting services.
outsourcing. For example, Abraham and Taylor (1996) report empirical findings of employers’ motives for contracting out business services in U.S. industry. These authors find empirical evidence supporting the influence of wage savings, economies of scale and smoothening production cycles on the decision to outsource.

3. Theoretical framework

This section is aimed at introducing a simple framework to be used when specifying a production function considering the possibility of production subcontracting. As I said before, I start from the econometric estimation of a production function, and I need some theoretical background to justify the changes in the “traditional” production function due to the introduction of variables measuring outsourcing.

For simplicity, I assume a Cobb-Douglas production function with constant returns to scale:

\[ Y = AK^\delta L^\alpha I^{1-\alpha-\delta} \] (1)

\( A \) is an index of Hicks-neutral technical progress. \( K \) represents the capital stock and \( L \) the labour input. Given technology, it is necessary to use an input \( I \). This input can be produced within the firm (\( I_f \)) or can be purchased (\( I_s \)).

Input \( I \) can also be obtained combining in-house production and outside sources. To control for substitution between \( I_f \) and \( I_s \), I express the procurement of \( I \) as follows:

\[ I = I^2_f I_{I}^{1-\lambda} \] (2)

Parameter \( \lambda \) determines the substitutability between in-house production and production subcontracting of the intermediate input \( I \).

Finally, production within the firm of input \( I \) can be written as:

\[ I_f = L^\gamma M^{1-\gamma} \] (3)
where $L$ represents labour input and $M$ row materials plus external services (intermediate consumptions excluding subcontracted purchases). For simplicity, the capital input ($K$) is not included in the internal production of $I$.

Given equation (2) I can write that:

$$I = I_f \left( \frac{sr}{1-sr} \right)^\lambda$$  \hspace{1cm} (4)

where $sr = \frac{I_s}{I_f + I_s}$. The variable $sr$ represents the proportion of intermediate input $I$ that is subcontracted. Therefore, ratio $\frac{sr}{1-sr}$ is an index of production subcontracting. The higher $sr$ is, the higher $\frac{sr}{1-sr}$ is, and hence the higher the intensity of production subcontracting is. This index is one measure of the “relative” importance of production subcontracting (“relative” in the sense that it is not a direct measure of subcontracted purchases. It is a measure of the importance of subcontracted purchases with respect to total intermediate consumptions).

Given (2) and (4) I can write

$$I = \begin{cases} I_f, & \text{if there is no outsourcing} \\ I_f \left( \frac{sr}{1-sr} \right)^\lambda, & \text{if there is outsourcing} \end{cases}$$  \hspace{1cm} (5)

Substituting (3) and (5) in (1), I can write:

$$Y = \begin{cases} AK^\delta L^\phi M^\beta, & \text{if there is no outsourcing} \\ AK^\delta L^\phi M^\beta \left( \frac{sr}{1-sr} \right)^\phi, & \text{if there is outsourcing} \end{cases}$$  \hspace{1cm} (6)

where $\phi_1 = \alpha + \gamma(1-\alpha - \delta)$, $\phi_2 = (1-\gamma)(1-\alpha - \delta)$ and $\phi_3 = \lambda(1-\alpha - \delta)$. Show that $\delta + \phi_1 + \phi_2 + \phi_3 = 1 + \phi_3$. And hence $\delta + \phi_1 + \phi_2 = 1$. This constraint implies constant returns to scale in the conventional inputs ($K, L, M$).
Note that the term \( \left( \frac{sr}{1-sr} \right)^{\phi} \) is the only difference between the specification of a production function with and without production subcontracting.

4. Econometric model

Taking logarithms in expression (6), I can write:

\[
\log Y = \begin{cases} 
\log A + \delta \log K + \phi_1 \log L + \phi_2 \log M, & \text{if there is no outsourcing} \\
\log A + \delta \log K + \phi_1 \log L + \phi_2 \log M + \phi_3 \log \left( \frac{sr}{1-sr} \right), & \text{if there is outsourcing}
\end{cases}
\]

To estimate a production function for firms with and without production subcontracting simultaneously, I write the production function adding a dummy variable indicating non-outsourcing. Now, I can write:

\[
\log Y = \log A + \delta \log K + \phi_1 \log L + \phi_2 \log M + \phi_3 \log SUB + \beta_{\text{subdum}}
\]  \hspace{1cm} (8)

where:

\[
\log SUB = \begin{cases} 
0, & \text{if there is no outsourcing} \\
\log \left( \frac{sr}{1-sr} \right), & \text{if there is outsourcing}
\end{cases}
\]  \hspace{1cm} (9)

\[
\text{subdum} = \begin{cases} 
1, & \text{if there is no outsourcing} \\
0, & \text{if there is outsourcing}
\end{cases}
\]  \hspace{1cm} (10)

I carry out all estimates in differences. Therefore, variables are in log differences. The specification in log differences or rates of growth implies that any level time-invariant individual or heterogeneous effects are differenced out. Taking differences in expression (8), two caveats should be noted:

1. \( \log SUB \) is not a continuous variable. And hence, the rate of growth (i.e., log differences) corresponding to a change in the outsourcing decision is not defined.

2. Differences of variable \( \text{subdum} (ddums) \) takes the values:
\[ ddums = \begin{cases} 
1, & \text{if the firm stops outsourcing (with respect to the previous period)} \\
0, & \text{period without change in the outsourcing decision} \\
-1, & \text{if the firm starts outsourcing (with respect to the previous period)} 
\end{cases} \] (11)

Solving these problems, firstly, a rate of growth for \( \frac{sr}{1 - sr} \) equal to zero is assigned to those observations corresponding to periods with changes in the outsourcing decision.

\[ sub = \begin{cases} 
\log\left(\frac{sr}{1 - sr}\right) - \log\left(\frac{sr}{1 - sr}\right)_{t-1}, & \text{if there is outsourcing at } t \text{ and at } t - 1 \\
0, & \text{otherwise} 
\end{cases} \] (12)

Secondly, to identify changes in the outsourcing decision, two dummy variables \((\text{substop}, \text{substart})\) are considered:

\[ \text{substop} = \begin{cases} 
1, & \text{if } ddums = 1 \\
0, & \text{otherwise} 
\end{cases} \] (13)

\[ \text{substart} = \begin{cases} 
1, & \text{if } ddums = -1 \\
0, & \text{otherwise} 
\end{cases} \] (14)

Using lowercase letters to represent log differences, the relevant equation to be estimated may be expressed as follows:

\[ y = a + \delta k + \phi_1 l + \phi_2 m + \phi_3 sub + \beta_1 substop + \beta_2 substart + \varphi cu + D \rho + \tilde{v} \] (15)

where \( y, k, l \) and \( m \) are, respectively, the rates of growth or log differences of output, capital, labor and intermediate consumptions (excluding subcontracted purchases). The variable \( sub \) is the rate of growth of the index of production subcontracting (see expression (12)).

Equations in levels are assumed to present an error term \( (u) \) that can be decomposed as \( u_t = \mu_t + v_t \), where \( \mu_t \) is the time-invariant term that accounts for the heterogeneity across firms. As I said before, the specification in first differences implies that the term \( \mu_t \) is eliminated from the residual. The term \( \varphi \) is assumed to be an uncorrelated zero mean error term, and \( \tilde{v} = v_t - v_{t-1} \).
The estimation of a production function makes it important to control for input utilization, and hence the inclusion of the capacity utilization variable\(^7\) (\(cu\)). \(D\) represents the set of dummy variables included (industry dummies, year dummies, dummies for entering and exiting firms, and dummies for mergers and scissions). Theoretical constraint \(\delta + \phi_1 + \phi_2 = 1\) can either be tested or imposed on the estimation in order to gain efficiency.

To summarize, expression (15) is the relevant equation to be estimated. In addition to traditional “inputs”, an index of outsourcing intensity and a couple of dummy variables representing changes in the outsourcing decision are taken into account. Since this paper is aimed at analyzing the relationship between outsourcing and productivity, I am interested in estimating parameters \(\delta, \phi_1, \phi_2, \phi_3, \beta_1\) and \(\beta_2\).\(^8\)

5. Data, variables and description

I present estimates based on an unbalanced sample of 1,728 Spanish manufacturing firms during the period 1990-1999. The data used correspond to the official survey “Encuesta sobre estrategias empresariales”, ESEE, (Survey on Firm Strategies). ESEE is an unbalanced panel survey of Spanish manufacturing firms with 10 or more workers, starting in 1990 and sponsored by the Ministry of Industry. At the beginning of the survey, all firms with more than 200 workers were requested to participate, while a representative sample of 5% of the firms with fewer than 200 workers was randomly selected. The final sample employed depends on the data available and the number of consecutive time observations required. Table A1 shows the composition in terms of time observations of the unbalanced panel sample used. The sample employed to estimate equation (15) consists of all the firms that have been surveyed for at least three consecutive years after dropping all the time observations for which the data needed are not available.

ESEE provides detailed information on firms’ output, capital, labor (measured through total hours of work) and intermediate consumptions. Moreover, the data provide information about the outsourcing of manufacturing activities (production subcontracting). Specifically, I have information indicating whether the firm

\(^7\) This variable is defined as the yearly average rate of capacity utilization reported by the firm.

\(^8\) The estimation of other parameters of the model (i.e., \(\lambda\) and \(\gamma\)) exceeds the purpose of this paper. In a companion paper, López (2007), I deal with this issue.
subcontracts production and information about subcontracted purchases (firms’ purchases of elaborated products and customized components to external suppliers.). This information allows me to define the ratio between subcontracted purchases and (total) intermediate consumptions (which will be used as a proxy for the theoretical variable $sr$). Hence, the theoretical index of production subcontracting, $\frac{sr}{1-sr}$, can be constructed.

A unique feature of this data set is the availability of information on the changes in the prices set by the firm, and on the changes in the prices that the firm pays for its non-labor inputs. Detailed definitions of all employed variables can be found in Appendix A. Moreover, Table A2 gives some descriptive statistics of the key variables.

In what follows, I present the main facts regarding production subcontracting for Spanish manufacturing firms during the 1990s. I analyze it along two dimensions: the percentage of firms that contract out manufacturing activities (Tables 1 and 2), and outsourcing intensity among performers (Tables 3 and 4).

Table 1 shows the percentage of firms contracting out manufacturing activities during the period 1990-99. Big firms are more likely to subcontract, and this gap does not decrease during the period. Moreover, it seems that there is a positive relationship between the decision of production subcontracting and the Spanish industrial cycle during the 1990s. The period analyzed coincides with a complete industrial cycle. In 1991, manufacturing experienced an important downturn. Recovery started in 1994 with only a minor halt in 1996 and in 1999. The percentage of firms contracting out manufacturing activities reflects a similar evolution (see Figure 1).

Regarding differences between industries, Table 2 shows that firms from Ind. and agric. machinery (industry 4), Office mach. and elec. goods (industry 5), Transport equipment (industry 6), and Other manufacturing products (industry 11) are highly active in outsourcing.

Four industries are in an intermediate position: Metals and metal products (industry 1), Chemical products (industry 3), Textile, leather and shoes (industry 8), and Paper and printing products (industry 10).

---

9 See López (2002) for a more detailed description of production subcontracting and externalization of services by Spanish manufacturing firms during the 1990s.

10 I consider 11 industries. Industry breakdown is defined in Appendix B.
Three industries -Non-metallic minerals (industry 2), Food, drink and tobacco (industry 7), and Timber and furniture (industry 9)- exhibit lower percentages.

To analyze the outsourcing intensity, I use the ratio between subcontracted purchases (a firm’s purchases of elaborated products and customized components) and (total) intermediate consumptions (variable $sr$). I restrict my attention to those firms active in outsourcing. This ratio is 18.0% for firms with than 200 workers and 14.0% for firms with more than 200 workers (see Table 3). I find out that small firms are more intensive in production subcontracting than big ones. This result may be shown in the bidirectional relation between outsourcing and the firm's structure, specifically between outsourcing and firm size (measured by the number of workers). The higher the intensity in subcontracting is, the higher the substitution of intermediate consumptions for labor is.

Figure 2 shows the evolution of the ratio between subcontracted purchases and intermediate consumptions over time. In this case, there is not a straight relationship between the intensity of production subcontracting and the industrial cycle. Moreover, there appears to be differences between small-medium firms and big firms\(^{11}\).

Table 4 shows intensity in production subcontracting by industry. There are differences between the share of firms active in outsourcing and outsourcing intensity. In this sense, the industries with the highest outsourcing intensity are: Ind. and agric. machinery (industry 4), Transport equipment (industry 6), Textile, leather and shoes (industry 8), Timber and furniture (industry 9) and Paper and printing products (industry 10). Industry 9, however, exhibits a low percentage of firms active in outsourcing.

Three industries are in an intermediate position: Metals and metal products (industry 1), Office mach. and elec. goods (industry 5) and Other manufacturing products (industry 11), and three industries -Non-metallic minerals (industry 2), Chemical products (industry 3), and Food, drink and tobacco (industry 7)- exhibit lower outsourcing intensities.

\(^{11}\) See Delgado et al. (1999), and López (2002) for evidence on the relationship between outsourcing and the Spanish industrial cycle during the 1990s.
6. Empirical results

Equation (15) is a linear equation with predetermined and endogenous variables. GMM techniques\textsuperscript{12} are applied for their estimation\textsuperscript{13}. The instruments used in each estimate are detailed in the notes to the tables. Sargan tests of the overidentifying restrictions are reported for each estimate.

Equations in levels are supposed to present an uncorrelated zero mean disturbance, and hence, disturbances of the differenced equation are expected to show a significant negative first-order autocorrelation (i.e. $\tilde{\nu}_t - \tilde{\nu}_{t-1}$), but an absence of correlation of higher orders\textsuperscript{14}. In this sense, each estimate includes $m_1$ and $m_2$ Arellano and Bond (1991) test statistics for first and second-order serial correlation\textsuperscript{15}.

Estimation of the production function is carried out taking capital as predetermined, and labor, non-subcontracted intermediate consumptions and subcontracted purchases as endogenous variables.

Equations include eighteen industry dummies and yearly time dummies. These industry and time dummies are included with their coefficients constrained to add up to zero (Suits method). I include a dummy indicating whether the firm was created during the period, and one dummy indicating whether the firm is going to exit during the period. Moreover, to control for discrete changes, dummies indicating merger/acquisition or scission are included.

Manufacturing level results

Table 5 presents the results for the estimation of equation (15) for manufacturing as a whole. Estimate a presents OLS results, while estimates b, c and d take into account the endogeneity of input choices and present GMM results. The preferred outcome is estimate d. Estimates b and c are used to check their robustness.

On the one hand, constant returns to scale in the conventional inputs -capital, labor and intermediate consumptions (excluding subcontracted purchases)- are accepted (see the Wald test for this restriction in estimate b). Estimates c and d impose this constraint.

\textsuperscript{12} See Arellano and Honoré (2002) for a recent review of this method.
\textsuperscript{13} Results are obtained using DPD98 (see Arellano and Bond, 1998).
\textsuperscript{14} See Arellano and Bond (1991, 1998) for further details.
\textsuperscript{15} $m_1$ and $m_2$ test statistics are asymptotically distributed as a $N(0,1)$ under the null hypothesis of no autocorrelation.
On the other hand, inclusion of capacity utilization does not change the coefficients of the other variables, but it is an important variable for explaining production shifts and it improves the result concerning second-order serial correlation (compare estimates c and d). The Sargan test allows me to accept the set of instruments employed.

Estimated elasticities for traditional inputs show plausible values. Low and insignificant capital coefficient in estimate b is consistent with traditional findings using GMM techniques.\textsuperscript{16}

As expected, the index of production subcontracting, $\frac{s_r}{1-s_r}$, appears to be significantly associated with productivity. All estimates show that intensity of outsourcing has a positive and significant effect on total factor productivity. In other words, keeping the “traditional” factors of production constant, increasing the share of production subcontracting (measured as firms’ purchases of elaborated products and customized components over total intermediate consumptions) leads to higher output.

It is not only the intensity that has a positive effect on production, but also the subcontracting decision. The coefficient of the substart variable is positive and significant, saying that the decision to start production subcontracting has a positive effect on production. The substop variable goes the other way around. Moreover, these results are robust to the use of a different set of instruments (see Table A3).

Therefore, I find evidence supporting the importance of production subcontracting as a production shifter. This practice (viewed as an organizational innovation) increases flexibility and efficiency, having its final effect on firm-level productivity.

**Results by industry**

Production behavior and technology are very likely to vary across industries. Table 6 presents the results of estimating equation (15) using GMM techniques and under the assumption of constant returns to scale for each industry. The industry breakdown considered is defined in Appendix B. I exclude industry 11 because of a lack of observations (only 35 firms belong to this industry. See Table A1 for further details).

Before discussing the main industry level results, Table 7 reports specification tests to check the validity of the estimates by industry. First, constant returns to scale in the

\textsuperscript{16} See Blundell and Bond (2000), and Griliches and Mairesse (1998) for a discussion about this problem. See Garcia, Jaumandreu and Rodriguez (2002) for a similar result on capital coefficient using ESEE.
conventional inputs are accepted by a wide margin for industries 2, 4, 5, 6, 8 and 9. Constant returns to scale are accepted for industries 1, 3 and 7 with a little ground for concern.

Second, I test for overidentifying restrictions or validity of the moment conditions. The Sargan test very clearly indicates the validity of the moment conditions.

Industry level results indicate (see Table 6) that industry differences in the estimated factor elasticities are quite sizeable. Estimated elasticities of output with respect to labor go from 0.17 (industry 7. Food, drink and tobacco) to 0.66 (industry 8. Textile, leather and shoes), while materials elasticity estimates are spread over a narrower range, and go from 0.26 (industry 5. Office mach. and elec. goods) to 0.52 (industry 7. Food, drink and tobacco).

Regarding outsourcing variables, firstly, outsourcing intensity appears to be significantly associated with productivity for five industries (industry 1. Metals and metal products; industry 5. Office mach. and elec. goods; industry 7. Food, drink and tobacco; industry 9. Timber and furniture; and industry 10. Paper and printing products). Significant estimated coefficients of the sub variable are quite similar, and go from 0.08 to 0.14. Moreover, outsourcing intensity has a positive effect on productivity, mainly for firms belonging to light industries (industries 5, 7, 9 and 10).

This finding is not surprising since light industries are labor-intensive. For these industries, outsourcing intensity (substitution of intermediate consumptions for labor) has a greater effect on productivity growth (increasing flexibility and efficiency).

Secondly, dummy variables related to outsourcing decisions (substop and substart) are, in most of the cases, significant and have the expected effect on productivity. These variables have the greatest effect in Industry 6. Transport equipment. In this case, the negative effect of the decision to stop outsourcing is particularly important.

7. Conclusions

Innovation is a primary source of productivity growth, but a concept of innovation broader than technological product and process innovation is needed. As it is pointed out in the Oslo Manual (OECD, 2005), the concept of innovation should include marketing and organizational innovations. Organizational innovations on their own can have an important effect on productivity. In this sense, organizational innovations can increase the quality and efficiency of work, improve information sharing and the ability
of the firm to use new technologies, as such increasing the productivity of investment in knowledge.

The aim of this paper is to analyze the relationship between organizational innovation and productivity growth. I focus on the role of one of the most relevant organizational methods, outsourcing. Specifically, this paper deals with outsourcing at the firm level and focuses on the role of contracting out manufacturing activities (production subcontracting).

In the existing empirical literature, outsourcing has been measured in many different ways. Most of the measures used are rough and there are few studies using data at the firm level. A feature of the firm-level data set that I use is the availability of a straight measure of production subcontracting. In this sense, I have information on firms’ purchases of elaborated products and customized components from external suppliers.

In analyzing the effect of outsourcing on a firm's productivity, I first introduce a simple framework that specifies a production function considering the possibility of production subcontracting. The framework developed leads to the estimation of a production function depending on traditional inputs (labor, capital and materials) and an index of production subcontracting. Specifically, both the effect of first-time outsourcing on productivity and the effect of the intensity of production subcontracting can be analyzed.

Results for manufacturing as a whole show a positive effect of both the outsourcing decision and outsourcing intensity on productivity. When analyzing industry-level results, I find that outsourcing intensity has a positive effect on productivity, mainly for firms belonging to light industries (labor-intensive industries), while the decision to start (stop) outsourcing has, in most of the cases, the expected positive (negative) effect on productivity.
Appendix A: Definitions of Variables

*Capacity utilization:* Yearly average rate of capacity utilization reported by the firm.

*Capital stock:* Capital at current replacement values is computed recursively from an initial estimate and the data on firms’ investments in equipment goods (but not buildings or financial assets), actualized by means of a price index of capital goods, and using sectorial estimates of the rates of depreciation. Real capital is then obtained by deflating the current replacement values. Details on this variable can be found in Martin-Marcos and Suárez (1997).

*Entrant firm:* Dummy variable that takes the value 1 when the firm has been created during the period.

*Exiting firms:* Dummy variable that takes the value 1 when the firm is going to exit during the period (stop activity or stop manufacturing).

*Hours of work:* Total normal hours of work plus overtime minus lost hours, computed by multiplying hours per worker by the number of workers.

*Hours per worker:* Normal hours of work plus overtime minus lost hours per worker.

*Industry dummies:* Eighteen industry dummies (ESEE Industries. See Appendix B).

*Intermediate consumption:* Sum of purchases of materials and external services minus the variation of intermediate inventories. Nominal intermediate consumption is deflated by the firm’s specific price index of intermediate consumption.

*Merger and acquisition:* Dummy variable that takes the value 1 in the years subsequent to a merger or acquisition.

*Output:* Goods and services production. Sales plus the variation of inventories deflated by the firm's output price index.

*Production subcontracting:* Dummy variable that takes the value 1 if the firm subcontracts production.

*Price:* Paasche-type price index computed by starting from the percentage price changes that the firm reports to have made in the markets in which it operates.

*Price of intermediate consumption:* Paasche-type price index computed by starting from the percentage variations in the prices of purchased materials, energy and services reported by the firms.

*Scission:* Dummy variable that takes the value 1 in the years subsequent to a scission.

*Size:* Two size dummies (fewer than or equal to 200 workers; and more than 200 workers).
Subcontracted purchases: Purchases of elaborated products or customized components. Nominal subcontracted purchases are deflated by the firm's specific price index of intermediate consumption.

Workers: Approximation of the average number of workers during the year.
## Appendix B: Industry definitions

<table>
<thead>
<tr>
<th>NACE Code (3-digit)</th>
<th>ESEE Industries</th>
<th>Industry breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>221 to 224</td>
<td>Ferrous and non-ferrous metals</td>
<td>1. Metals and metal products</td>
</tr>
<tr>
<td>311 to 319</td>
<td>Metal products</td>
<td></td>
</tr>
<tr>
<td>240 to 249</td>
<td>Non-metallic mineral products</td>
<td>2. Non-metallic minerals</td>
</tr>
<tr>
<td>251 to 255, 481, 482</td>
<td>Chemical products</td>
<td>3. Chemical products</td>
</tr>
<tr>
<td>321 to 329</td>
<td>Industrial and agricultural machinery</td>
<td>4. Ind. and agric. machinery</td>
</tr>
<tr>
<td>330, 391 to 399</td>
<td>Office and data processing machinery</td>
<td>5. Office mach. and elec. goods</td>
</tr>
<tr>
<td>341 to 347, 351 to 355</td>
<td>Electrical goods</td>
<td></td>
</tr>
<tr>
<td>361 to 363, 371, 372, 381 to 389</td>
<td>Motor vehicles, Other transport equipment</td>
<td>6. Transport equipment</td>
</tr>
<tr>
<td>413, 411, 412, 414 to 423, 429, 424 to 428</td>
<td>Meats, meat preparation, Food products and tobacco, Beverages</td>
<td>7. Food, drink and tobacco</td>
</tr>
<tr>
<td>431 to 439, 453 to 456, 441, 442, 451, 452</td>
<td>Textiles and clothing, Leather and leather products</td>
<td>8. Textile, leather and shoes</td>
</tr>
<tr>
<td>461 to 468</td>
<td>Timber, wood products</td>
<td>9. Timber and furniture</td>
</tr>
<tr>
<td>471 to 475</td>
<td>Paper and printing products</td>
<td>10. Paper and printing products</td>
</tr>
<tr>
<td>491 to 495</td>
<td>Other manufacturing products</td>
<td>11. Other manufacturing products</td>
</tr>
</tbody>
</table>
References


Table 1. Percentage of firms contracting out of manufacturing activities
Total manufacturing (by year)

<table>
<thead>
<tr>
<th>Year</th>
<th>All firms</th>
<th>Up to 200 workers</th>
<th>More than 200 workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>39.9</td>
<td>31.7</td>
<td>53.1</td>
</tr>
<tr>
<td>1991</td>
<td>50.6</td>
<td>42.9</td>
<td>65.3</td>
</tr>
<tr>
<td>1992</td>
<td>46.2</td>
<td>41.8</td>
<td>55.9</td>
</tr>
<tr>
<td>1993</td>
<td>44.0</td>
<td>39.2</td>
<td>55.9</td>
</tr>
<tr>
<td>1994</td>
<td>41.9</td>
<td>36.6</td>
<td>54.6</td>
</tr>
<tr>
<td>1995</td>
<td>42.6</td>
<td>37.3</td>
<td>54.8</td>
</tr>
<tr>
<td>1996</td>
<td>42.6</td>
<td>37.2</td>
<td>55.0</td>
</tr>
<tr>
<td>1997</td>
<td>45.6</td>
<td>41.1</td>
<td>55.8</td>
</tr>
<tr>
<td>1998</td>
<td>47.5</td>
<td>42.7</td>
<td>58.3</td>
</tr>
<tr>
<td>1999</td>
<td>43.7</td>
<td>36.9</td>
<td>58.8</td>
</tr>
<tr>
<td>Total¹</td>
<td>44.7</td>
<td>39.9</td>
<td>55.6</td>
</tr>
</tbody>
</table>

¹Average of period 1990-99

Table 2. Percentage of firms contracting out of manufacturing activities¹
Total manufacturing (by industry)

<table>
<thead>
<tr>
<th>Industry</th>
<th>All firms</th>
<th>Up to 200 workers</th>
<th>More than 200 workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Metals and metal products</td>
<td>47.0</td>
<td>46.3</td>
<td>48.5</td>
</tr>
<tr>
<td>2. Non-metallic minerals</td>
<td>26.5</td>
<td>24.1</td>
<td>36.5</td>
</tr>
<tr>
<td>3. Chemical products</td>
<td>43.6</td>
<td>35.3</td>
<td>59.3</td>
</tr>
<tr>
<td>4. Ind. and agric. machinery</td>
<td>65.4</td>
<td>65.2</td>
<td>64.1</td>
</tr>
<tr>
<td>5. Office mach. and elec. goods</td>
<td>61.5</td>
<td>55.2</td>
<td>66.1</td>
</tr>
<tr>
<td>6. Transport equipment</td>
<td>59.9</td>
<td>50.4</td>
<td>63.1</td>
</tr>
<tr>
<td>7. Food, drink and tobacco</td>
<td>21.5</td>
<td>13.4</td>
<td>39.8</td>
</tr>
<tr>
<td>8. Textile, leather and shoes</td>
<td>50.4</td>
<td>47.4</td>
<td>62.6</td>
</tr>
<tr>
<td>9. Timber and furniture</td>
<td>33.0</td>
<td>33.0</td>
<td>45.0</td>
</tr>
<tr>
<td>10. Paper and printing products</td>
<td>53.9</td>
<td>51.7</td>
<td>61.0</td>
</tr>
<tr>
<td>11. Other manufacturing products</td>
<td>63.6</td>
<td>62.7</td>
<td>77.4</td>
</tr>
<tr>
<td>Total manufacturing</td>
<td>44.7</td>
<td>39.9</td>
<td>55.6</td>
</tr>
</tbody>
</table>

¹Average of period 1990-99
Table 3. Subcontracted purchases¹ over Intermediate consumptions (variable \( sr \), %)
Firms contracting out of manufacturing activities (by year)

<table>
<thead>
<tr>
<th>Year</th>
<th>All firms</th>
<th>Up to 200 workers</th>
<th>More than 200 workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>16.9</td>
<td>17.4</td>
<td>16.4</td>
</tr>
<tr>
<td>1991</td>
<td>14.4</td>
<td>18.0</td>
<td>9.7</td>
</tr>
<tr>
<td>1992</td>
<td>16.6</td>
<td>19.0</td>
<td>12.6</td>
</tr>
<tr>
<td>1993</td>
<td>16.3</td>
<td>17.8</td>
<td>13.7</td>
</tr>
<tr>
<td>1994</td>
<td>15.3</td>
<td>17.3</td>
<td>12.0</td>
</tr>
<tr>
<td>1995</td>
<td>15.6</td>
<td>16.7</td>
<td>13.7</td>
</tr>
<tr>
<td>1996</td>
<td>17.5</td>
<td>19.8</td>
<td>14.0</td>
</tr>
<tr>
<td>1997</td>
<td>16.8</td>
<td>18.5</td>
<td>13.9</td>
</tr>
<tr>
<td>1998</td>
<td>16.7</td>
<td>18.0</td>
<td>14.6</td>
</tr>
<tr>
<td>1999</td>
<td>18.2</td>
<td>20.3</td>
<td>15.3</td>
</tr>
<tr>
<td>Total²</td>
<td>16.5</td>
<td>18.0</td>
<td>14.0</td>
</tr>
</tbody>
</table>

¹Firm’s purchases of elaborated products and customized components
²Average of period 1990-99

Table 4. Subcontracted purchases¹ over Intermediate consumptions² (variable \( sr \), %)
Firms contracting out of manufacturing activities (by industry)

<table>
<thead>
<tr>
<th>Industry</th>
<th>All firms</th>
<th>Up to 200 workers</th>
<th>More than 200 workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Metals and metal products</td>
<td>15.3</td>
<td>16.7</td>
<td>13.0</td>
</tr>
<tr>
<td>2. Non-metallic minerals</td>
<td>11.6</td>
<td>12.7</td>
<td>10.1</td>
</tr>
<tr>
<td>3. Chemical products</td>
<td>9.8</td>
<td>10.4</td>
<td>9.7</td>
</tr>
<tr>
<td>4. Ind. and agric. machinery</td>
<td>22.3</td>
<td>23.7</td>
<td>18.4</td>
</tr>
<tr>
<td>5. Office mach. and elec. goods</td>
<td>17.1</td>
<td>18.1</td>
<td>15.7</td>
</tr>
<tr>
<td>6. Transport equipment</td>
<td>19.8</td>
<td>21.4</td>
<td>18.8</td>
</tr>
<tr>
<td>7. Food, drink and tobacco</td>
<td>10.5</td>
<td>12.4</td>
<td>9.9</td>
</tr>
<tr>
<td>8. Textile, leather and shoes</td>
<td>18.7</td>
<td>19.5</td>
<td>15.5</td>
</tr>
<tr>
<td>9. Timber and furniture</td>
<td>19.8</td>
<td>20.0</td>
<td>15.9</td>
</tr>
<tr>
<td>10. Paper and printing products</td>
<td>21.5</td>
<td>24.2</td>
<td>13.2</td>
</tr>
<tr>
<td>11. Other manufacturing products</td>
<td>14.0</td>
<td>12.5</td>
<td>18.7</td>
</tr>
<tr>
<td>Total manufacturing</td>
<td>16.5</td>
<td>18.0</td>
<td>14.0</td>
</tr>
</tbody>
</table>

¹Firm’s purchases of elaborated products and customized components
²Average of period 1990-99
### Table 5. Production function estimates

Sample period: 1992-1999  
Nº of firms: 1728  
Dependent variable: y

<table>
<thead>
<tr>
<th>Independent variables²</th>
<th>a (OLS)</th>
<th>b (GMM¹)</th>
<th>c (GMM¹)</th>
<th>d (GMM¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.03(9.7)</td>
<td>0.02(2.0)</td>
<td>0.02(2.4)</td>
<td>0.02(2.2)</td>
</tr>
<tr>
<td>k</td>
<td>0.05(4.9)</td>
<td>0.13(1.38)</td>
<td>0.13</td>
<td>0.15</td>
</tr>
<tr>
<td>l</td>
<td>0.29(10.9)</td>
<td>0.36(3.8)</td>
<td>0.37(4.0)</td>
<td>0.36(3.8)</td>
</tr>
<tr>
<td>m</td>
<td>0.40(16.4)</td>
<td>0.49(7.2)</td>
<td>0.50(8.0)</td>
<td>0.49(8.0)</td>
</tr>
<tr>
<td>sub</td>
<td>0.07(10.7)</td>
<td>0.14(4.5)</td>
<td>0.14(4.7)</td>
<td>0.14(4.6)</td>
</tr>
<tr>
<td>substop</td>
<td>-0.07(-7.9)</td>
<td>-0.08(-7.2)</td>
<td>-0.08(-7.3)</td>
<td>-0.08(-7.4)</td>
</tr>
<tr>
<td>substart</td>
<td>0.06(6.5)</td>
<td>0.07(5.2)</td>
<td>0.07(5.4)</td>
<td>0.07(5.4)</td>
</tr>
<tr>
<td>cu</td>
<td>0.10(4.9)</td>
<td>0.06(2.5)</td>
<td>-</td>
<td>0.06(2.6)</td>
</tr>
<tr>
<td>Industry dummies³</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Time dummies³</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>m₁</td>
<td>-</td>
<td>-9.0</td>
<td>-9.2</td>
<td>-9.3</td>
</tr>
<tr>
<td>m₂</td>
<td>-</td>
<td>-1.5</td>
<td>-1.67</td>
<td>-1.5</td>
</tr>
<tr>
<td>Sargan test (df)</td>
<td>-</td>
<td>21.7(22)</td>
<td>21.6(23)</td>
<td>21.6(23)</td>
</tr>
<tr>
<td>Wald test (df)</td>
<td>-</td>
<td>0.02(1)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

¹Heteroskedasticity robust t-ratios shown in parentheses.  
²Wald test allows us to accept \( \delta + \phi_1 + \phi_2 = 1 \). Estimates c and d impose this constraint.  
³18 industry dummies (ESEE Industries) and 8 year dummies, with the coefficients of each set constrained to add up to zero; dummies for entering and exiting firms, as well as mergers and scissions, also included.
Table 6. Production function estimates. Results by industry

<table>
<thead>
<tr>
<th>Industry</th>
<th>k</th>
<th>l</th>
<th>m</th>
<th>sub</th>
<th>substop</th>
<th>substart</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Metals and metal products</td>
<td>0.35</td>
<td>0.24(1.6)</td>
<td>0.41(3.2)</td>
<td>0.12(2.2)</td>
<td>-0.09(-2.5)</td>
<td>0.06(1.6)</td>
</tr>
<tr>
<td>2. Non-metallic minerals</td>
<td>0.20</td>
<td>0.46(2.6)</td>
<td>0.34(2.6)</td>
<td>0.006(0.1)</td>
<td>-0.05(-1.8)</td>
<td>-0.01(-0.5)</td>
</tr>
<tr>
<td>3. Chemical products</td>
<td>0.29</td>
<td>0.40(2.0)</td>
<td>0.31(1.9)</td>
<td>-0.03(-0.6)</td>
<td>-0.05(-2.3)</td>
<td>0.04(1.7)</td>
</tr>
<tr>
<td>4. Ind. and agric. machinery</td>
<td>0.13</td>
<td>0.53(3.1)</td>
<td>0.34(3.7)</td>
<td>0.02(0.9)</td>
<td>-0.08(-2.2)</td>
<td>0.07(2.2)</td>
</tr>
<tr>
<td>5. Office mach. and elec. goods</td>
<td>0.21</td>
<td>0.53(3.4)</td>
<td>0.26(2.1)</td>
<td>0.08(2.2)</td>
<td>-0.03(-0.7)</td>
<td>0.006(0.15)</td>
</tr>
<tr>
<td>6. Transport equipment</td>
<td>0.09</td>
<td>0.50(2.8)</td>
<td>0.41(2.6)</td>
<td>0.02(0.5)</td>
<td>-0.17(-3.7)</td>
<td>0.11(2.0)</td>
</tr>
<tr>
<td>7. Food, drink and tobacco</td>
<td>0.31</td>
<td>0.17(1.4)</td>
<td>0.52(5.3)</td>
<td>0.14(1.9)</td>
<td>-0.07(-3.6)</td>
<td>0.03(2.0)</td>
</tr>
<tr>
<td>8. Textile, leather and shoes</td>
<td>0.02</td>
<td>0.66(4.1)</td>
<td>0.32(2.4)</td>
<td>0.02(0.5)</td>
<td>-0.05(-1.8)</td>
<td>0.07(2.1)</td>
</tr>
<tr>
<td>9. Timber and furniture</td>
<td>0.26</td>
<td>0.37(2.2)</td>
<td>0.37(2.9)</td>
<td>0.12(1.9)</td>
<td>-0.05(-1.7)</td>
<td>-0.005(-0.07)</td>
</tr>
<tr>
<td>10. Paper and printing products</td>
<td>0.20</td>
<td>0.30(2.1)</td>
<td>0.50(4.3)</td>
<td>0.14(2.2)</td>
<td>-0.10(-2.9)</td>
<td>0.10(2.9)</td>
</tr>
</tbody>
</table>

Heteroskedasticity robust t-ratios shown in parentheses.

1 Instruments are: l, m and sub-lagged levels t-2; lagged log-differences of k; and one size dummy (>200 workers). The set of instruments for industry 3 does not include the size dummy.

2 Estimates include 8 year dummies, with the coefficients of each set constrained to add up to zero. Dummies for entering and exiting firms, as well as mergers and scissions, also included. The estimate for industry 3 also includes one size dummy (>200 workers). The estimate for industry 8 does not include dummies for entering firm, exiting firm, merger and scission.
Table 7. Specification tests. Results by industry

<table>
<thead>
<tr>
<th>Industry</th>
<th>Serial correlation</th>
<th>Constant returns to scale</th>
<th>Overidentifying restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$m_1$</td>
<td>$m_2$</td>
<td>Wald test (df)</td>
</tr>
<tr>
<td>1. Metals and metal products</td>
<td>-3.0</td>
<td>-0.6</td>
<td>7.1(1)</td>
</tr>
<tr>
<td>2. Non-metallic minerals</td>
<td>-3.7</td>
<td>-1.1</td>
<td>2.2(1)</td>
</tr>
<tr>
<td>3. Chemical products</td>
<td>-2.9</td>
<td>-1.4</td>
<td>7.7(1)</td>
</tr>
<tr>
<td>4. Ind. and agric. machinery</td>
<td>-3.4</td>
<td>0.4</td>
<td>0.4(1)</td>
</tr>
<tr>
<td>5. Office mach. and elec. goods</td>
<td>-2.4</td>
<td>-0.9</td>
<td>0.1(1)</td>
</tr>
<tr>
<td>6. Transport equipment</td>
<td>-2.6</td>
<td>-0.9</td>
<td>1.3(1)</td>
</tr>
<tr>
<td>7. Food, drink and tobacco</td>
<td>-3.6</td>
<td>0.2</td>
<td>5.7(1)</td>
</tr>
<tr>
<td>8. Textile, leather and shoes</td>
<td>-2.8</td>
<td>-0.06</td>
<td>0.4(1)</td>
</tr>
<tr>
<td>9. Timber and furniture</td>
<td>-2.1</td>
<td>-0.8</td>
<td>1.1(1)</td>
</tr>
<tr>
<td>10. Paper and printing products</td>
<td>-2.8</td>
<td>-0.5</td>
<td>2.4(1)</td>
</tr>
</tbody>
</table>
Table A1. Firms by industry and number of observations

<table>
<thead>
<tr>
<th>Industry breakdown</th>
<th>No. of observations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>1. Metals and metal products</td>
<td>40</td>
</tr>
<tr>
<td>2. Non-metallic minerals</td>
<td>22</td>
</tr>
<tr>
<td>3. Chemical products</td>
<td>42</td>
</tr>
<tr>
<td>4. Ind. and agric. machinery</td>
<td>23</td>
</tr>
<tr>
<td>5. Office mach. and elec. goods</td>
<td>29</td>
</tr>
<tr>
<td>6. Transport equipment</td>
<td>21</td>
</tr>
<tr>
<td>7. Food, drink and tobacco</td>
<td>37</td>
</tr>
<tr>
<td>8. Textile, leather and shoes</td>
<td>69</td>
</tr>
<tr>
<td>9. Timber and furniture</td>
<td>20</td>
</tr>
<tr>
<td>10. Paper and printing products</td>
<td>20</td>
</tr>
<tr>
<td>11. Other manufacturing products</td>
<td>3</td>
</tr>
<tr>
<td>Total Industry</td>
<td>326</td>
</tr>
</tbody>
</table>
Table A2 Variable descriptive statistics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Mean</th>
<th>St. dev</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent variable:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output (growth rate)</td>
<td>y</td>
<td>0.038</td>
<td>0.259</td>
<td>-3.220</td>
</tr>
<tr>
<td><strong>Explanatory variables:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity utilization (growth rate)</td>
<td>cu</td>
<td>0.001</td>
<td>0.194</td>
<td>-2.833</td>
</tr>
<tr>
<td>Capital stock (growth rate)</td>
<td>k</td>
<td>0.086</td>
<td>0.297</td>
<td>-2.619</td>
</tr>
<tr>
<td>Hours of work (growth rate)</td>
<td>l</td>
<td>-0.002</td>
<td>0.193</td>
<td>-2.833</td>
</tr>
<tr>
<td>Intermediate consumptions¹ (growth rate)</td>
<td>m</td>
<td>0.026</td>
<td>0.402</td>
<td>-4.375</td>
</tr>
<tr>
<td>Index of production subcontracting (growth rate)</td>
<td>sub</td>
<td>0.001</td>
<td>0.747</td>
<td>-8.650</td>
</tr>
<tr>
<td>Dummy indicating stopping outsourcing</td>
<td>substop</td>
<td>0.084</td>
<td>0.747</td>
<td>-8.650</td>
</tr>
<tr>
<td>Dummy indicating starting outsourcing</td>
<td>substart</td>
<td>0.087</td>
<td>0.747</td>
<td>-8.650</td>
</tr>
<tr>
<td>Industry dummies (ESEE Industries)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ferrous and non-ferrous metals</td>
<td></td>
<td>0.023</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Metal products</td>
<td></td>
<td>0.100</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Non-metallic mineral products</td>
<td></td>
<td>0.073</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Chemical products</td>
<td></td>
<td>0.072</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Rubber and plastic products</td>
<td></td>
<td>0.059</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Industrial and agricultural machinery</td>
<td>0.054</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Office and data processing machinery</td>
<td>0.008</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Electrical goods</td>
<td></td>
<td>0.077</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Motor vehicles</td>
<td></td>
<td>0.046</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Other transport equipment</td>
<td></td>
<td>0.019</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Meats, meat preparation</td>
<td></td>
<td>0.030</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Food products and tobacco</td>
<td></td>
<td>0.114</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Beverages</td>
<td></td>
<td>0.021</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Textiles and clothing</td>
<td></td>
<td>0.119</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Leather and leather goods</td>
<td></td>
<td>0.030</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Timber, wood products</td>
<td></td>
<td>0.060</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Paper and printing products</td>
<td></td>
<td>0.072</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Other manufacturing products</td>
<td></td>
<td>0.023</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Size dummies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 200 workers</td>
<td></td>
<td>0.690</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>&gt; 200 workers</td>
<td></td>
<td>0.310</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Time dummies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td></td>
<td>0.076</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1992</td>
<td></td>
<td>0.088</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1993</td>
<td></td>
<td>0.110</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1994</td>
<td></td>
<td>0.120</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1995</td>
<td></td>
<td>0.121</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1996</td>
<td></td>
<td>0.125</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1997</td>
<td></td>
<td>0.125</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1998</td>
<td></td>
<td>0.126</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1999</td>
<td></td>
<td>0.110</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

¹Without firm’s purchases of elaborated products and customized components
Table A3. Production function estimates. Robustness checks

Sample period: 1992-1999
Nº of firms: 1728
Estimation method: GMM¹
Dependent variable: y

<table>
<thead>
<tr>
<th>Independent variables²</th>
<th>a.1</th>
<th>a.2</th>
<th>b.1</th>
<th>b.2</th>
<th>c.1</th>
<th>c.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.02(2.5)</td>
<td>0.02(2.5)</td>
<td>0.02(2.2)</td>
<td>0.02(2.2)</td>
<td>0.02(2.1)</td>
<td>0.01(1.96)</td>
</tr>
<tr>
<td>k</td>
<td>0.13(1.45)</td>
<td>0.17</td>
<td>0.15(1.6)</td>
<td>0.19</td>
<td>0.15(1.59)</td>
<td>0.20</td>
</tr>
<tr>
<td>l</td>
<td>0.39(4.1)</td>
<td>0.39(4.2)</td>
<td>0.38(4.0)</td>
<td>0.38(4.0)</td>
<td>0.39(4.2)</td>
<td>0.40(4.3)</td>
</tr>
<tr>
<td>m</td>
<td>0.42(5.6)</td>
<td>0.44(6.3)</td>
<td>0.42(5.1)</td>
<td>0.43(5.9)</td>
<td>0.37(5.2)</td>
<td>0.40(6.0)</td>
</tr>
<tr>
<td>sub</td>
<td>0.11(3.7)</td>
<td>0.12(2.9)</td>
<td>0.11(3.4)</td>
<td>0.11(3.6)</td>
<td>0.10(3.2)</td>
<td>0.10(3.4)</td>
</tr>
<tr>
<td>substop</td>
<td>-0.07(-6.3)</td>
<td>-0.07(-6.7)</td>
<td>-0.07(-6.0)</td>
<td>-0.07(-6.4)</td>
<td>-0.06(-5.8)</td>
<td>-0.07(-6.3)</td>
</tr>
<tr>
<td>substart</td>
<td>0.06(4.2)</td>
<td>0.06(4.4)</td>
<td>0.06(3.9)</td>
<td>0.06(4.2)</td>
<td>0.05(3.8)</td>
<td>0.05(4.1)</td>
</tr>
<tr>
<td>cu</td>
<td>0.08(3.0)</td>
<td>0.07(2.9)</td>
<td>0.08(2.9)</td>
<td>0.07(2.9)</td>
<td>0.09(3.4)</td>
<td>0.08(3.4)</td>
</tr>
<tr>
<td>Industry dummies³</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Time dummies³</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Size dummies³</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>m₁</td>
<td>-8.8</td>
<td>-9.2</td>
<td>-8.8</td>
<td>-9.2</td>
<td>-8.2</td>
<td>-8.6</td>
</tr>
<tr>
<td>m₂</td>
<td>-1.7</td>
<td>-1.6</td>
<td>-1.7</td>
<td>-1.6</td>
<td>-1.8</td>
<td>-1.7</td>
</tr>
<tr>
<td>Sargan test (df)</td>
<td>30.5(28)</td>
<td>30.6(29)</td>
<td>22.6(21)</td>
<td>22.2(22)</td>
<td>24.4(21)</td>
<td>24.0(22)</td>
</tr>
<tr>
<td>Wald test (df)</td>
<td>0.35(1)</td>
<td>0.22(1)</td>
<td>0.6(1)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heteroskedasticity robust t-ratios shown in parentheses.

¹Instruments are:
Estimate (a): 1 lagged levels t-2 and t-3; m and sub-lagged levels t-2; and lagged log-differences of k.
Estimate (b): l, m and sub-lagged levels t-2; and lagged log-differences of k.
Estimate (c): l, m and sub-lagged levels t-2; lagged log-differences of k; and log of price of intermediate consumptions.

²Wald test allows us to accept δ+φ₁+φ₂=1. Estimates a.2, b.2 and c.2 impose this constraint.

³18 industry dummies (ESEE Industries), 8 year dummies and 2 size dummies, with the coefficients of each set constrained to add up to zero; dummies for entering and exiting firms, as well as mergers and scissions, also included.
Figure 1. Percentage of firms contracting out of manufacturing activities

Figure 2. Subcontracted purchases over Intermediate consumptions

---

34
### Últimos números publicados

<table>
<thead>
<tr>
<th>Número</th>
<th>Título</th>
<th>Autor(es)</th>
</tr>
</thead>
<tbody>
<tr>
<td>159/2000</td>
<td>Participación privada en la construcción y explotación de carreteras de peaje</td>
<td>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></td>
<td>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</td>
<td>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</td>
<td>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</td>
<td>Alfonso Utrilla de la Hoz y Carmen Pérez Esparrells</td>
</tr>
<tr>
<td>165/2001</td>
<td>Bank cost efficiency and output specification</td>
<td>Emili Tortosa-Ausina</td>
</tr>
<tr>
<td>166/2001</td>
<td>Recent trends in Spanish income distribution: A robust picture of falling income inequality</td>
<td>Josep Oliver-Alonso, Xavier Ramos y José Luis Raymond-Bara</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</td>
<td>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</td>
<td>Mónica Melle-Hernández</td>
</tr>
<tr>
<td>169/2001</td>
<td>La política de cohesión de la UE ampliada: la perspectiva de España</td>
<td>Ismael Sanz Labrador</td>
</tr>
<tr>
<td>170/2002</td>
<td>Riesgo de liquidez de Mercado</td>
<td>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.</td>
<td>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.</td>
<td>Llorenç Pou, Joaquín Alegre</td>
</tr>
<tr>
<td>173/2002</td>
<td>Modelos paramétricos y no paramétricos en problemas de concesión de tarjetas de crédito.</td>
<td>Rosa Puertas, María Bonilla, Ignacio Olmeda</td>
</tr>
</tbody>
</table>
174/2002 Mercado único, comercio intra-industrial y costes de ajuste en las manufacturas españolas. José Vicente Blanes Cristóbal

175/2003 La Administración tributaria en España. Un análisis de la gestión a través de los ingresos y de los gastos. Juan de Dios Jiménez Aguilera, Pedro Enrique Barrilao González


177/2003 Effects of ATMs and Electronic Payments on Banking Costs: The Spanish Case. Santiago Carbó Valverde, Rafael López del Paso, David B. Humphrey

178/2003 Factors explaining the interest margin in the banking sectors of the European Union. Joaquín Maudos y Juan Fernández Guevara

179/2003 Los planes de stock options para directivos y consejeros y su valoración por el mercado de valores en España. Mónica Melle Hernández


181/2003 The Euro effect on the integration of the European stock markets. Mónica Melle Hernández

182/2004 In search of complementarity in the innovation strategy: international R&D and external knowledge acquisition. Bruno Cassiman, Reinhilde Veugelers

183/2004 Fijación de precios en el sector público: una aplicación para el servicio municipal de suministro de agua. Mª Ángeles García Valiñas

184/2004 Estimación de la economía sumergida es España: un modelo estructural de variables latentes. Ángel Alañón Pardo, Miguel Gómez de Antonio

185/2004 Causas políticas y consecuencias sociales de la corrupción. Joan Oriol Prats Cabrera

186/2004 Loan bankers’ decisions and sensitivity to the audit report using the belief revision model. Andrés Guiral Contreras and José A. Gonzalo Angulo

187/2004 El modelo de Black, Derman y Toy en la práctica. Aplicación al mercado español. Marta Tolentino García-Abadillo y Antonio Díaz Pérez

188/2004 Does market competition make banks perform well?. Mónica Melle

189/2004 Efficiency differences among banks: external, technical, internal, and managerial Santiago Carbó Valverde, David B. Humphrey y Rafael López del Paso
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-Benito y Óscar González-Benito

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 Ciriacó Fernández y Rafael Santamaría Aquilué

195/2005 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 Cantarero 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. Martínez 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 Rodríguez

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
Tendencia post-anuncio de resultados contables: evidencia para el mercado español
Carlos Forner Rodríguez, Joaquín Marhuenda Fructuoso y Sonia Sanabria García

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

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

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

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

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

Incumplimiento fiscal en el irpf (1993-2000): un análisis de sus factores determinantes
Alejandro Estellér Moré

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

Concurrent Engineering: The Moderating Effect Of Uncertainty On New Product Development Success
Daniel Vázquez-Bustelo and Sandra Valle

On zero lower bound traps: a framework for the analysis of monetary policy in the ‘age’ of central banks
Alfonso Palacio-Vera

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

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

Inheritance Taxes In The Eu Fiscal Systems: The Present Situation And Future Perspectives.
Miguel Angel Barberán Lahuerta

Bank Ownership And Informativeness Of Earnings.
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 manufacturera 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.
Paolo 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
Luis 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>289/06</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>290/06</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>291/06</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>292/06</td>
<td>Una teoría sobre la contribución de la función de compras al rendimiento empresarial</td>
<td>Javier González Benito</td>
</tr>
<tr>
<td>293/06</td>
<td>Agility drivers, enablers and outcomes: empirical test of an integrated agile manufacturing model</td>
<td>Daniel Vázquez-Bustelo, Lucía Avella and Esteban Fernández</td>
</tr>
<tr>
<td>294/06</td>
<td>Testing the parametric vs the semiparametric generalized mixed effects models</td>
<td>María José Lombardía and Stefan Sperlich</td>
</tr>
<tr>
<td>295/06</td>
<td>Nonlinear dynamics in energy futures</td>
<td>Mariano Matilla-García</td>
</tr>
<tr>
<td>296/06</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 Rodríguez-Valez</td>
</tr>
<tr>
<td>297/06</td>
<td>Optimización fiscal en las transmisiones lucrativas: análisis metodológico</td>
<td>Félix Domínguez Barrero</td>
</tr>
<tr>
<td>298/06</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>299/06</td>
<td>Estrategia competitiva y rendimiento del negocio: el papel mediador de la estrategia y las capacidades productivas</td>
<td>Javier González Benito y Isabel Suárez González</td>
</tr>
<tr>
<td>300/06</td>
<td>A Parametric Model to Estimate Risk in a Fixed Income Portfolio</td>
<td>Pilar Abad and Sonia Benito</td>
</tr>
<tr>
<td>301/07</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>302/07</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>303/07</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>304/07</td>
<td>On the Finite-Sample Biases in Nonparametric Testing for Variance Constancy</td>
<td>Paulo M.M. Rodrigues and Antonio Rubia</td>
</tr>
<tr>
<td>305/07</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
Cesar 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 Piqueres
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
341/2007 ¿Cómo organizar una cadena hotelera? La elección de la forma de gobierno Marta Fernández Barcala y Manuel González Díaz

342/2007 Análisis de los efectos de la decisión de diversificar: un contraste del marco teórico “Agencia-Stewardship” Almudena Martínez Campillo y Roberto Fernández Gago

343/2007 Selecting portfolios given multiple eurostoxx-based uncertainty scenarios: a stochastic goal programming approach from fuzzy betas Enrique Ballesteros, Blanca Pérez-Gladish, Mar Arenas-Parra and Amelia Bilbao-Terol

344/2007 “El bienestar de los inmigrantes y los factores implicados en la decisión de emigrar” Anastasia Hernández Alemán y Carmelo J. León


346/2007 Diferencias salariales entre empresas públicas y privadas. El caso español Begoña Cueto y Nuria Sánchez- Sánchez

347/2007 Effects of Fiscal Treatments of Second Home Ownership on Renting Supply Celia Bilbao Terol and Juan Prieto Rodríguez

348/2007 Auditors’ ethical dilemmas in the going concern evaluation Andres Guiral, Waymond Rodgers, Emiliano Ruiz and Jose A. Gonzalo


350/2007 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

351/2007 Persistencia del resultado contable y sus componentes: implicaciones de la medida de ajustes por devengo Raúl Iñiguez Sánchez y Francisco Poveda Fuentes

352/2007 Wage Inequality and Globalisation: What can we Learn from the Past? A General Equilibrium Approach Concha Betrán, Javier Ferri and Maria A. Pons

353/2007 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

354/2007 Convergencia regional en renta y bienestar en España Robert Meneu Gaya

355/2007 Tributación ambiental: Estado de la Cuestión y Experiencia en España Ana Carrera Poncela

356/2007 Salient features of dependence in daily us stock market indices Luis A. Gil-Alana, Juncal Cuñado and Fernando Pérez de Gracia

357/2007 La educación superior: ¿un gasto o una inversión rentable para el sector público? Inés P. Murillo y Francisco Pedraja
<table>
<thead>
<tr>
<th>Volume</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>358/2007</td>
<td>Effects of a reduction of working hours on a model with job creation and job destruction</td>
<td>Emilio Domínguez, Miren Ullibarri y Idoya Zabaleta</td>
</tr>
<tr>
<td>360/2007</td>
<td>Modelización de las expectativas y estrategias de inversión en mercados de derivados</td>
<td>Begoña Font-Belaire</td>
</tr>
<tr>
<td>361/2008</td>
<td>Trade in capital goods during the golden age, 1953-1973</td>
<td>Mª Teresa Sanchis and Antonio Cubel</td>
</tr>
<tr>
<td>362/2008</td>
<td>El capital económico por riesgo operacional: una aplicación del modelo de distribución de pérdidas</td>
<td>Enrique José Jiménez Rodríguez y José Manuel Feria Domínguez</td>
</tr>
<tr>
<td>363/2008</td>
<td>The drivers of effectiveness in competition policy</td>
<td>Joan-Ramon Borrell and Juan-Luis Jiménez</td>
</tr>
<tr>
<td>364/2008</td>
<td>Corporate governance structure and board of directors remuneration policies: evidence from Spain</td>
<td>Carlos Fernández Méndez, Rubén Arrondo García and Enrique Fernández Rodríguez</td>
</tr>
<tr>
<td>365/2008</td>
<td>Beyond the disciplinary role of governance: how boards and donors add value to Spanish foundations</td>
<td>Pablo De Andrés Alonso, Valentín Azofra Palenzuela y M. Elena Romero Merino</td>
</tr>
<tr>
<td>366/2008</td>
<td>Complejidad y perfeccionamiento contractual para la contención del oportunismo en los acuerdos de franquicia</td>
<td>Vanesa Solís Rodríguez y Manuel González Díaz</td>
</tr>
<tr>
<td>367/2008</td>
<td>Inestabilidad y convergencia entre las regiones europeas</td>
<td>Jesús Mur, Fernando López y Ana Angulo</td>
</tr>
<tr>
<td>368/2008</td>
<td>Análisis espacial del cierre de explotaciones agrarias</td>
<td>Ana Aldanondo Ochoa, Carmen Almansa Sáez y Valero Casanovas Oliva</td>
</tr>
<tr>
<td>369/2008</td>
<td>Cross-Country Efficiency Comparison between Italian and Spanish Public Universities in the period 2000-2005</td>
<td>Tommaso Agasisti and Carmen Pérez Esparrells</td>
</tr>
<tr>
<td>370/2008</td>
<td>El desarrollo de la sociedad de la información en España: un análisis por comunidades autónomas</td>
<td>María Concepción García Jiménez y José Luis Gómez Barroso</td>
</tr>
<tr>
<td>371/2008</td>
<td>El medioambiente y los objetivos de fabricación: un análisis de los modelos estratégicos para su consecución</td>
<td>Lucía Avella Camarero, Esteban Fernández Sánchez y Daniel Vázquez-Bustelo</td>
</tr>
<tr>
<td>372/2008</td>
<td>Influence of bank concentration and institutions on capital structure: New international evidence</td>
<td>Víctor M. González and Francisco González</td>
</tr>
<tr>
<td>373/2008</td>
<td>Generalización del concepto de equilibrio en juegos de competición política</td>
<td>Mª Dolores López González y Javier Rodrigo Hitos</td>
</tr>
<tr>
<td>374/2008</td>
<td>Smooth Transition from Fixed Effects to Mixed Effects Models in Multi-level regression Models</td>
<td>Maria José Lombardía and Stefan Sperlich</td>
</tr>
</tbody>
</table>
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 Efectos 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 farmacéuticas, a través del análisis de sus principales intangibles, con el método de opciones reales
Gracia Rubio Martín 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
391/2008 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

392/2008 Cuando el tamaño importa: estudio sobre la influencia de los sujetos políticos en la balanza de bienes y servicios
Alfonso Echazarra de Gregorio

393/2008 Una visión cooperativa de las medidas ante el posible daño ambiental de la desalación
Borja Montaño Sanz

394/2008 Efectos externos del endeudamiento sobre la calificación crediticia de las Comunidades Autónomas
Andrés Leal Marcos y Julio López Laborda

395/2008 Technical efficiency and productivity changes in Spanish airports: A parametric distance functions approach
Beatriz Tovar & Roberto Rendeiro Martín-Cejas

396/2008 Network analysis of exchange data: Interdependence drives crisis contagion
David Matesanz Gómez & Guillermo J. Ortega

397/2008 Explaining the performance of Spanish privatised firms: a panel data approach
Laura Cabeza García and Silvia Gomez Anson

398/2008 Technological capabilities and the decision to outsource R&D services
Andrea Martínez-Noya and Esteban García-Canal

399/2008 Hybrid Risk Adjustment for Pharmaceutical Benefits
Manuel García-Goñi, Pere Ibern & José María Inoriza

400/2008 The Team Consensus–Performance Relationship and the Moderating Role of Team Diversity
José Henrique Dieguez, Javier González-Benito and Jesús Galende

401/2008 The institutional determinants of CO₂ emissions: A computational modelling approach using Artificial Neural Networks and Genetic Programming
Marcos Álvarez-Díaz, Gonzalo Caballero Míguez and Mario Soliño

402/2008 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

403/2008 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

404/2008 Análisis de fusiones, variaciones conjeturales y la falacia del estimador en diferencias
Juan Luis Jiménez y Jordi Perdiguero

405/2008 Política fiscal en la uem: ¿basta con los estabilizadores automáticos?
Jorge Uxó González y Mª Jesús Arroyo Fernández

406/2008 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

407/2008 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 Luís 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 Aguiar 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