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.

ISSN: 1988-8767

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.
ENVIRONMENTAL TAX AND PRODUCTIVITY IN A SUBCENTRAL CONTEXT: NEW FINDINGS ON THE PORTER HYPOTHESIS

Jaime Vallés- Giménez*
Anabel Zárate-Marco**

Abstract

This paper study, for the first time, the effects of Spanish regional environmental taxes on efficiency gains and the growth of the regions. To this end, we have adapted the multifactor productivity model proposed by Jorgenson and Wilcoxen (1990), Nicoletti and Scarpetta (2003), De Vries and Withagen (2005), and Loayza et al. (2005) to the context of the Spanish regions, and we have estimated a dynamic panel-data model for the period 1989-2001 that reflects the effects of environmental taxation and regulation separately. The results provides further empirical evidence in favour of the Porter hypothesis, to the extent that a strict environmental policy implemented via green taxes rather than regulation may raise productivity, which may be because they drive organizational and technological change in firms seeking to reduce their tax payments.

Key words: regional green taxes, Porter hypothesis, regional growth, productivity.

JEL classification: H23, H71, O44

Corresponding author: Anabel Zárate Marco, Department of Public Economics, University of Zaragoza, Escuela Empresariales (Edificio Lorenzo Normante), C/ María de Luna, Zaragoza, Spain. E-mail: azarate@unizar.es

*Department of Public Economics, University of Zaragoza, Faculty of Economics.
** Department of Public Economics, University of Zaragoza, Escuela Empresariales.

Acknowledgements: We acknowledge financial support provided by the Spanish Ministry of Science and Education and the European Regional Development Fund, project SEJ2007-66654.
1.- Introduction

There has been much debate in recent decades over the possible impact of regulation on productivity and the superiority of economic instruments, particularly environmental taxes, as a weapon in the fight against pollution. It was Porter (1991) who drew attention to the first of these issues, arguing against the conventional view that strict regulation properly implemented would encourage productivity growth by creating benefits capable of offsetting regulatory costs. The second issue came to the fore, meanwhile, as awareness of environmental issues rose in the developed nations in parallel with increasing concerns about the inefficiency of the command and control instruments that had traditionally been used to combat pollution. The result has been increasing use of green taxes in environmental policy in recent decades, given their advantages in terms of efficiency and economic growth.

Based on a review of the existing literature, we may identify various factors that are directly or indirectly associated with productivity and economic growth: human capital, infrastructure, technology gap, openness and absorptive capacity, ... even environmental aspects. In particular, we might mention the surveys by Isaksson and Ng (2006) and Isaksson (2007), although numerous other papers also examine the determining factors of productivity including, for example, Hall and Kramarz (1998), Easterly and Levine (2002), Keller and Yeaple (2003), Fisman and Love (2004), and Bloom, Canning and Sevilla (2004).

According to the conventional view defended by scholars like Barberá and McConnell (1990), Gollop and Roberts (1983), Gray (1987), and Palmer et al. (1995), a strict environmental policy imposes costs on firms that affect their competitiveness, resulting in adverse socio-economic outcomes for jobs and living standards. This is so because regulation almost always requires firms to allocate a part of their inputs (labour, capital, etc.) to reduce pollution, which is unproductive from a business standpoint. Moreover, regulation may depress investment if it raises the price of energy (a supplementary input to capital), as Ambec and Barla (2006) point out.

However, two decades ago Porter (1991) proposed a different approach to the analysis, arguing that a strict, effectively implemented environmental policy
could have the opposite result, fostering productivity and comparative advantages that would enhance the competitiveness of regulated firms in such a way as to offset the costs initially entailed\(^1\). To put this another way, additional benefits may be generated that are not detected by conventional theory, which fails to consider the dynamic nature of the problem. This hypothesis is defended in Porter and Linde (1995), Shrivastava (1995), Facheux et al (1998), Mohr (2002), and Ambec and Barla (2006).

As Brännlund (2008) notes, Porter’s ideas are controversial and they have spurred considerable theoretical research (Simpson and Bradford, 1996; Xepapadeas and de Zeeuw, 1999; Mohr, 2002; Feichtinger et al, 2005; Popp, 2005, and Greaker, 2006, among others)\(^2\). Our approach is to test whether environmental taxes can have a positive impact in terms of productivity gains and/or economic growth, given that such taxes provide an alternative instrument offering considerable advantages over conventional regulation, in terms of cost-effectiveness and dynamic efficiency\(^3\).

---

\(^1\) There are three different readings of the Porter hypothesis (Brännlund, 2008). The first maintains that regulated firms cut their costs by eliminating internal inefficiencies. The second refers to relative gains in competitiveness (in relation to other firms), which Porter calls the “early mover advantage”: despite the costs inherent in regulation, these costs will be greater for firms that are regulated later. The third interpretation is based on enhanced competitiveness through the increase in demand for products associated with environmental regulation. Thus, the gains do not come from the regulated firms themselves, but from firms supplying them with the materials and equipment required to comply with environmental regulations.

\(^2\) Palmer et al. (1995) point out certain weaknesses in the arguments for the Porter hypothesis, including the assumption that private firms systematically ignore opportunities and inefficiencies, whereas the regulator can identify and, what is more, correct market failures of this kind. They also criticize the use of case studies as empirical evidence. Finally, the notions of competitiveness and rivalry are fundamental to the Porter hypothesis, requiring close proximity between competitors, and between firms and their customers (clustering).

\(^3\) This hypothesis can be reinforced by others like the theory that defend that environmental taxes can even be used to undertake green reform processes capable of generating what has been called the “double dividend”, and the theory that support the possible effects of tax decentralization on economic growth.

For an explanation of the double dividend hypothesis, see Pearce (1991), Goulder (1994), Bovenberg (1999), Bosquet (2000), Schöb (2003) and, more recently, Fullerton et al. (2008). Abundant empirical evidence exists about double dividend, but it is widely scattered. However, an extensive compilation of existing empirical papers will be found in Hoerner and Bosquet (2001). Although the Spanish regions have never officially used green taxes as part of a green tax reform (seemingly, they have employed these green taxes to raise extra revenues, with the minimum possible effect on their citizens and hoping for stability), however it is also possible to think that it can be taking place an incipient process of green tax reform at the regional level, as various reforms of direct taxation at the level of the state have cut regional revenues (Income tax rates have diminished, Wealth Tax has been recently eliminated, …), the regions have undertaken a race to the bottom in the Estate and Gift Tax, etc, sometimes making it necessary to impose
In view of the Porter hypothesis and the superiority of environmental taxes over command and control measures, we ask whether the environmental taxes established in the regions of Spain have had any impact on productivity and the growth of regional economies. In contrast to the few other papers that have looked at this relationship in Spain (Gil and López Laborda, 2005; Carrión-i-Silvestre, Espasa and Mora, 2007; and Pérez and Cantarero, 2009), the scope of the study described here is confined to regional decentralization and green taxes, an issue that is also largely absent from the international literature. Hence, the approach we have taken is new.

The paper is structured as follows. The next section describes the model and examines the factors that may be expected to affect productivity and economic growth, paying special attention to regulation and green taxes. An econometric test is also carried out to validate the hypotheses proposed. The paper ends with a section containing our conclusions.

2.- Estimation of the relationship between environmental policy and regional development

Much empirical research exists with regard to the Porter hypothesis, as shown in the recent surveys by Vollbebergh (2007), and Brännlund and Lundgren (2009). Table 1 summarises a representative cross-section of the existing literature. As will be seen, many papers focus on the effects of environmental proportional environmental taxes to offset the revenues lost. These processes may, in turn, have given rise to a “double dividend” with effects on economic growth.

Furthermore, even if this “double dividend” does not occur, it is not unthinkable that more intensive use of environmental taxes would further tax decentralization through revenues, which could also boost economic growth. This renewed interest in decentralization has various roots, including the conviction that it provides a useful tool to improve the efficiency of the public sector (Martínez-Vázquez and McNab, 2003). Its potential effect on growth is based on two assumptions. The first is the Leviathan model proposed by Brennan and Buchanan (1980), which implies that the public sector will vary, ceteris paribus, inversely to the scope of decentralization. The second is the hypothesis that sub-central tiers of government have access to privileged information about citizens’ needs and preferences given their proximity, and they are therefore better placed to provide public services than central government. The corollary to this is geographical mobility and competition between different administrations, resulting in enhanced living standards and more uniform income distribution.

4 We are aware of the green regional taxes are scarce in Spain (in number and in revenue-raising capacity), so their impact on growth a la Porter in a context of Spanish regions could be limited.

5 A study of green taxes is especially appropriate in the case of Spain, given the regions’ interest in balancing their budgets in response to budgetary stability legislation.
regulation on investment, innovation and R+D (Nelson et al, 1993; Xepapadeas and de Zeeuw, 1999; Gray and Shadbegian, 1998; Brunneheimer and Cohen, 2003; and De Vries and Withagen, 2005), while a second group examines effects on efficiency and productivity gains (Gollop and Roberts, 1983; Berman and Bui, 2001; Gray and Shadbegian, 2003; Marklund, 2003; Hamamoto, 2006; and Van der Vlist et al, 2007). Finally, a third group of studies examines the effects of regulation on benefits and other type of financial impacts (Brännlund et al, 1995; King and Lenox, 2001; Nicoletti and Scarpetta, 2003; Filbeck and Gorman, 2004; and Gupta and Goldar, 2005).

These papers do not find clear evidence to validate the Porter hypothesis. It is therefore not possible to affirm that the Porter hypothesis is true, either from a theoretical or from an empirical standpoint. However, this does not mean that there are no specific cases and circumstances in which progress may be made in terms of business, productivity and economic growth after the implementation of an environmental policy.

The question of whether or not the Porter hypothesis is in fact applicable cannot be answered definitively based on the existing research. This is presumably the result of several different factors. Perhaps the most important of these is the fact that existing studies fail to apply a formal hypothesis test to Porter’s idea, at least in part because there is no general consensus about what should be tested. Measurements and definitions are also problematic. What is meant by the terms “competitiveness” and “environmental regulation”, and how can they be measured? Brännlund and Lundgren (2009) also note that most studies fail to distinguish clearly between regulatory measures and instruments, even though Porter is relatively clear that only certain specific types of regulation can actually neutralize the initial costs, suggesting that a better approach might be to try and classify regulations into groups or categories and then analyze the differences in effects.

---

6 All of the requirements necessary for the Porter hypothesis are present in Sweden, but empirical results do not support it. It was recently noted by Ambec and Barla (2006) that the majority of the studies that have sought to test the Porter hypothesis use empirical structures based on very simple or non-existent dynamic structures. These authors point to the work of Lanoie et al. (2001), who obtain positive results for Quebec in a study based on a more dynamic structure that was better aligned with the nature of the Porter hypothesis.
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Description</th>
<th>Findings/Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albrecht (1998)</td>
<td>OECD CFC-using industries (e.g. manufacture of refrigerators, freezers and air conditioning machines), 1989-1995.</td>
<td>Environmental regulation leads to improved competitiveness.</td>
</tr>
<tr>
<td>Cohen (1997)</td>
<td>U.S.-based industry data in the manufacturing sector, 1983-1992.</td>
<td>Increases in pollution abatement expenditures (regulatory pressure) were associated with a small but significant rise in environmental innovation, using patents as a proxy.</td>
</tr>
<tr>
<td>Berman and Bui (2001)</td>
<td>U.S. petroleum refining industry, 1987-1995.</td>
<td>Comparison of productivity at Californian South Coast refineries (subject to stricter air pollution regulations) and other US refineries. Stricter regulations imply higher abatement costs. However, these investments appear to increase productivity.</td>
</tr>
<tr>
<td>Dasgupta and Laplante (2001)</td>
<td>126 events involving 48 publicly-traded firms in Argentina, Chile, the Philippines and Mexico, 1989-94.</td>
<td>20 out of 39 positive environmental events (investment in pollution control, awards) lead to positive abnormal returns 33 out of 85 negative environmental events (complaints, spills) lead to negative abnormal returns.</td>
</tr>
<tr>
<td>Source</td>
<td>Description</td>
<td>Findings</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Lanoie et al (2007)</td>
<td>Approximately 4,200 plants in seven OECD countries</td>
<td>Some indirect positive effect of environmental policy stringency on business performance (through environmental R&amp;D), although the direct effect on business performance is negative and greater in size. Flexible “performance standards” are more likely to induce innovation than prescriptive “technology-based standards”. Environmental policy induces innovation (R&amp;D expenditure).</td>
</tr>
<tr>
<td>Telle and Larsson (2007)</td>
<td>Plant-level data for energy intensives industries in Norway: Pulp and paper, Primary aluminum, Ferro alloys and Inorganic chemicals, 1993-2002.</td>
<td>Positive effect of regulatory stringency on productivity growth when emissions are included in the calculation of the productivity index. No effect when emissions are not included in the calculation.</td>
</tr>
<tr>
<td>Van der Vlist et al (2007)</td>
<td>Panel data for Holland’s horticulture industry. Medium and small companies, 1991-1999.</td>
<td>Voluntary agreements to reduce environmental impacts are (on average) positively correlated with increased technological efficiency. Correlation between technological efficiency and voluntary agreements depends upon the type of company (type of ownership, experience, size, etc)</td>
</tr>
<tr>
<td>Lanoie et al (2008)</td>
<td>17 sectors (clothing, food and beverages, leather, machinery, textiles, electrical and electronic products, furniture, wood, printing and publishing, metal manufacturing, rubber and plastics, transportation equipment, petroleum and coal products, primary metals, non-metallic minerals, paper and allied products, and chemicals) in the Quebec manufacturing industry, 1985-1994.</td>
<td>Negative contemporaneous effect of environmental regulation on productivity. Positive lagged effect of environmental regulation on productivity. The positive effects of regulation on performance are most significant in a subgroup of industries that are more exposed to international competition. Contrary to the author’s conjecture, the positive effects are confirmed only for the second group of industries when a distinction is drawn between more and less polluting industries.</td>
</tr>
<tr>
<td>Smith and Sims (1985)</td>
<td>4$ Canadian beer breweries, 1971-1980.</td>
<td>Two breweries were submitted to an effluent surcharge and two breweries were not. Average productivity growth was negative for the regulated plants and positive for the unregulated plants.</td>
</tr>
<tr>
<td>Barberá and McConnell (1990)</td>
<td>5 pollution intensive industries in the US (paper, chemicals, stone-clay-glass, iron-steel, non-ferrous metals), 1960-1980.</td>
<td>Abatement capital requirements reduce productivity growth (direct effect of pollution control capital), but the indirect effect (changes in other inputs and production processes) is sometimes positive.</td>
</tr>
<tr>
<td>Jorgenson and Wilcoxen (1990)</td>
<td>USA, 1974-1985.</td>
<td>The combined effects of mandatory pollution abatement costs and investments, and compliance costs was to reduce the average growth rate of real Gross National Product, because of the capital investment required to comply with regulations</td>
</tr>
<tr>
<td>Brännlund and Liljas (1993)</td>
<td>Facility-specific data for Swedish pulp and paper industry, 1986-1990.</td>
<td>Some evidence that more stringent regulations have negative effects on corporate earnings. However, no clear answer is found because not all tests show a significant effect.</td>
</tr>
<tr>
<td>Brännlund et al (1995)</td>
<td>41 Swedish pulp and paper mills, 1989-1990.</td>
<td>Average decline in profits due to regulation. However between 66% and 88% of mills are unaffected by regulations.</td>
</tr>
<tr>
<td>Study</td>
<td>Sample / Time</td>
<td>Findings</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Khanna et al (1998)</td>
<td>91 U.S. chemicals firms, 1989-1994.</td>
<td>Negative abnormal returns during one-day period following disclosure. Abnormal losses are higher for firms that do not reduce emissions or perform poorly compared to other firms. Abnormal losses push firms to increase transfers of waste off site.</td>
</tr>
<tr>
<td>Marklund (2003)</td>
<td>12 Swedish pulp plants, 1983-1990</td>
<td>No evidence that environmental regulation made the pulp plants more resource efficient during the period under study</td>
</tr>
<tr>
<td>Nicoletti and Scarpetta (2003)</td>
<td>23 industries in manufacturing and business services in 18 OECD countries, 1984-1998</td>
<td>Negative effect on productivity, mainly by slowing down technological catch-up</td>
</tr>
<tr>
<td>Hitchens and Tribswetter (2005)</td>
<td>160 face-to-face interviews undertaken in three industry case studies in the food sector, the packaging industry with the respective supply chain links in the food and retail sector, and the cement industry, in Germany, the UK and Spain. The three sample industries and related regulatory fields were chosen so as to cover a variety of environmental problems (waste water, solid waste and air pollution), 1999.</td>
<td>Environmental regulations have not had a great impact on competitiveness in the chosen sectors.</td>
</tr>
<tr>
<td>Loayza et al (2005)</td>
<td>76 countries. Country observations for each variable consist of averages for the 1990s.</td>
<td>A heavier regulatory burden reduces growth and increases volatility, although these effects are smaller the higher the quality of the overall institutional framework.</td>
</tr>
</tbody>
</table>
In light of the above, we shall differentiate between regulation and environmental taxation. Thus, our approach will be to examine whether environmental taxes can have a positive impact in terms of productivity gains and/or economic growth, given that such taxes offer considerable advantages over conventional regulation. Finally, we have employed a dynamic specification in our econometric estimates, as it may be that the discrepancies in the findings from existing empirical studies stem from the failure to consider the dynamic nature of the problem analysed.

2.1.- Empirical model

The aim of this paper is to test, for the first time, the possible efficiency gains in terms of productivity and economic growth that may be generated by green taxes at the sub-central level in Spain, employing a dynamic specification in our econometric estimates. Consequently, our empirical analysis adapts the proposals contained in Jorgenson and Wilcoxen (1990), Nicoletti and Scarpetta (2003), De Vries and Withagen (2005), and Loayza et al. (2005) to the situation of the Spanish regions. We begin with the multi-factor productivity equation. Thus, if we denote the regions using the subscript $i = 1, \ldots, 17$, then the value added for a given year "$t$" in each region will be produced by labour ($H$) and physical capital ($K$) applying a standard neo-classical production technology:

$$Y_{it} = A_{it} \cdot F(H_{it}, K_{it}) \quad [1]$$

where $F(\cdot)$ is grade one homogenous and displays decreasing returns for each factor of production, and $A_{it}$ is a technology efficiency or multifactor productivity (MFP) index.

We extend the conventional endogenous growth model, in which MFP is generally expressed as a function of knowledge and a residual set of influences\(^7\), by assuming that efficiency depends on country characteristics as well as technological and organisational transfers from the technology-leader region ($i = L$). This implies that MFP growth in the leading region leads to faster MFP growth

---

\(^7\) The determinants of productivity and growth are discussed in depth in Isaksson and Ng (2006), Isaksson (2007) and the paper of Aghion and Howitt (1998).
in catch-up regions by expanding production options. We assume that the technology gap between a given region and the technological leader measures the extent of technology transfers. The leading region is defined as that displaying the highest level of MFP. Hence, multifactor productivity growth for a given region may be modeled as follows:

\[ \Delta \ln A_{it} = \delta_{it} \Delta \ln A_{Lt} - \sigma_{it} \ln \left( \frac{A_i}{A_L} \right)_{t-1} + \xi_{it} \]  

where \( \delta_{it} \) captures the immediate effect of changes in growth in the leader region; \( \sigma_{it} \) denotes the pace of technology transfer; \( \ln \left( \frac{A_i}{A_L} \right)_{t-1} \) is the technology gap between region “i” and region “L”, the technology leader; and \( \xi_{it} \) represents all other factors involved in MFP growth, including those related with inter-regional differences in environmental regulation and taxation.

We also assume that environmental policy, whether in the form of green taxes or regulation, can affect opportunities and incentives for the adoption of cutting-edge technologies. Following Nicoletti and Scarpetta (2003), this link between environmental policy (POLAMB) and the rate of technology transfers between non-leading regions can be formulated as follows:

---

8 Catch-up economies may be well placed to grow faster than the technological leader by imitating state-of-the-art technologies, while the leader incurs the costs and delays associated with development. It is likely that technologies will spread faster at the regional level, unhindered by the cultural and institutional barriers to the transfer of knowledge that exist internationally.

9 Multi-factor productivity (MFP) growth is often used as a proxy for technological progress, although it also captures the impact of efficiency gains related with improvements in management, organizational change and other innovations in production methods, as well as the level of competition in markets. MFP estimates are residual rates of variation of Gross Valued Added (GVA) after discounting the weighted contribution of changes in the capital and labour production factors. Consequently, these estimates include various assumptions about the measurement of outputs and inputs. Firstly, given data limitations, we have used total employment as a measure of the labour input, and the total capital stock as a measure of the capital input, which means that we do not consider changes in the composition of the labour force or the stock of capital. Furthermore, these estimates of MFP growth reflect both disembodied and embodied components of technological progress. The disembodied component captures technological and organisational improvements that increase output for a given amount of –qualitatively and compositionally adjusted- inputs. However, we also want to assess the extent to which improvements in the quality of labour and capital boosted productivity in industries and countries that have invested in them. This second component of technological progress is embodied and proxies for improvements in production capacity due to shifts to higher quality factor inputs (Greenwood et al. [1997], Hercowitz [1998], and Nicoletti and Scarpetta [2005]). Secondly, the weightings assigned to the factors of production in the MFP, or residual growth, calculation should represent the marginal productivity of labour and capital. Nevertheless, these values are not observable, and we have therefore followed the standard procedure of proxying them using income shares. These procedures are based, inter alia, on the assumptions that product and input markets are perfectly competitive and that there are constant returns to scale (Morrison [1999], Scarpetta et al. [2000], and Scarpetta and Tressel [2002]).

10 See Scarpetta and Tressel (2002) for further details of this productivity model. Similar specifications will be found in Griffith et al. (2000) and de la Fuente and Doménech (2006).
σ_{it} = σ_{1it} + σ_{2it} POLAMB_{it-1} \quad [3]

Substituting [3] in [2], we obtain the following specification:

\[ \Delta \ln A_{it} = \delta_{it} \Delta \ln A_{Lt} - \sigma_{1it} \ln (A_i/A_L)_{t-1} - \sigma_{2it} POLBAMB_{it-1} \ln (A_i/A_L)_{t-1} + \xi_{it} \quad [4] \]

In deriving a specification of the MFP equation that can be estimated empirically, it is important to observe that equation [4] could be considered an error correction equation derived from a first order lagged autoregressive specification, in which the level of MFP in each region is cointegrated with that of the leader region, as follows:

\[ \ln MFP_{it} = \beta_1 \ln MFP_{it-1} + \beta_2 \ln MFP_{Lt} + \beta_3 \ln MFP_{Lt-1} + \omega_{it} \quad [5] \]

Reordering equation [5] under the assumption of long-run homogeneity \((1-\beta_1 = [\beta_2 + \beta_3])\), we obtain:

\[ \Delta \ln MFP_{it} = \beta_2 \Delta \ln MFP_{Lt} - (1-\beta_1) \text{RMFP}_{it-1} + \omega_{it}; \text{ donde: } \text{RMFP}_{it-1} = \ln (MFP_{it-1}/MFP_{Lt-1}) \quad [6] \]

Equation [6] is equivalent to equation [4], in which the relative MFP coefficient is a function of environmental policy. We have also imposed the constraint that the leader region’s MFP growth coefficient \((\beta_2)\) and the technology transfer coefficient \((1-\beta_1)\) do not change.

In addition, the error term in equations [5] and [6] can be broken down into a vector of variables \((V_{it})\) including structural aspects (e.g. human capital) and environmental policies with potential effects at the MFP level, as well as unobserved regional effects \((f_i)\), national macroeconomic shocks \((d_t)\) and a non-correlated error term \((\eta_{it})\).

\[ \omega_{it} = \Sigma_k \gamma_{lk} V_{kit-1} + f_i + d_t + \eta \quad [7] \]

From equation [6] it is clear that the MFP gap coefficient measures the (conditional) speed of convergence with the long-run stationary state of MFP. In the presence of technological convergence, moreover, the technology gap between each region and the leader converges on a constant value. This implies that the vector of variables \((V_{it})\) and the fixed effects for each region only translate into differences in MFP levels but not into permanent differences in MFP growth rates.
2.2.- Data and empirical estimation

The period considered in the study runs from 1989 to 2001, for which the relevant information is available. Thus, we have a sample comprising Spanish regions that have enacted environmental regulations and green taxes, although we have also included regions that made use of neither in order to avoid any possible sample selection bias.

MFP growth, the endogenous variable, was measured as follows: \( \Delta \text{MFP}_{it} = \Delta y_{it} - \alpha_{it} \Delta l_{it} - (1- \alpha_{it}) \Delta k_{it} \), where \( y, l \) and \( k \) are logarithms of actual aggregate or added value, total jobs and capital stock, respectively. Under conditions of perfect competition, \( \alpha_{it} \) may be proxied as the participation of labour in GVA. The main source of data at the level of regional disaggregation for the calculation of productivity as we have defined it consists of the Regional Accounts published by the Spanish National Institute of Statistics (INE in its Spanish acronym)\(^{11}\), which contain comparable regional data on aggregate value and jobs. Data on the stock of fixed capital was obtained from publications by BBVA (Bank of Bilbao, Vizcaya, Argentaria), and the Valencia Institute for Economic Research (http://www.ivie.es/banco/stock.php).

As our objective is to test whether the environmental policies implemented by the Spanish regions have had any impact on efficiency in terms of productivity and economic growth, we have identified the different green taxes enacted by the Spanish regions during the period of the study (1989-2001). This variable has been included as the ratio of the green tax revenues to the total tax take of each region (ENVTAX). These data were supplied by the Ministry of Economy and Finance in territorial statistical publications\(^{12}\). Table 2 shows the environmental taxes established by each region in this period, revealing that ever more regions have legislated in this regard, although some Autonomous Communities still no green taxes in 2001.

---

\(^{11}\) All of the variables obtained from the National Institute of Statistics may be consulted at http://www.ine.es.

Table 2: Environmental taxes established by the Spanish regions, 1989-2001

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Andalusia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aragon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asturias</td>
<td>C. Sewerage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cantabria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Castile-León</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Castile-La Mancha</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balearic Islands</td>
<td>C. Sewerage</td>
<td>C. Sewerage</td>
<td>C. Sewerage</td>
<td>C. Sewerage</td>
<td>Activities affecting the environment</td>
<td>C. Sewerage</td>
<td>Activities affecting the environment</td>
<td>C. Sewerage</td>
</tr>
<tr>
<td>Madrid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murcia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Own work based on the Ministry of Economy and Finance publication: *Financiación de las CCAA de Régimen Común y Ciudades con Estatuto de Autonomía*
The database of the Spanish Institute of Public Law (Instituto de Derecho Público) was used to obtain information on regional environmental regulation (ENVREG). This database contains 22,607 different acts of the regional parliaments, and it provides a complete record of parliamentary activity in the Spanish regions. The information is presented in Table 3, which shows the environmental legislation passed by the Spanish regions in the study period. Again, it may be observed that ever more regions enacted environmental regulations in this period.

<table>
<thead>
<tr>
<th>Year</th>
<th>Andalusia</th>
<th>Aragon</th>
<th>Asturias</th>
<th>Balearic Islands</th>
<th>Valencia</th>
<th>Canary Islands</th>
<th>Cantabria</th>
<th>Castile and Leon</th>
<th>Castile-La Mancha</th>
<th>Catalonia</th>
<th>Extremadura</th>
<th>Galicia</th>
<th>La Rioja</th>
<th>Madrid</th>
<th>Murcia</th>
<th>Navarre</th>
<th>Basque Country</th>
<th>Total regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>1990</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>1991</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>1992</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>1993</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>1994</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>1995</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>1996</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td>1997</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>1998</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>48</td>
</tr>
</tbody>
</table>

Source: own work using the Institute of Public Law database.

As the impact of these environmental policies is not necessarily immediate or permanent, we have lagged these variables. We have also included variables

---

13 This database formed the embryo of the Spanish Senate’s APCA database of parliamentary activity in the Spanish regions, which contains information drawn from the official publications of the Regional Parliaments. These databases are based on Eurovoc, a multidisciplinary and multilingual thesaurus developed by the European Parliament and the Office for Official Publications of the European Communities (OOPEC) used for indexing in at least fifteen European Parliaments. For further discussion of methodological aspects concerning the data obtained and the construction of the regulation variable, see http://www.senado.es/basesdedatos/index.html y http://europa.eu/eurovoc/.
that measure the interaction between environmental regulations or taxes and the technology gap (IRGAP and ITGAP) in order to capture any possible influence of environmental policy on convergence between regions in the period considered. This interaction is also measured with a lag of up to three periods \(^{14}\).

As mentioned in the description of the model, we have also considered other possible explanatory hypotheses for MFP growth in addition to these variables. These are shown with the expected sign in Table 4. Thus, the explanatory variables in the model estimated include the technology gap lagged by one period, which we have defined as the coefficient between the MFP of each region and the MFP of the leader region \((GAP_{t-1})\) as the theoretical model suggests, MFP growth in the leader region \((LEADER)\), and the stock of public capital per employee \((PUBKW)\). We also consider the different levels of human capital between the regions to capture the influence of variations in the quality of labour, based on INE data, which we include as the percentage of illiterate members of the population according to the National Institute of Statistics’ Active Population Survey \((ILLITERATE)\); changes in the production structure, measured as the coefficient of the relative share of services and farming in regional product \((PRODUCTEST)\); and economies of scale or the rate of growth in gross added value in real terms based on the Regional Accounts for Spain published by the National Institute of Statistics \((\Delta RGVA)\). The model also includes certain temporal dummy variables to control for any common aggregate shocks that might affect the variation in the MFP of all regions \(^{15}\).

As it seems reasonable to expect that the behavior of MFP will display some inertia, the method used to estimate the multifactor productivity model presented consisted of a dynamic panel-data model, which includes the dependent variable lagged by one period. Consequently, we opted to estimate the model using the generalized method of moments (GMM), which provides a consistent and efficient estimator (see Hansen, 1982 and Arellano and Bond, 1991). As the unobserved factor, \(f_{it}\) (representing the specific characteristics of

\(^{14}\) The additional lags were eliminated in the case of environmental regulation and its interaction with the technology gap after it was confirmed that these variables have no effects beyond one year. This was also done with the interaction between environmental variables and the technology gap.

\(^{15}\) The key descriptive statistics and the correlation matrix for the principal variables are shown in tables 1.A and 2.A in the annex.
each region), may be correlated with the rest of the variables in the model, we shall estimate the model based on first differences to eliminate individual effects (f). All of the estimations therefore relate to first differences and two-stage estimators with standard errors that are robust to heteroscedasticity.

Table 4: Explanatory variables included in the model

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Expected sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAP_{t-1}</td>
<td>Technology gap (MFP_{t-1}/MFP_{t-1})</td>
</tr>
<tr>
<td>LEADER</td>
<td>MFP growth in the leader region</td>
</tr>
<tr>
<td>PUBKW</td>
<td>Stock of public capital per employee</td>
</tr>
<tr>
<td>ILLITERATE</td>
<td>Human capital</td>
</tr>
<tr>
<td>PRODUCTEST</td>
<td>Changes in the production structure</td>
</tr>
<tr>
<td>ΔRGVA</td>
<td>Economies of scale or gross value added growth rate</td>
</tr>
<tr>
<td>ENVREG</td>
<td>Environmental legislative activity (Porter Hypothesis)</td>
</tr>
<tr>
<td>IRGAP</td>
<td>Interaction of regulation with the technology gap</td>
</tr>
<tr>
<td>ENVTAX</td>
<td>Environmental taxation (Porter Hypothesis)</td>
</tr>
<tr>
<td>ITGAP</td>
<td>Possible influence of environmental taxes on convergence between regions in the period considered</td>
</tr>
</tbody>
</table>

A sufficient number of valid instruments are required to employ the GMM method. In principle, any variable that might be correlated with the regression variables in period t would be classified as a valid instrument wherever it is orthogonal to the error term (otherwise the over-identifying restrictions would be rejected). In our case, we shall use all available lagged levels of the dependent variables, as well as the variables representing human capital, public capital per employee and changes in the production structure. We validate the instruments using the Sargan test for over-identifying restrictions. Tests were also included for the absence of first and second order serial correlation, allowing us to analyse the consistency of estimators. If errors are not autocorrelated, evidence of first-order autocorrelation of differenced residual errors must exist, but no evidence of second-order autocorrelation.

16 Some studies suggest that regulation, environmental taxes and economies of scale could be endogenous. Consequently, we have treated these variables as endogenous in the estimates and they are not used as instruments.

17 This is a test for over-identifying restrictions. The test statistic is asymptotically distributed as chi-squared with the same degrees of freedom as the number of over-identifying restrictions tested. Given that the available sample size is not particularly large in the present case, we report t statistics instead of Z statistics, and F statistics instead of chi-squared statistics.
Based on the results obtained, reflected in Table 5, we may conclude that the technology gap lagged by one period (GAP_{t-1}) displays a significant, negative effect at conventional levels, which suggests, in view of the definition of the gap in the theoretical model, that the regions furthest from the technological forefront have higher rates of productivity growth, which is to say long-run technological progress exists based on imitation of the leader, as Gual, Jódar and Ruiz (2003), and Nicoletti and Scarpetta (2003) appear to find for regulation indicators, although the former did not employ econometric techniques. Short run technological progress (i.e. the coefficient for the leading region) is also significant (LEADER), and the leader region therefore exerts a drag effect on the other regions.

Table 5: Results of the dynamic panel data model with lag effects for the estimation of multifactor productivity

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>t-student</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFP_{t-1}</td>
<td>-0.5797338</td>
<td>-6.93**</td>
</tr>
<tr>
<td>LOG(GAP_{t-1})</td>
<td>-0.3238982</td>
<td>-5.95**</td>
</tr>
<tr>
<td>ΔLOG(LEADER)</td>
<td>0.6534797</td>
<td>4.05**</td>
</tr>
<tr>
<td>PUBKW</td>
<td>0.000000925</td>
<td>6.29**</td>
</tr>
<tr>
<td>ILLITERATE</td>
<td>0.000000523</td>
<td>0.01</td>
</tr>
<tr>
<td>PRODUCTEST</td>
<td>-0.0000823</td>
<td>-4.26**</td>
</tr>
<tr>
<td>ARGVA</td>
<td>0.6686047</td>
<td>10.06**</td>
</tr>
<tr>
<td>ENVREG</td>
<td>-0.0008331</td>
<td>-1.97*</td>
</tr>
<tr>
<td>ENVREG_{t-1}</td>
<td>-0.0000543</td>
<td>-0.15</td>
</tr>
<tr>
<td>IRGAP</td>
<td>0.0002221</td>
<td>0.45</td>
</tr>
<tr>
<td>IRGAP_{t-1}</td>
<td>-0.0001589</td>
<td>-0.55</td>
</tr>
<tr>
<td>ENVTAX</td>
<td>-0.0179716</td>
<td>-1.26</td>
</tr>
<tr>
<td>ENVTAX_{t-1}</td>
<td>0.0383316</td>
<td>2.92**</td>
</tr>
<tr>
<td>ENVTAX_{t-2}</td>
<td>-0.0076448</td>
<td>-0.79</td>
</tr>
<tr>
<td>ENVTAX_{t-3}</td>
<td>-0.00361</td>
<td>-0.41</td>
</tr>
<tr>
<td>ITGAP</td>
<td>-0.0756722</td>
<td>-1.58</td>
</tr>
<tr>
<td>ITGAP_{t-1}</td>
<td>0.0606302</td>
<td>1.62</td>
</tr>
<tr>
<td>T93</td>
<td>0.0176559</td>
<td>1.62</td>
</tr>
<tr>
<td>T94</td>
<td>-0.0353343</td>
<td>-2.09*</td>
</tr>
<tr>
<td>T95</td>
<td>0.002046</td>
<td>0.22</td>
</tr>
<tr>
<td>T96</td>
<td>0.0161402</td>
<td>1.64</td>
</tr>
<tr>
<td>T97</td>
<td>-0.0087712</td>
<td>-0.93</td>
</tr>
<tr>
<td>T98</td>
<td>-0.0034294</td>
<td>-0.34</td>
</tr>
<tr>
<td>T99</td>
<td>-0.0127335</td>
<td>-1.41</td>
</tr>
<tr>
<td>T00</td>
<td>0.013773</td>
<td>1.52</td>
</tr>
<tr>
<td>T01</td>
<td>0.0154484</td>
<td>1.71*</td>
</tr>
<tr>
<td>C</td>
<td>-0.0015248</td>
<td>-0.18</td>
</tr>
</tbody>
</table>

Observations: 153
First-order serial correlation: -2.67
Second-order serial correlation: -0.39
Sargan test: F-statistic: 134.91

* Significantly different from 0 at a level of confidence between 99% and 95% in the bilateral test.
** Significantly different from 0 at a level of confidence of 99% in the bilateral test.
The influence of public capital per employee (PUBKW) and economies of scale (ΔRGVA) is positive and significant, as was expected. This result reflects the importance of the stock of public capital for productivity gains, as well as the significant role played by economies of scale in the growth achieved by Spain after joining the European Union. The reallocation of resources between productive sectors is measured through the variable (PRODUCTEST). The estimation displays a significant, negative coefficient, and the change in the structure of production may therefore be said to have had a negative influence on productivity growth, which is consistent with the increase in the relative size of the service sector and the expansion of construction, both sectors in which productivity tends to be low. Meanwhile, the results suggest that human capital (ILLITERATE) has an indeterminate effect on the variation in MFP. As Islam (1995) argues, this non-significant result can basically be attributed to the fact that the variables selected are not good proxies for the theoretical concept of human capital. Or it may be that the channels through which human capital affects productivity growth are more complex than can be reflected through the mere inclusion of a multiplier in the equation. There is another possible explanation associated with the fact that human capital presents important shortcomings as was evidenced by the Pisa report OECD (2004) for Spain.

The estimation also indicates that green taxes lagged by one period (ENVTAXt-1) has a positive effect on productivity, which may be because taxes of this kind drive organizational and technological changes in firms seeking to reduce their tax payments, causing a positive effect on multifactor productivity growth. Furthermore, green taxes do not seem to influence the effect of the technology gap on productivity by accelerating technology transfer, as the impact of the gap on productivity growth did not prove to be significant when the two variables interact (ITGAP).

Environmental regulation (ENVREG), meanwhile, displays a negative, significant coefficient, and it may therefore be deduced that this factor slows multifactor productivity growth, suggesting that policy has not been well instrumented, as Porter argued (1991). As Griffith and Harrison (2004) and Griffith, Harrison and Simpson (2006) argue, these costs do not really represent the
economic or efficiency cost of regulation, because regulation also creates significant but unquantifiable burdens for government, the agents regulated and society in general, such as adverse effects on competition, flexibility and innovation (potentially acting as a drag on productivity and economic competitiveness), as well as uncertainties and private incentives that may affect decision making (distorting or overstimulating investment, or reducing the support required for certain activities). Nevertheless, the empirical evidence does not allow any clear conclusions to be drawn with regard to the impact of environmental legislation on technology transfer, as the coefficient for the interaction between the two variables is not significant (ITGAP).

3. Conclusions

Economic growth and productivity may to some be extent influenced by a series of factors (such as human capital, the technology gap, etc.), and many studies have sought to establish whether environmental policy affects economic growth in the ways predicted either by Porter or by his detractors. Given the successive reforms of direct taxation undertaken by the central and regional government of Spain, and the policy of introduce green taxes in some regions, this study examines whether the environmental policy implemented by the Spanish regions could have had any influence on efficiency in terms of productivity and economic growth. To this end, we have adapted the multifactor productivity model proposed by Jorgenson and Wilcoxen (1990), Nicoletti and Scarpetta (2003), De Vries and Withagen (2005), and Loayza et al. (2005) to the context of the Spanish regions, and we have estimated a dynamic panel-data model for the period 1989-2001 that reflects the effects of environmental taxation and regulation separately. The model also allows dynamic treatment in our econometric estimate, given the possibility that failure to consider the dynamic nature of the problem analysed may explain the discrepancies appearing in the different empirical studies.

The results from the model, which was estimated using the generalized method of moments estimator (GMM), suggest that short-run technological progress (i.e. the coefficient for the leading regions) is positive and significant. Hence, the leader region exerts a drag effect on the others, and the most
technologically backward regions grow faster than the leader, which is to say they achieve long-run technology gains by imitation. Public capital per employee and economies of scale also have a positive influence on productivity growth, as was expected, while changes in the productive structure have had a negative impact on productivity growth, which is consistent with the increasing size of the service sector and construction, both low-productivity industries.

The results indicate that green taxes, lagged by one period, have a positive effect on productivity, which may be because they drive organizational and technological change in firms seeking to reduce their tax payments. This would have a positive effect on growth in multifactor productivity. Meanwhile, environmental regulation (ENVREG) has slowed growth in multifactor productivity and, therefore, it has not been appropriately instrumented, as Porter (1991) argued. This result provides further empirical evidence in favour of the Porter hypothesis, to the extent that a strict environmental policy implemented via green taxes rather than regulation may raise productivity or enhance comparative advantage, improving the competitiveness of the firms subject to the environmental policy, thereby offsetting the costs it initially entailed.

The obtained results could also support the hypothesis that tax decentralization on the revenue side via more intensive use of environmental taxation may boost economic growth, and they could form the basis for a study of the validity of the double dividend theory in this context. Future research could develope in these lines.
References


APPENDIX

Table 1.A: Descriptive statistics for the main variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG(MFP_{t-1})</td>
<td>136</td>
<td>0.01901</td>
<td>0.0193047</td>
<td>-0.02402</td>
<td>0.077958</td>
</tr>
<tr>
<td>LOG(GAP_{t-1})</td>
<td>136</td>
<td>-0.20325</td>
<td>0.1303527</td>
<td>-0.57634</td>
<td>0</td>
</tr>
<tr>
<td>ΔLOG(LEADER)</td>
<td>136</td>
<td>0.02417</td>
<td>0.032182</td>
<td>-0.01956</td>
<td>0.086612</td>
</tr>
<tr>
<td>PUBIKW</td>
<td>136</td>
<td>14530.31</td>
<td>3210.464</td>
<td>9049.246</td>
<td>20656.22</td>
</tr>
<tr>
<td>ANALFAB</td>
<td>136</td>
<td>15.25369</td>
<td>7.602436</td>
<td>3.48312</td>
<td>30.0672</td>
</tr>
<tr>
<td>PRODUCTEST</td>
<td>136</td>
<td>64.7516</td>
<td>8.027211</td>
<td>46.57741</td>
<td>83.64017</td>
</tr>
<tr>
<td>ΔRGVAB</td>
<td>136</td>
<td>0.04574</td>
<td>0.014926</td>
<td>0.00697</td>
<td>0.085779</td>
</tr>
<tr>
<td>ENVREG</td>
<td>136</td>
<td>1.82353</td>
<td>3.138488</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>ENVTAX</td>
<td>136</td>
<td>0.20029</td>
<td>0.3887194</td>
<td>0</td>
<td>1.886767</td>
</tr>
</tbody>
</table>

Table 2.A: Correlation matrix for the main variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>MFP_{t-1}</th>
<th>LOG(GAP_{t-1})</th>
<th>ΔLOG(LEADER)</th>
<th>PUBIK</th>
<th>ANALFAB</th>
<th>PRODUCTEST</th>
<th>ΔRGVAB</th>
<th>AMBREG</th>
<th>AMBTAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG(MFP_{t-1})</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOG(GAP_{t-1})</td>
<td>-0.1335</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔLOG(LEADER)</td>
<td>0.3902</td>
<td>0.0352</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUBIKW</td>
<td>0.1131</td>
<td>-0.1757</td>
<td>0.0932</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANALFAB</td>
<td>0.0014</td>
<td>-0.6051</td>
<td>0.0088</td>
<td>-0.1576</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRODUCTEST</td>
<td>0.1024</td>
<td>0.2032</td>
<td>0.0029</td>
<td>-0.4466</td>
<td>0.1853</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔRGVAB</td>
<td>0.3801</td>
<td>0.0343</td>
<td>-0.1436</td>
<td>0.0161</td>
<td>-0.0499</td>
<td>0.3442</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENVREG</td>
<td>0.1185</td>
<td>0.0325</td>
<td>0.1846</td>
<td>-0.1033</td>
<td>0.0139</td>
<td>0.0391</td>
<td>-0.0064</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>ENVTAX</td>
<td>0.0659</td>
<td>0.0858</td>
<td>0.0339</td>
<td>-0.1923</td>
<td>0.1891</td>
<td>0.5941</td>
<td>0.2197</td>
<td>0.0225</td>
<td>1.0000</td>
</tr>
</tbody>
</table>
Últimos números publicados

159/2000  Participación privada en la construcción y explotación de carreteras de peaje
    Ginés de Rus, Manuel Romero y Lourdes Trujillo

160/2000  Errores y posibles soluciones en la aplicación del Value at Risk
    Mariano González Sánchez

161/2000  Tax neutrality on saving assets. The spahish case before and after the tax reform
    Cristina Ruza y de Paz-Curbera

162/2000  Private rates of return to human capital in Spain: new evidence
    F. Barceinas, J. Oliver-Alonso, J.L. Raymond y J.L. Roig-Sabaté

163/2000  El control interno del riesgo. Una propuesta de sistema de límites
    riesgo neutral
    Mariano González Sánchez

164/2001  La evolución de las políticas de gasto de las Administraciones Públicas en los años 90
    Alfonso Utrilla de la Hoz y Carmen Pérez Esparrells

165/2001  Bank cost efficiency and output specification
    Emili Tortosa-Ausina

166/2001  Recent trends in Spanish income distribution: A robust picture of falling income inequality
    Josep Oliver-Alonso, Xavier Ramos y José Luis Raymond-Bara

167/2001  Efectos redistributivos y sobre el bienestar social del tratamiento de las cargas familiares en
    el nuevo IRPF
    Nuria Badenes Plá, Julio López Laborda, Jorge Onrubia Fernández

168/2001  The Effects of Bank Debt on Financial Structure of Small and Medium Firms in some Euro-
    pean Countries
    Mónica Melle-Hernández

169/2001  La política de cohesión de la UE ampliada: la perspectiva de España
    Ismael Sanz Labrador

170/2002  Riesgo de liquidez de Mercado
    Mariano González Sánchez

171/2002  Los costes de administración para el afiliado en los sistemas de pensiones basados en cuentas
    de capitalización individual: medida y comparación internacional.
    José Enrique Devesa Carpio, Rosa Rodríguez Barrera, Carlos Vidal Meliá

    y propuestas de metodología para la explotación de la información de los ingresos y el gasto.
    Llorenc Pou, Joaquín Alegre

173/2002  Modelos paramétricos y no paramétricos en problemas de concesión de tarjetas de credito.
    Rosa Puertas, María Bonilla, Ignacio Olmeda
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 en 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 notional defined contribution accounts (NDCs)
Carlos Vidal-Meliá, Inmaculada Domínguez-Fabian y José Enrique Devesa-Carpio

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

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

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

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

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 Díaz
221/2005  Tendencia post-anuncio de resultados contables: evidencia para el mercado español
Carlos Forner Rodríguez, Joaquín Marhuenda Fructuoso y Sonia Sanabria García

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

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

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

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

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

Alejandro Estellér Moré

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

Daniel Vázquez-Bustelo and Sandra Valle

Alfonso Palacio-Vera

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

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

Miguel Angel Barberán Lahuerta

Víctor M. González

Waymond Rodgers, Paul Pavlou and Andres Guiral.

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

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


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

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


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


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

José M. Pastor, Empar Pons y Lorenzo Serrano

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

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

257/2006 La internacionalización de la empresa 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 Perdiguer.

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
<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>272/2006</td>
<td>Riesgo asimétrico y estrategias de momentum en el mercado de valores español</td>
<td>Luis Muga y Rafael Santamaría</td>
</tr>
<tr>
<td>273/2006</td>
<td>Valoración de capital-riesgo en proyectos de base tecnológica e innovadora a través de la teoría de opciones reales</td>
<td>Gracia Rubio Martín</td>
</tr>
<tr>
<td>274/2006</td>
<td>Capital stock and unemployment: searching for the missing link</td>
<td>Ana Rosa Martínez-Cañete, Elena Márquez de la Cruz, Alfonso Palacio-Vera and Inés Pérez-Soba Aguilar</td>
</tr>
<tr>
<td>275/2006</td>
<td>Study of the influence of the voters’ political culture on vote decision through the simulation of a political competition problem in Spain</td>
<td>Sagrario Lantarón, Isabel Lillo, Mª Dolores López and Javier Rodrigo</td>
</tr>
<tr>
<td>276/2006</td>
<td>Investment and growth in Europe during the Golden Age</td>
<td>Antonio Cubel and Mª Teresa Sanchis</td>
</tr>
<tr>
<td>277/2006</td>
<td>Efectos de vincular la pensión pública a la inversión en cantidad y calidad de hijos en un modelo de equilibrio general</td>
<td>Robert Meneu Gaya</td>
</tr>
<tr>
<td>278/2006</td>
<td>El consumo y la valoración de activos</td>
<td>Elena Márquez y Belén Nieto</td>
</tr>
<tr>
<td>280/2006</td>
<td>Three measures of returns to education: An illustration for the case of Spain</td>
<td>María Arrazola y José de Hevia</td>
</tr>
<tr>
<td>281/2006</td>
<td>Composition of Firms versus Composition of Jobs</td>
<td>Antoni Cunyat</td>
</tr>
<tr>
<td>282/2006</td>
<td>La vocación internacional de un holding tranviario belga: la Compagnie Mutuelle de Tramways, 1895-1918</td>
<td>Alberte Martínez López</td>
</tr>
<tr>
<td>283/2006</td>
<td>Una visión panorámica de las entidades de crédito en España en la última década.</td>
<td>Constantino García Ramos</td>
</tr>
<tr>
<td>285/2006</td>
<td>Los intereses belgas en la red ferroviaria catalana, 1890-1936</td>
<td>Alberte Martínez López</td>
</tr>
<tr>
<td>286/2006</td>
<td>The Governance of Quality: The Case of the Agrifood Brand Names</td>
<td>Marta Fernández Barcala, Manuel González-Díaz y Emmanuel Raynaud</td>
</tr>
<tr>
<td>287/2006</td>
<td>Modelling the role of health status in the transition out of malthusian equilibrium</td>
<td>Paolo Rungo, Luis Currais and Berta Rivera</td>
</tr>
<tr>
<td>288/2006</td>
<td>Industrial Effects of Climate Change Policies through the EU Emissions Trading Scheme</td>
<td>Xavier Labandeira and Miguel Rodriguez</td>
</tr>
</tbody>
</table>
Globalisation and the Composition of Government Spending: An analysis for OECD countries
Norman Gemmell, Richard Kneller and Ismael Sanz

La producción de energía eléctrica en España: Análisis económico de la actividad tras la liberalización del Sector Eléctrico
Fernando Hernández Martínez

Further considerations on the link between adjustment costs and the productivity of R&D investment: evidence for Spain
Desiderio Romero-Jordán, José Félix Sanz-Sanz and Inmaculada Álvarez-Ayuso

Una teoría sobre la contribución de la función de compras al rendimiento empresarial
Javier González Benito

Agility drivers, enablers and outcomes: empirical test of an integrated agile manufacturing model
Daniel Vázquez-Bustelo, Lucía Avella and Esteban Fernández

Testing the parametric vs the semiparametric generalized mixed effects models
Maria José Lombardía and Stefan Sperlich

Nonlinear dynamics in energy futures
Mariano Matilla-García

Estimating Spatial Models By Generalized Maximum Entropy Or How To Get Rid Of W
Esteban Fernández Vázquez, Matías Mayor Fernández and Jorge Rodríguez-Valez

Optimización fiscal en las transmisiones lucrativas: análisis metodológico
Félix Domínguez Barrero

La situación actual de la banca online en España
Francisco José Climent Diranzo y Alexandre Momparler Pechuán

Estrategia competitiva y rendimiento del negocio: el papel mediador de la estrategia y las capacidades productivas
Javier González Benito y Isabel Suárez González

A Parametric Model to Estimate Risk in a Fixed Income Portfolio
Pilar Abad and Sonia Benito

Análisis Empírico de las Preferencias Sociales Respecto del Gasto en Obra Social de las Cajas de Ahorros
Alejandro Esteller-Moré, Jonathan Jorba Jiménez y Albert Solé-Ollé

Assessing the enlargement and deepening of regional trading blocs: The European Union case
Salvador Gil-Pareja, Rafael Llorca-Vivero y José Antonio Martínez-Serrano

¿Es la Franquicia un Medio de Financiación?: Evidencia para el Caso Español
Vanessa Solís Rodríguez y Manuel González Díaz

On the Finite-Sample Biases in Nonparametric Testing for Variance Constancy
Paulo M.M. Rodrigues and Antonio Rubia

Spain is Different: Relative Wages 1989-98
José Antonio Carrasco Gallego
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, Belén Iráizoz, Pedro Pascual and Manuel Rapún

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

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

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

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

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

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

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

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

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

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

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

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

322/2007 Human resource management and environment management systems: an empirical study
Mª Concepción López Fernández, Ana Mª Serrano Bedia 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
¿Cómo organizar una cadena hotelera? La elección de la forma de gobierno  
Marta Fernández Barcala y Manuel González Díaz

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

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

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

Andrea Martínez-Noya and Esteban García-Canal

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

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

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

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

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

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

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

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

Convergencia regional en renta y bienestar en España  
Robert Meneu Gaya

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

374/2008 Smooth Transition from Fixed Effects to Mixed Effects Models in Multi-level regression Models
Maria José Lombardía and Stefan Sperlich
<table>
<thead>
<tr>
<th>Número</th>
<th>Título</th>
<th>Autor(es)</th>
</tr>
</thead>
<tbody>
<tr>
<td>375/2008</td>
<td>A Revenue-Neutral Tax Reform to Increase Demand for Public Transport Services</td>
<td>Carlos Pestana Barros and Juan Prieto-Rodriguez</td>
</tr>
<tr>
<td>376/2008</td>
<td>Measurement of intra-distribution dynamics: An application of different approaches to the European regions</td>
<td>Adolfo Maza, María Hierro and José Villaverde</td>
</tr>
<tr>
<td>377/2008</td>
<td>Migración interna de extranjeros y ¿nueva fase en la convergencia?</td>
<td>María Hierro y Adolfo Maza</td>
</tr>
<tr>
<td>378/2008</td>
<td>Efectos de la Reforma del Sector eléctrico: Modelización teórica y Experiencia Internacional</td>
<td>Ciro Eduardo Bazán Navarro</td>
</tr>
<tr>
<td>379/2008</td>
<td>A Non-Parametric Independence Test Using Permutation Entropy</td>
<td>Mariano Matilla-Garcia and Manuel Ruiz Marín</td>
</tr>
<tr>
<td>380/2008</td>
<td>Testing for the General Fractional Unit Root Hypothesis in the Time Domain</td>
<td>Uwe Hassler, Paulo M.M. Rodrigues and Antonio Rubia</td>
</tr>
<tr>
<td>381/2008</td>
<td>Multivariate gram-charlier densities</td>
<td>Esther B. Del Brio, Trino-Manuel Ñíguez and Javier Perote</td>
</tr>
<tr>
<td>382/2008</td>
<td>Analyzing Semiparametrically the Trends in the Gender Pay Gap - The Example of Spain</td>
<td>Ignacio Moral-Arce, Stefan Sperlich, Ana I. Fernández-Sainz and María J. Roca</td>
</tr>
<tr>
<td>383/2008</td>
<td>A Cost-Benefit Analysis of a Two-Sided Card Market</td>
<td>Santiago Carbó Valverde, David B. Humphrey, José Manuel Liñares Zegarra and Francisco Rodríguez</td>
</tr>
<tr>
<td>385/2008</td>
<td>Valoración de las grandes corporaciones farmacéuticas, a través del análisis de sus principales intangibles, con el método de opciones reales</td>
<td>Gracia Rubio Martín y Prosper Lamothe Fernández</td>
</tr>
<tr>
<td>386/2008</td>
<td>El marketing interno como impulsor de las habilidades comerciales de las pymes españolas: efectos en los resultados empresariales</td>
<td>Mª Leticia Santos Vijande, Mª José Sanzo Pérez, Nuria García Rodríguez y Juan A. Trespalacios</td>
</tr>
<tr>
<td>388/2008</td>
<td>Aglomeración espacial, Potencial de Mercado y Geografía Económica: Una revisión de la literatura</td>
<td>Jesús López-Rodríguez y J. Andrés Faiña</td>
</tr>
<tr>
<td>389/2008</td>
<td>An empirical assessment of the impact of switching costs and first mover advantages on firm performance</td>
<td>Jaime Gómez, Juan Pablo Maicas</td>
</tr>
<tr>
<td>390/2008</td>
<td>Tender offers in Spain: testing the wave</td>
<td>Ana R. Martínez-Cañete y Inés Pérez-Soba Aguilar</td>
</tr>
</tbody>
</table>
La integración del mercado español a finales del siglo XIX: los precios del trigo entre 1891 y 1905
Mariano Matilla García, Pedro Pérez Pascual y Basilio Sanz Carnero

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

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

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

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

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

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

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

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

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

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

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

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

Análisis de fusiones, variaciones conjeturales y la falacia del estimator en diferencias
Juan Jiménez y Jordi Perdiguero

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

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

La presión fiscal por impuesto sobre sociedades en la unión europea
Elena Fernández Rodríguez, Antonio Martínez Arias y Santiago Álvarez García
408/2008 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

409/2008 Cooperation for innovation: the impact on innovatory effort
Gloria Sánchez González and Liliana Herrera

410/2008 Spanish post-earnings announcement drift and behavioral finance models
Carlos Forner and Sonia Sanabria

411/2008 Decision taking with external pressure: evidence on football manager dismissals in argentina and their consequences
Ramón Flores, David Forrest and Juan de Dios Tena

Raúl Serrano y Vicente Pinilla

413/2008 Voter heuristics in Spain: a descriptive approach elector decision
José Luis Sáez Lozano and Antonio M. Jaime Castillo

414/2008 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

415/2008 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

416/2008 Organizational innovation and productivity growth: Assessing the impact of outsourcing on firm performance
Alberto López

417/2008 Value Efficiency Analysis of Health Systems
Eduardo González, Ana Cárcaba & Juan Ventura

418/2008 Equidad en la utilización de servicios sanitarios públicos por comunidades autónomas en España: un análisis multinivel
Ignacio Abásolo, Jaime Pinilla, Miguel Negrín, Raquel Aguiar y Lidia García

419/2008 Piedras en el camino hacia Bolonia: efectos de la implantación del EEES sobre los resultados académicos
Carmen Florido, Juan Luis Jiménez e Isabel Santana

420/2008 The welfare effects of the allocation of airlines to different terminals
M. Pilar Socorro and Ofelia Betancor

421/2008 How bank capital buffers vary across countries. The influence of cost of deposits, market power and bank regulation
Ana Rosa Fonseca and Francisco González

422/2008 Analysing health limitations in spain: an empirical approach based on the european community household panel
Marta Pascual and David Cantarero
Regional productivity variation and the impact of public capital stock: an analysis with spatial interaction, with reference to Spain
Miguel Gómez-Antonio and Bernard Fingleton

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

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

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

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

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

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

Efectos de la descentralización fiscal sobre el precio de los carburantes en España
Desiderio Romero Jordán, Marta Jorge García-Inés y Santiago Álvarez García

Euros, firm size and export behavior
Silviano Esteve-Pérez, Salvador Gil-Pareja, Rafael Llorca-Vivero and José Antonio Martínez-Serrano

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

Potencial de Mercado y Estructura Espacial de Salarios: El Caso de Colombia
Jesús López-Rodríguez and Maria Cecilia Acevedo

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

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

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

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

Friendly or Controlling Boards?
Pablo de Andrés Alonso & Juan Antonio Rodríguez Sanz
439/2009 La sociedad Trenor y Cía. (1838-1926): un modelo de negocio industrial en la España del siglo XIX
Amparo Ruiz Llopis

440/2009 Continental bias in trade
Salvador Gil-Pareja, Rafael Llorca-Vivero & José Antonio Martínez Serrano

441/2009 Determining operational capital at risk: an empirical application to the retail banking
Enrique José Jiménez-Rodriguez, José Manuel Feria-Dominguez & José Luis Martín-Marín

442/2009 Costes de mitigación y escenarios post-kyoto en España: un análisis de equilibrio general para España
Mikel González Ruiz de Eguino

443/2009 Las revistas españolas de economía en las bibliotecas universitarias: ranking, valoración del indicador y del sistema
Valentín Edo Hernández

444/2009 Convergencia económica en España y coordinación de políticas económicas. un estudio basado en la estructura productiva de las CC.AA.
Ana Cristina Mingorance Arnáiz

445/2009 Instrumentos de mercado para reducir emisiones de co2: un análisis de equilibrio general para España
Mikel González Ruiz de Eguino

446/2009 El comercio intra e inter-regional del sector Turismo en España
Carlos Llano y Tamara de la Mata

447/2009 Efectos del incremento del precio del petróleo en la economía española: Análisis de cointegración y de la política monetaria mediante reglas de Taylor
Fernando Hernández Martinez

448/2009 Bologna Process and Expenditure on Higher Education: A Convergence Analysis of the EU-15
T. Agasisti, C. Pérez Esparrells, G. Catalano & S. Morales

449/2009 Global Economy Dynamics? Panel Data Approach to Spillover Effects
Gregory Daco, Fernando Hernández Martínez & Li-Wu Hsu

450/2009 Pricing levered warrants with dilution using observable variables
Isabel Abinzano & Javier F. Navas

Lucio Fuentelsaz, Jaime Gómez & Sergio Palomas

452/2009 A Detailed Comparison of Value at Risk in International Stock Exchanges
Pilar Abad & Sonia Benito

453/2009 Understanding offshoring: has Spain been an offshoring location in the nineties?
Belén González-Díaz & Rosario Gandoy

454/2009 Outsourcing decision, product innovation and the spatial dimension: Evidence from the Spanish footwear industry
José Antonio Belso-Martínez
On measuring the effect of demand uncertainty on costs: an application to port terminals
Ana Rodríguez-Álvarez, Beatriz Tovar & Alan Wall

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

José Antonio Carrasco Gallego

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

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

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

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

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

505/2010  The effect of technological, commercial and human resources on the use of new technology
Jaime Gómez & Pilar Vargas
¿Cómo ha afectado la fiscalidad a la rentabilidad de la inversión en vivienda en España? Un análisis para el periodo 1996 y 2007
Jorge Onrubia Fernández y María del Carmen Rodado Ruiz

Modelización de flujos en el análisis input-output a partir de la teoría de redes
Ana Salomé García Muñiz

Export-led-growth hypothesis revisited. A balance of payments approach for Argentina, Brazil, Chile and Mexico
David Matesanz Gómez & Guadalupe Fugarolas Álvarez-Ude

Realised hedge ratio properties, performance and implications for risk management: evidence from the spanish ibex 35 spot and futures markets
David G McMillan & Raquel Quiroga García

Do we sack the manager... or is it better not to? Evidence from Spanish professional football
Francisco González-Gómez, Andrés J. Picazo-Tadeo & Miguel Á. García-Rubio

Have Spanish port sector reforms during the last two decades been successful? A cost frontier approach
Ana Rodríguez-Álvarez & Beatriz Tovar

Size & Regional Distribution of Financial Behavior Patterns in Spain
Juan Antonio Maroto Acín, Pablo García Estévez & Salvador Roji Ferrari

The impact of public reforms on the productivity of the Spanish ports: a parametric distance function approach
Ramón Núñez-Sánchez & Pablo Coto-Millán

Trade policy versus institutional trade barriers: an application using “good old” ols
Laura Márquez-Ramos, Inmaculada Martínez-Zarzoso & Celestino Suárez-Burguet

The “Double Market” approach in venture capital and private equity activity: the case of Europe
Marina Balboa & José Martí

International accounting differences and earnings smoothing in the banking industry
Marina Balboa, Germán López-Espinosa & Antonio Rubia

Convergence in car prices among European countries
Simón Sosvilla-Rivero & Salvador Gil-Pareja

Effects of process and product-oriented innovations on employee downsizing
José David Vicente-Lorente & José Ángel Zúñiga-Vicente

Inequality, the politics of redistribution and the tax-mix
Jenny De Freitas

Efectos del desajuste educativo sobre el rendimiento privado de la educación: un análisis para el caso español (1995-2006)
Inés P. Murillo, Marta Rahona y Mª del Mar Salinas

Structural breaks and real convergence in opec countries
Juncal Cuñado

Human Capital, Geographical location and Policy Implications: The case of Romania
Jesús López-Rodríguez, Andres Faiña y Bolea Cosmin-Gabriel
The efficiency of public and publicly-subsidized high schools in Spain: evidence from pisa-2006
Maria Jesús Mancebón, Jorge Calero, Álvaro Choi & Domingo P. Ximénez-de-Embún

Regulation as a way to force innovation: the biodiesel case
Jordi Perdiguero & Juan Luis Jiménez

Pricing strategies of Spanish network carrier
Xavier Fageda, Juan Luis Jiménez & Jordi Perdiguero

Papel del posicionamiento del distribuidor en la relación entre la marca de distribuidor y lealtad al establecimiento comercial
Oscar González-Benito y Mercedes Martos-Partal

How Bank Market Concentration, Regulation, and Institutions Shape the Real Effects of Banking Crises
Ana I. Fernández, Francisco González & Nuria Suárez

Una estimación del comercio interregional trimestral de bienes en España mediante técnicas de interpolación temporal
Nuria Gallego López, Carlos Llano Verduras y Julián Pérez García

Puerto, empresas y ciudad: una aproximación histórica al caso de Las Palmas de Gran Canaria
Miguel Suárez, Juan Luis Jiménez y Daniel Castillo

Multinationals in the motor vehicles industry: a general equilibrium analysis for a transition economy
Concepción Latorre & Antonio G. Gómez-Plana

Core/periphery scientific collaboration networks among very similar researchers
Antoni Rubi-Barceló

Basic R&D in vertical markets
Miguel González-Maestre & Luis M. Granero

Factores condicionantes de la presión fiscal de las entidades de crédito españolas, ¿existen diferencias entre bancos y cajas de ahorros?
Ana Rosa Fonseca Díaz, Elena Fernández Rodríguez y Antonio Martínez Arias

Analyzing an absorptive capacity: Unlearning context and Information System Capabilities as catalysts for innovativeness
Gabriel Cepeda-Carrión, Juan Gabriel Cegarra-Navarro & Daniel Jimenez-Jimenez

The resolution of banking crises and market discipline: international evidence
Elena Cubillas, Ana Rosa Fonseca & Francisco González

A strategic approach to network value in information markets
Lucio Fuentelsaz, Elisabet Garrido & Juan Pablo Maicas

Accounting for the time pattern of remittances in the Spanish context
Alfonso Echazarra

How to design franchise contracts: the role of contractual hazards and experience
Vanesa Solis-Rodriguez & Manuel Gonzalez-Diaz
555/2010 Una teoría integradora de la función de producción al rendimiento empresarial
Javier González Benito

556/2010 Height and economic development in Spain, 1850-1958
Ramón Maria-Dolores & José Miguel Martínez-Carrión

557/2010 Why do entrepreneurs use franchising as a financial tool? An agency explanation
Manuel González-Díaz & Vanesa Solís-Rodríguez

558/2010 Explanatory Factors of Urban Water Leakage Rates in Southern Spain
Francisco González-Gómez, Roberto Martínez-Espiñeira, Maria A. García-Valiñas & Miguel Á. García Rubio

559/2010 Los rankings internacionales de las instituciones de educación superior y las clasificaciones universitarias en España: visión panorámica y prospectiva de futuro.
Carmen Pérez-Esparrells y José Mª Gómez-Sancho.

560/2010 Análisis de los determinantes de la transparencia fiscal: Evidencia empírica para los municipios catalanes
Alejandro Esteller Moré y José Polo Otero

561/2010 Diversidad lingüística e inversión exterior: el papel de las barreras lingüísticas en los procesos de adquisición internacional
Cristina López Duarte y Marta Mª Vidal Suárez

562/2010 Costes y beneficios de la competencia fiscal en la Unión Europea y en la España de las autonomías
José Mª Cantos, Agustín García Rico, Mª Gabriela Lagos Rodríguez y Raquel Álamo Cerrillo

563/2010 Customer base management and profitability in information technology industries
Juan Pablo Maicas y Francisco Javier Sese

564/2010 Expansión internacional y distancia cultural: distintas aproximaciones —hofstede, schwartz, globe
Cristina López Duarte y Marta Mª Vidal Suárez

565/2010 Economies of scale and scope in service firms with demand uncertainty: An application to a Spanish port
Beatriz Tovar & Alan Wall

566/2010 Fiscalidad y elección entre renta vitalicia y capital único por los inversores en planes de pensiones: el caso de España
Félix Domínguez Barrero y Julio López Laborda

567/2010 Did the cooperative start life as a joint-stock company? Business law and cooperatives in Spain, 1869–1931
Timothy W. Guinnan & Susana Martínez-Rodríguez

Félix J. López-Iturriaga, Óscar López-de-Foronda & Iván Pastor Sanz

569/2010 Financiación de los cuidados de larga duración en España
Raúl del Pozo Rubio y Francisco Escribano Sotos
<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>Is the Border Effect an Artefact of Geographic Aggregation?</td>
<td>Carlos Llano-Verduras, Asier Minondo-Uribe &amp; Francisco Requena-Silvente</td>
</tr>
<tr>
<td>2010</td>
<td>Notes on using the hidden asset or the contribution asset to compile the actuarial balance for pay-as-you-go pension systems</td>
<td>Carlos Vidal-Meliá &amp; María del Carmen Boado-Penas</td>
</tr>
<tr>
<td>2010</td>
<td>The Real Effects of Banking Crises: Finance or Asset Allocation Effects? Some International Evidence</td>
<td>Ana I. Fernández, Francisco González &amp; Nuria Suárez Carlos</td>
</tr>
<tr>
<td>2010</td>
<td>Endogenous mergers of complements with mixed bundling</td>
<td>Ricardo Flores-Fillol &amp; Rafael Moner-Colonques</td>
</tr>
<tr>
<td>2010</td>
<td>Redistributive Conflicts and Preferences for Tax Schemes in Europe</td>
<td>Antonio M. Jaime-Castillo &amp; Jose L. Saez-Lozano</td>
</tr>
<tr>
<td>2010</td>
<td>Spanish emigration and the setting-up of a great company in Mexico: bimbo, 1903-2008</td>
<td>Javier Moreno Lázaro</td>
</tr>
<tr>
<td>2010</td>
<td>Mantenimiento temporal de la equidad horizontal en el sistema de financiación autonómica</td>
<td>Julio López Laborda y Antoni Zabalza</td>
</tr>
<tr>
<td>2010</td>
<td>Sobreeeducación, Educación no formal y Salarios: Evidencia para España</td>
<td>Sandra Nieto y Raúl Ramos</td>
</tr>
<tr>
<td>2010</td>
<td>Dependencia y empleo: un análisis empírico con la encuesta de discapacidades y atención a la dependencia (edad) 2008.</td>
<td>David Cantarero-Prieto y Patricia Moreno-Mencia</td>
</tr>
<tr>
<td>2011</td>
<td>Environment and happiness: new evidence for Spain</td>
<td>Juncal Cuñado &amp; Fernando Pérez de Gracia</td>
</tr>
<tr>
<td>2011</td>
<td>Aanalysis of emerging barriers for e-learning models. a case of study</td>
<td>Nuria Calvo &amp; Paolo Rungo</td>
</tr>
<tr>
<td>2011</td>
<td>Unemployment, cycle and gender</td>
<td>Amado Peiró, Jorge Belaire-Franch, &amp; Maria Teresa Gonzalo</td>
</tr>
<tr>
<td>2011</td>
<td>The Efficiency of Performance-based-fee Funds</td>
<td>Ana C. Díaz-Mendoza, Germán López-Espinosa &amp; Miguel A. Martínez-Sedano</td>
</tr>
<tr>
<td>2011</td>
<td>Green and good?. The investment performance of US environmental mutual funds</td>
<td>Francisco J. Climent-Diranze &amp; Pilar Soriano-Felipe</td>
</tr>
<tr>
<td>2011</td>
<td>El fracaso de Copenhague desde la teoría de juegos.</td>
<td>Yolanda Fernández Fernández, Mª Angeles Fernández López y Blanca Olmedillas Blanco</td>
</tr>
<tr>
<td>2011</td>
<td>Tie me up, tie me down! the interplay of the unemployment compensation system, fixed-term contracts and rehirings</td>
<td>José M. Arranz &amp; Carlos García-Serrano</td>
</tr>
</tbody>
</table>
Corporate social performance, innovation intensity and their impacts on financial performance: evidence from lending decisions
Andrés Guiral

Assessment of the programme of measures for coastal lagoon environmental restoration using cost-benefit analysis.
José Miguel Martínez Paz & Ángel Perni Llorente

Illicit drug use and labour force participation: a simultaneous equations approach
Berta Rivera, Bruno Casal, Luis Currais & Paolo Rungo

Influencia de la propiedad y el control en la puesta en práctica de la rsc en las grandes empresas españolas
José-Luis Godos-Diez, Roberto Fernández-Gago y Laura Cabeza-García

Ownership, incentives and hospitals
Xavier Fageda & Eva Fiz

La liberalización del ferrocarril de mercancías en europa: ¿éxito o fracaso?
Daniel Albalate del Sol, Maria Lluïsa Sort García y Universitat de Barcelona

Do nonreciprocal preference regimes increase exports?
Salvador Gil-Pareja, Rafael Llorca-Vivero & José Antonio Martínez-Serrano

Towards a dynamic analysis of multiple-store shopping: evidence from Spanish panel data
Noemí Martínez-Caraballo, Manuel Salvador, Carmen Berné & Pilar Gargallo

Base imponible y neutralidad del impuesto de sociedades: alternativas y experiencias
Lourdes Jerez Barroso

Cambio técnico y modelo de negocio: las compañías de transporte urbano en España, 1871-1989
Alberte Martínez López

A modified dickey-fuller procedure to test for stationarity
Antonio Aznar, María-Isabel Ayuda

Entorno institucional, estructura de propiedad e inversión en I+D: Un análisis internacional
Félix J. López Iturriaga y Emilio J. López Millán

Factores competitivos y oferta potencial del sector lechero en Navarra
Valero L. Casasnoves Oliva y Ana M. Aldanondo Ochoa

Política aeroportuaria y su impacto sobre la calidad percibida de los aeropuertos
Juan Luis Jiménez y Ancor Suárez

Regímenes de tipo de cambio y crecimiento económico en países en desarrollo
Elena Lasarte Navamuel y José Luis Pérez Rivero

La supervivencia en las empresas de alta tecnología españolas: análisis del sector investigación y desarrollo
Evangelina Baltar Salgado, Sara Fernández López, Isabel Neira Gómez y Milagros Vivel Búa

Análisis económico y de rentabilidad del sistema financiero español, por tipo de entidades y tamaño, después de cuatro años de crisis y ante los retos de la reestructuración financiera
Salvador Climent Serrano
604/2011 Does competition affect the price of water services? Evidence from Spain
Germà Bel, Francisco González-Gómez & Andrès J Picazo-Tadeo

605/2011 The Effects of Remoteness in Japanese Educational Levels
Jesús López-Rodriguez & Daisuke Nakamura

606/2011 The money market under information asymmetries and imperfectly competitive loan and deposit markets
Aday Hernández

607/2011 The effects of airline and high speed train integration
M. Pilar Socorro & M. Fernanda Viecens

608/2011 Consecuencias de la imbricación de los clientes en la dirección medioambiental: un análisis empírico
Jesús Ángel del Brío González, Esteban Fernández Sánchez y Beatriz Junquera Cimadevilla

609/2011 Revenue autonomy and regional growth: an analysis for the 25 year-process of fiscal decentralisation in Spain
Ramiro Gil-Serrate, Julio López-Laborda & Jesús Mur

610/2011 The accessibility to employment offices in the Spanish labor market: Implications in terms of registered unemployment
Patricia Suárez, Matías Mayor & Begoña Cueto

611/2011 Time-varying integration in European government bond markets
Pilar Abad, Helena Chulíá & Marta Gómez-Puig

612/2011 Production networks and EU enlargement: is there room for everyone in the automotive industry?
Leticia Blázquez, Carmen Díaz-Mora & Rosario Gandoy

613/2011 Los factores pronóstico económico, estructura productiva y capacidad de innovar en la valoración de activos españoles
Mª Begoña Font Belaire y Alfredo Juan Grau Grau

614/2011 Capital structure adjustment process in firms accessing venture funding
Marina Balboa, José Martí & Álvaro Tresierra

615/2011 Flexibilidad Contable en la Valoración de Instrumentos Financieros Hibridos
Jacinto Marabel-Romo, Andrés Guiral-Contreras & José Luis Crespo-Espert

616/2011 Why are (or were) Spanish banks so profitable?
Antonio Trujillo-Ponce

617/2011 Extreme value theory versus traditional garch approaches applied to financial data: a comparative evaluation
Dolores Furió & Francisco J. Climent

618/2011 La restricción de balanza de pagos en la España del euro. Un enfoque comparativo.
David Matesanz Gómez, Guadalupe Fugarolas Álvarez-Ude y Roberto Bande Ramudo

619/2011 Is inefficiency under control in the justice administration?
Marta Espasa & Alejandro Esteller-Morè

620/2011 The evolving patterns of competition after deregulation
Jaime Gómez Villascuerna, Raquel Orcos Sánchez & Sergio Palomas Doña
<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>621/2011</td>
<td>Análisis pre y post-fusiones del sector compuesto por las cajas de ahorros españolas: el tamaño importa</td>
<td>Antonio A. Golpe, Jesús Iglesias y Juan Manuel Martín</td>
</tr>
<tr>
<td>623/2011</td>
<td>Valoración del Mercado de los Activos Éticos en España: una Aplicación del Método de los Precios Hedónicos</td>
<td>Celia Bilbao-Terol y Verónica Cañal-Fernández</td>
</tr>
<tr>
<td>625/2011</td>
<td>Stock characteristics, investor type and market myopia</td>
<td>Cristina Del Rio-Solano &amp; Rafael Santamaria-Aquilué</td>
</tr>
<tr>
<td>626/2011</td>
<td>Is mistrust under control in the justice administration?</td>
<td>Alejandro Esteller-Moré</td>
</tr>
<tr>
<td>627/2011</td>
<td>Working capital management, corporate performance, and financial constraints</td>
<td>Sonia Baños-Caballero, Pedro J. García-Teruel &amp; Pedro Martínez-Solano</td>
</tr>
<tr>
<td>628/2011</td>
<td>On the optimal distribution of traffic of network airlines</td>
<td>Xavier Fageda &amp; Ricardo Flores-Fillol</td>
</tr>
<tr>
<td>629/2011</td>
<td>Environmental tax and productivity in a subcentral context: new findings on the porter hypothesis</td>
<td>Jaime Vallés- Giménez &amp; Anabel Zárate-Marco</td>
</tr>
</tbody>
</table>