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EFFICIENCY AND ELUSION: BOTH SIDES OF PUBLIC ENTERPRISES IN SPAIN

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Fiscal Federalism

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**ABSTRACT:** The main objective of this research consists on analyzing regional public sector enterprises (PSEs) in Spain. We describe a general view on Spanish Autonomous Communities (ACs) financial resources, in the context of the Stability and Growth Pact and Budgetary Stability Act. From 2002, such regulation imposes several constraints to ACs' indebtedness. In this paper, we find out about the roll of PSEs as an alternative way to traditional debt mechanisms. Thus, according to Eurostat criteria, PSEs' debt can be taken off the public sector's consolidated budget. Descriptive and econometric results confirm our expectations. ACs' have used public enterprises to avoid the stringent financial rules. Additionally, it seems that low productivity ACs are accumulating more public debt outside the scope of consolidation. The paper concludes with some recommendations and policy implications.

JEL Codes: H74, L32

Keywords: deficit, debt, public sector enterprises, regional governments, Spain.

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## 1. Introduction

The important decentralization process carried out in Spain during the last decades has led to become Autonomous Communities (ACs) in the most significant public expenditure managers. At the same time, regional governments are responsible of the highest volume of productive investment. However, the relative weakness of the traditional financial sources to cover investments (current saving, capital grants and borrowing) has queried ACs' investment ability. So an alternative set of financial mechanisms has been developed, in order to maintain a high public investment level. All those mechanisms would be compatible with the debt restrictions imposed by European and Spanish regulation (Stability and Growth Pact and Budgetary Stability Act). This paper focuses in the public sector enterprises (PSEs), which could be using as a way to avoid those budget constraints.

There is no a unique concept or a single definition that could characterize accurately PSEs. In USA, it is normally used the term 'public authority' to refer to a quasi-governmental agency created for a specific public sector purpose (Eger, 2006). Selected European national denominations of PSEs include *Etablissements Publics* (France), *Crown Agencies / Non-Departmental Public Bodies* (UK), *Eigenbetriebe* (Germany), *Aziende con Personalita Giuridica Pubblica / Enti pubblici non economici* (Italy), *Stadtwerke* (Austria) or *Intercomunale* (Belgium). In Spain there are also many kinds of public entities like *Empresas Públicas*, *Entes Públicos*, *Entidades Públicas Empresariales*, *Consortios* and other institutions. In this paper, we do not care about the legal status of the public sector entities. In fact, we focused on two relevant issues of PSEs from an economic perspective: (1) their classification either inside or outside of the general government sector and (2) the connexion between aggregate efficiency and PSEs.

The aim of this paper consists on analyzing the creation of regional public firms in order to elude the legal restrictions on public deficit and debt. This is one of the main mechanisms to get credits, collaborating with the private sector and at the same time, guarantying the Budgetary Stability Act's compliance. However, as far as not all the public firms would have been created to get such an objective, we will try to capture the 'efficiency' or 'value for money' effect linked to institutional and organizational changes in the provision of public services.

The rest of this paper is organized as follows. In section 2 we appraise the analytical background of ACs' financing choices concerning the relative costs of any alternative. In section 3 we discuss about the role and delimitation of PSEs and the measuring of the efficiency in the Public Sector (including PSEs). Also, a brief statistical panorama of the recent evolution of PSEs in ACs is also presented here. Section 4 includes a literature revision which summarizes the main results of previous empiric papers, in particular for the USA. In section 5 we present an empirical model based on a panel data approach for the 17 ACs in 1994-2008 period. Finally, we draw the main conclusions from our analysis.

## **2. A brief view about the regional financial system in Spain**

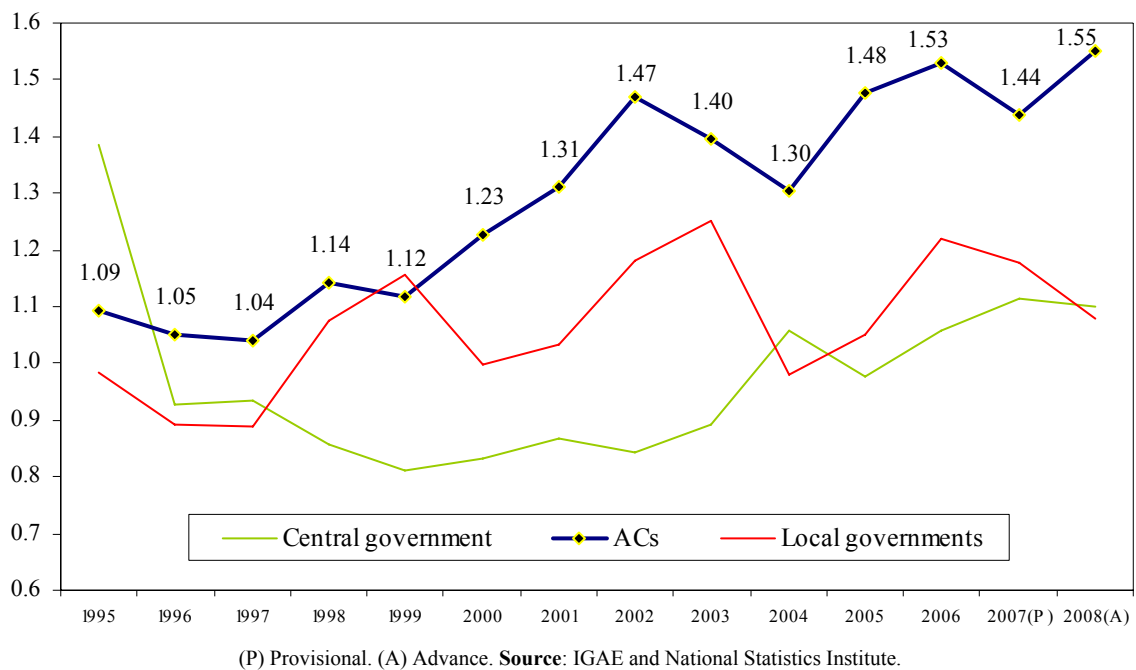
### 2.1. The weakness of ACs' traditional revenue sources

During the last 30 years, Spanish Autonomous Communities (regional governments) have increased their expenditures and competences. In fact, they have become in the main public expenditure agent in Spain. Their expenditures exceed the aggregate expenditures by Central Government, Social Security and Local Governments. According to IGAE (2009), in 2008 ACs managed the 36,3% of public

sector non-financial expenditures, while Social Security handled the 28,8%, Central Government the 21,6% and Local Governments the 13,2% of total public expenditures.

Additionally, ACs are the government level showing the highest investment expenditure, especially from 2000 onward. Graph 1 shows an increasing trend of all government levels' gross fixed capital formation during the period 1995-2008 for different levels of government (Central, ACs, Local Governments). That trend is more emphasized in the case of ACs. Thus, ACs have a significant roll promoting as capital stock and economic growth in Spain.

**Graph 1: Public Sector Gross Fixed Capital Formation (% GDP)**



However, public revenues in Spain have not been shared in a similar way as expenditures. In this respect, notice that there is significant fiscal disequilibrium. IGAE (2009) data show that ACs only managed the 22.7% of total non-financial revenues, which means a negative lag of 13.6 percentage points, compared with their participation

in public expenditures. Follow, we analyze the three ‘traditional’ sources (current savings, grants and borrowing) of the ACs in order to finance their outlays.

### *Current saving*

It has grown-up quickly during the last decade, due to a dynamic economic growth and a quick increase in tax revenues. Although the main taxes (income tax and corporate tax) were reformed towards a nominal reduction in tax rates, public revenues increasing was based on the economic growth experimented during that period. Some economic factors, such as profits, labour income and households’ consumption increased strongly. However, national and international economic situation has deteriorated in the last recent years, so fiscal revenues have reduced significantly, even with the announced tax rates increasing (mainly in VAT). Additionally, the main taxes are handled by central government and ACs have strong constrains to create their own tributes. All of these factors condition the current revenues’ growth of ACs.

On the other hand, many current expenditures in ACs are very difficult or costly to reduce in the short run, so it reduces their margin of manoeuvre (Barberán-Ortí, 2005). In particular, it is really complicated to reduce some budgetary items such as labour expenditures, transfers or debt burden<sup>1</sup>. Additionally, there are new factors which have influence on current expenditures, such as some demographic issues (population growth and ageing, especially significant in health services) and new social services (introduced by the Spanish Law 39/2006). As a consequence, current savings improvements can only be obtained from three sources:

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<sup>1</sup> It may be possible to reduce that item by means of a debt renegotiation with financial institutions.

- a) Public expenditure reduction. For the reasons previously mentioned, capital expenditures will probably suffer such a cut, leading to deteriorate more the potential economic growth.
- b) Tax rates increases. They are limited to income tax, tax on inheritances and gifts, some indirect taxes (electricity, matriculation of vehicles and retail fuel tax) and small environmental taxes. ACs have no regulatory capacity neither on VAT and selective consumption taxes (tobacco, alcohol and gasoline) nor corporate tax. This is a not probable way to solve the revenue deficit, due to the political and economic costs of implementing it during economic crisis period.
- c) Efficiency/productivity improvements. To achieve that aim, it would be necessary to reinforce internal control and external auditing, and to introduce new management techniques, trying to improve global efficiency. The main disadvantage is that potential savings are observed only in the long run.

### *Grants*

European funds for Spain were reduced for the 2007-2013 period. From 2013 they will be significantly reduced again because Spain got an income level up to 100% of EU27 GDP per capita (in purchasing power parity). The Spanish Constitution requires a national fund (the *Interterritorial Compensation Fund*) whose aim is to offset economic imbalances across regions. However this national fund will not be able to replace the European funds, at least in the short term due to budget general restrictions.

### *Borrowing*

Borrowing is the 'locking mechanism' in the budget and it is also an adequate instrument for intergenerational equity (Musgrave, 1959). The Spanish budgetary



stability legislation in 2001 imposed the annual budget balance and it also restricts borrowing to exceptional events. This was a major constraint to investment finance and it imposed a pro-cyclical fiscal policy, as Vallés-Giménez (2002) pointed out<sup>2</sup>.

### *The alternatives*

Given this general panorama, ACs wish to maintain their investment projects avoiding an inefficient and costly tax increasing. In fact, they might have several alternatives for action but all of them depend on the general government reform and require a broad political consensus. The first one is the change in the regional financing system in order to reduce the vertical fiscal imbalance, encouraging fiscal responsibility and facilitating the growth of current savings. This reform is being negotiated right now between the ACs and the Government of Spain.

The second alternative would be a substantial increase in the *Interterritorial Compensation Fund*, in the line suggested by Fernández-Llera and Delgado-Rivero (2008), but this is very unlikely applied under an economic crisis.

The third alternative consists of improving the flexibility of the budgetary stability law, as it was finally enacted in 2006. From that year onwards, the goals of deficit or surplus are defined over the economic cycle, consistently with the Stability and Growth Pact (renewed in 2005). Also, the new budgetary stability legislation permits an additional deficit equivalent to 0.25% of regional GDP for each of the regions, according to the purpose of finance productive capital outlays<sup>3</sup>. Both conditions significantly improve the access to credit and thus the ACs' ability to undertake new

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<sup>2</sup> Between 2002 and 2006, the outstanding debt of all the regions remained quite stable, with an average of 6.2% of GDP and always below 6.7%. The latter is the threshold that Alcalde-Fradejas and Vallés-Giménez (2002) had estimated as the ratio of debt which would involve the withdrawal of confidence by the financial market to the ACs.

<sup>3</sup> An assessment of budgetary stability legislation of 2006 can be found in Monasterio-Escudero y Fernández-Llera (2008).

investment projects without resorting to tax increases. Finally, ACs must do from then on an effort of transparency, including the development of a full list (*Inventario*) with a precise setting down of their PSEs<sup>4</sup>.

According to Marlow and Joulfaian (1989), governments always choose the funding sources with lower ‘relative costs’, given a complete set of revenues (general taxes, grants, service charges, user fees, borrowing, PPP and others). This insight is also pointed out by Monasterio-Escudero (1996), which warned that some selective borrowing constraints could lead to a ‘shift effect’ in Spain. This effect would bias the internal structure of the debt from those handling it more discretionary to others that are not subject to formal controls. In the same context, Polackova (1998) layed down that policymakers pursuing a balanced budget (or some deficit or debt target) tend to favour off-budget financing that do not require immediate cash and that, at least for some time, hide the underlying fiscal cost. The same author puts as example the omission of net liabilities of public enterprises and agencies which are outside the sphere of general government but benefit from government guarantees.

As we previously mentioned, in the case of the current savings, ACs are struggling to increase, subsidies are declining and borrowing is more ‘expensive’ since the budgetary stability act was enacted. Thus, Spanish regions are deploying ‘innovative’ mechanisms in order to continue to finance its growing level of spending, complying the objectives of deficit and debt. Some of the alternatives can be *public-private partnership* (PPP), public entities and enterprises, or banking mechanisms (for instance, factoring, leasing, renting and confirming).

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<sup>4</sup> In fact, the *Inventario* had been already required from 2003 in Spain. Polackova (1998) suggested the elaboration of a full census of PSEs and a provision of their audited balance sheets and statements of contingent liabilities.

A simple taxonomy classifies these ‘innovative’ instruments in two categories (Ezquiaga-Domínguez and Ferrero, 1997): ‘orthodox’ and ‘spurious’. The former ones provide additional revenues to the government, diversifying the risks and maintaining the sustainability of public finances<sup>5</sup>. On the other hand, the ‘spurious’ mechanisms are based on creative accounting (Milesi-Ferretti, 2004) which formally improves the amount of public debt, but they do not reflect a real improvement in government net wealth. The next sections will focus on the role played by public enterprises as well as a briefly introduction to PPP formulas.

## 2.2. Public-private partnership as an alternative and a complement

Following the European Commission (2004), the term PPP involves different “forms of cooperation between public authorities and the world of business which aim to ensure the funding, construction, renovation, management or maintenance of an infrastructure or the provision of a service”. This broad and open definition includes the distinction between *purely contractual PPP* and *institutionalised PPP*. The latter is the most elaborated since it implies “the establishment of an entity held jointly by the public partner and the private partner”. Experiences with PPP have been diverse and extensive during the last years in the Member States of the EU, especially in UK.

In Spain, we can find the earlier normative background in the *Public Works General Act* and the *General Road Law*, both are dated 1877. Nowadays, the Act 13/1996 introduced the deferred payment of infrastructures in Spain, which is well-known as the ‘german model’<sup>6</sup>. Recently, the Act 30/2007 introduced a detailed regulation in public procurement and PPP contracts, adapting the EU regulation at the

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<sup>5</sup> The paradigm is the project finance, which the only guarantee for borrowing are the cash flows generated by the project in the future (see for example Finnerty, 2007).

<sup>6</sup> This mechanism has been vastly implemented in Spain in order to streamline some infrastructures in the latter 1990s (Tribunal de Cuentas, 2006). With the ESA95 regulations, the ‘german model’ can be considered a ‘spurious’ mechanism (expenses must be charged as it is being executing).

national level. *Institutionalised PPP* has a long tradition in Spanish local governments (Warner and Bel, 2008) and the ACs are developing these kind of entities in last years, for instance, in R+D projects, transport infrastructures and hospitals.

The core advantage of the PPP is also the main reason for its arrangement: the obtaining of additional resources for the Public Sector and, simultaneously, the achievement of the deficit and debt limitations. In order to this condition fulfil, Eurostat (2004) recommends that the assets involved in a PPP should be classified as non-government assets, and therefore recorded off balance sheet for government, if there is a complete risk transfer to the private sector. It implies that the private partner must support the *construction* risk, and at least one of either *availability* or *demand* risk.

Other advantages of the PPP models can be given by the close implication of private firms in public objectives, as well as the potential attainment of efficiency gains from a value for money scheme. Nevertheless, there is no academic consensus about the second (Heald, 2003; Grimsey and Lewis, 2005). Also, the proliferation of PPP formulas may endanger the quality of public services –especially in education and health systems- because they promote a decreased transparency and a loss of control by citizens and legislators. In absence of adequate control and auditing, PPP could imply an overrun or, eventually, an increasing in user fees. This is because private companies make their investment decisions from a profit maximization point of view, based on the *internal rate of return* of the project, which is normally above the market interest rate (opportunity cost). Instead, Public Sector makes their investment decisions from a social viewpoint by taking into account a *social internal rate of return*. This rate takes account of the external (environmental) costs of the project.

The European Commission (2003) has summarized the key factors that determine the success in a PPP. Mainly, it pointed out the efficient division of

responsibilities and risks among the government and the private partner. The private sector wishes to contribute to the financial support of large scale projects, attracted by the potential rate of return. Besides it, Public Sector provides the operating rights, sets the standards and contributes to funding.

PricewaterhouseCoopers (2006) show that, just behind United Kingdom, Spain is one of the Member States of the European Union with the largest number of PPP initiatives. In fact, there is a greater volume of investment developed through these mechanisms and more projects under consideration or in bidding. Furthermore, Spain has opened the fields in PPP, from the more traditional toll road, to others such as hospitals, prisons or water services infrastructures.

The empirical literature about PPP formulas has not been very profuse in Spain till the moment. It is possible to find some partial reports that address topics and case studies, like the one of the Cámara de Comptos de Navarra (2007), which estimates the contingent liabilities of a *shadow toll* in a regional motorway. Instead, there are many theoretical papers and books on different economic, accounting and legal aspects of PPP<sup>7</sup>.

### **3. The role of public sector enterprises**

#### 3.1. Delimitation and growing of the public enterprises

In many cases, ACs and the other tiers of government (central and local) in Spain have created PSEs to increase the debt outside the ‘perimeter of consolidation’ of the general government sector. In compliance with the *ESA95 Manual on government deficit and debt* (Eurostat, 2002), only the *non-market public institutional unit* must be

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<sup>7</sup> For example, Benito-López and Montesinos-Julve (2003), Acerete-Gil (2006) and González-García (2007).

classified into the ‘general government’ sector and, therefore, within the ‘scope of consolidation’ of debt<sup>8</sup>. In summary, three conditions must be met simultaneously:

- a) *Institutional unit*: if the entity has autonomy of decision and a complete set of accounts.
- b) *Public*: when it is controlled by the general government. That means that the government officials have the ability to determine the general corporate policy or programme of an institutional unit by appointing appropriate directors or managers, if necessary. The control can be exercised either by owning more than half the shares of a corporation (sufficient condition) or ‘as a result of special legislation decree or regulation that empowers the government to determine corporate policy or to appoint the directors’.
- c) *Non-market*: either the unit redistributes national income and wealth or a maximum of the 50% of its production costs are covered by sales.

Once the ‘perimeter of consolidation’ has been defined, governments should promote transparency of financial relations between government itself and public enterprises, in a double sense. First, it should bring under control the abuse of dominant position by public enterprises which have granted special or exclusive rights. Second, it seeks to control the financial relations between public enterprises and public administrations. Both issues have been regulated by Spanish Law 4/2007, which is mandatory for all the tiers of government. Eurostat (2002) also establishes that capital injections in public corporations will have no impact on the public deficit when they are considered as a financial transaction. Namely, when the general government receives in exchange a financial asset of equal value to the payment made to the public enterprise.

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<sup>8</sup> Some regional audit institutions (Cámara de Cuentas de Andalucía, 2006, 2009) have devoted specific audit reports to the implementation of ESA95 and the delimitation of the ‘perimeter of consolidation’.

In any other case, the capital injections in PSEs will be considered as a capital transfer with a direct impact on the deficit.

The optimal situation in order to allow market discipline run (Lane, 1993) takes place when the financial market does not judge PSEs as a mere ‘appendix’ of the general government but as an autonomous entity. Otherwise, the market may perceive a false and exaggerated PSEs’ solvency, given it is supported by the government. If this happened, there would be a problem of moral hazard for the perception of a soft budget constraint, based on a credible expectation of bailout. As stated by Fitch Ratings (2004), that situation occurs in three cases: (1) if there is a governmental statutory guarantee (universal and unlimited) to the PSEs; (2) if the PSES is benefited by a specific guarantee by the government (e.g. restricted to a particular debt issue) or, (3) if the government has subscribed a written and strong commitment with the PSEs. In these three cases, the rating of a PSEs is being automatically equated to that of its public sector guarantor. Otherwise, both ratings could differ on the basis of four attendant factors: legal status and institutional framework; integration between the PSES accounts with those of its owner; strategic importance of the PSES (including the nature of the services provided by the PSEs) and, finally, governmental control over the PSEs (the stronger the control, the narrower the rating differentiation).

Table 1 shows that between 1997 and 2006 the Spanish ACs have established 367 net PSEs (87% increase). The explanation for this growth can be given, first, by the intense process of competences transfer to the regions (especially in education and health), which has led to the deployment of new administrative and institutional structures in the ACs. The opposite effect is registered in the central government<sup>9</sup>.

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<sup>9</sup> In the case of the central government, it has been also added the effect of numerous privatizations carried out during the 1980s and 1990s (Guarnido-Rueda and Jaén-García, 2005).

Secondly, the ‘shift effect’ that could have been caused by the stringent 2001 budgetary stability law.

**Table 1: Number of public enterprises in the ACs**

ACs ordered by PSEs number in 2006	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	$\Delta$ 1997-2006	$\Delta\%$ 1997-2006
Madrid	27	28	27	29	31	39	40	41	51	58	31	114.8
Aragon	14	20	19	20	20	30	31	33	44	45	31	221.4
Principality of Asturias	16	16	20	18	19	22	28	30	42	44	28	175.0
Cantabria	8	8	11	17	18	15	20	23	29	38	30	375.0
Balearic Islands	13	14	14	13	15	16	16	23	29	36	23	176.9
Murcia	12	12	11	10	12	13	14	14	21	27	15	125.0
Extremadura	18	19	17	17	17	15	15	16	23	24	6	33.3
Castille and Leon	12	12	11	11	10	11	12	12	16	19	7	58.3
Castille-La Mancha	1	1	2	2	2	3	8	8	14	19	18	1.800.0
La Rioja	4	7	7	8	8	9	10	10	10	11	7	175.0
<b>‘Slow lane’ ACs</b>	<b>125</b>	<b>137</b>	<b>139</b>	<b>145</b>	<b>152</b>	<b>173</b>	<b>194</b>	<b>210</b>	<b>279</b>	<b>321</b>	<b>196</b>	<b>156.8</b>
Catalonia	45	62	65	66	70	76	90	95	104	110	65	144.4
Basque Country	83	83	83	89	83	86	85	86	90	93	10	12.0
Andalusia	42	46	56	56	61	63	66	66	66	76	34	81.0
C. Valenciana	27	28	28	32	38	41	45	49	56	56	29	107.4
Navarre	31	31	30	29	29	30	30	31	36	40	9	29.0
Galicia	23	23	25	28	29	30	33	34	37	39	16	69.6
Canary Islands	30	31	31	30	31	29	31	31	34	34	4	13.3
<b>‘Fast lane’ ACs</b>	<b>281</b>	<b>304</b>	<b>318</b>	<b>330</b>	<b>341</b>	<b>355</b>	<b>380</b>	<b>392</b>	<b>423</b>	<b>448</b>	<b>167</b>	<b>59.4</b>
<b>ACs</b>	<b>406</b>	<b>441</b>	<b>457</b>	<b>475</b>	<b>493</b>	<b>528</b>	<b>574</b>	<b>602</b>	<b>702</b>	<b>771</b>	<b>365</b>	<b>89.9</b>

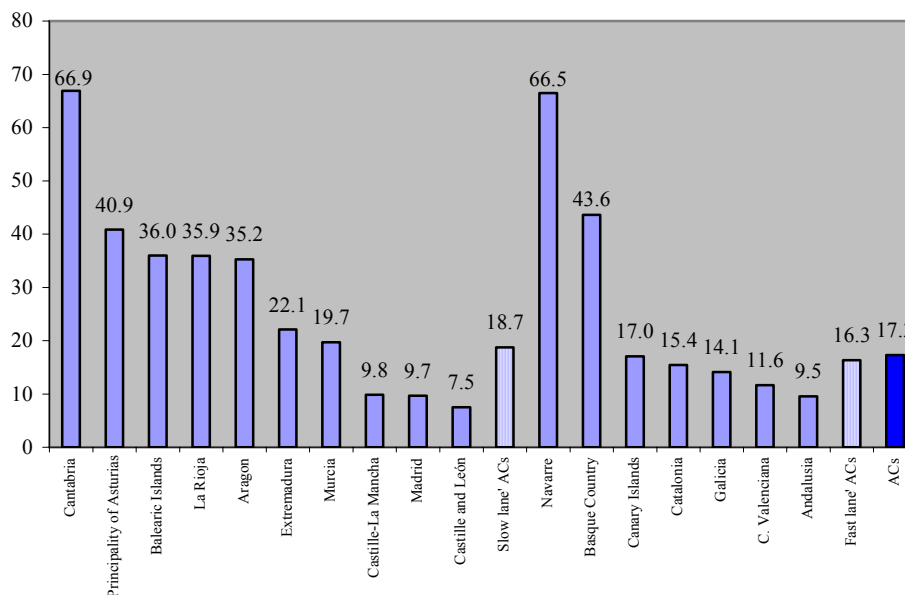
\* It includes 2 public enterprises of various ACs in 2006. **Source:** IGAE, National Statistics Institute and own calculations.

A simple descriptive analysis provides us some basic highlight. Previously, we split ACs in two categories which differ in the level of autonomy and the rhythm to get it. Thus, the so-called ‘fast lane’ ACs achieve more and faster autonomy, while the ‘slow lane’ ACs entail a more limited and gradual gain of authority. The seven ‘fast lane’ regions had assumed major expenditure powers (basically, health and education) many years ago and, therefore, it may be plausible that they had already developed the bulk of their institutional sector (including the majority of own PSEs). In any case, this distinction among ACs is not significant from 2002 onwards. If we operate in this way, we can get a first approximation of the ‘shift effect’, at least as far as creating PSEs are



concerned<sup>10</sup>. The data let us see that ‘slow lane’ regions recorded a growth of 156.8% in the number of PSEs, which seems a large percentage to be justified only as a mechanism for avoidance of debt. In contrast, the number of PSEs in the ‘fast lane’ ACs grew in the same period a 59.4%. Catalonia (+144.4%) and Valencia (+107.4%) clearly highlight within this latter group. However, as the Graph 2 shows, Cantabria, Navarre and Basque Country present the highest levels when computing the number of PSES per million inhabitants.

**Graph 2: PSES per million inhabitants (2006)**



Source: IGAE, National Statistics Institute and own calculations.

For industries, according IGAE (2008), the common areas for many ACs in 2006 are the following: infrastructure, broadcasting and corporate development and economic promotion. Moreover, in recent years have become more important PSES in health, education and R+D. The census (*Inventario*) of the Ministry of Economy and Finance (2009), referring to 1 July 2008, reflects that government-owned corporations

<sup>10</sup> The 7 ‘fast lane’ ACs are Andalusia, Canary Islands, Catalonia, Comunidad Valenciana, Galicia, Navarre and Basque Country. The 10 ‘slow lane’ ACs are Aragon, Asturias, Balearic Islands, Cantabria, Castilla and Leon, Castilla-La Mancha, Extremadura, Madrid, Murcia and La Rioja.

(*sociedades mercantiles*) activities in the ACs are very diverse. They include real estate, renting and business services (20.4%), transportation, storage and communications (15.4%, including broadcasting) and construction (11.8%, including engineering civil works).

**Table 2: Outstanding debt in PSEs (% regional GDP)**

ACs ordered by percentage in 2006	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Average 1994-2002	Average 2003-2008
Balearic Islands	0.60	0.05	0.05	0.04	0.01	0.01	0.28	0.20	0.19	0.25	0.19	0.20	0.38	2.11	2.57	0.16	0.95
Castille-La Mancha	0.00	0.00	0.00	0.00	0.00	0.09	0.21	0.26	1.77	1.76	2.14	2.24	1.99	1.86	2.27	0.26	2.04
Aragon	0.02	0.02	0.02	0.04	0.04	0.07	0.06	0.06	0.04	0.53	0.56	0.44	0.29	0.67	0.90	0.04	0.57
Principality of Asturias	0.13	0.17	0.18	0.22	0.16	0.18	0.09	0.10	0.12	0.15	0.08	0.31	0.45	0.76	0.67	0.15	0.40
Madrid	0.68	0.66	0.58	0.64	0.65	1.16	0.35	0.37	0.34	0.43	0.38	0.32	0.56	0.50	0.60	0.60	0.47
La Rioja	0.29	0.21	0.23	0.32	0.10	0.18	0.10	0.05	0.12	0.15	0.05	0.13	0.39	0.22	0.30	0.18	0.21
Castille and Leon	0.11	0.11	0.09	0.06	0.13	0.14	0.05	0.05	0.06	0.07	0.09	0.08	0.07	0.10	0.16	0.09	0.10
Cantabria	0.07	0.00	0.00	0.00	0.00	0.00	0.07	0.06	0.08	0.09	0.09	0.09	0.15	0.14	0.14	0.03	0.12
Murcia	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.02
Extremadura	0.11	0.20	0.15	0.18	0.12	0.06	0.01	0.08	0.07	0.12	0.10	0.05	0.05	0.02	0.08	0.11	0.07
<b>'Slow lane' ACs</b>	<b>0.18</b>	<b>0.17</b>	<b>0.16</b>	<b>0.18</b>	<b>0.15</b>	<b>0.22</b>	<b>0.09</b>	<b>0.10</b>	<b>0.10</b>	<b>0.19</b>	<b>0.17</b>	<b>0.18</b>	<b>0.25</b>	<b>0.30</b>	<b>0.37</b>	<b>0.15</b>	<b>0.24</b>
Catalonia	1.00	0.88	0.89	0.96	1.05	1.14	0.79	0.94	1.19	1.77	1.78	2.01	2.23	2.34	2.83	0.98	2.16
C. Valenciana	0.33	0.45	0.50	0.39	0.39	0.68	1.41	1.71	1.82	1.90	1.77	1.70	1.77	1.72	1.89	0.85	1.79
Navarre	0.20	0.16	0.17	0.12	0.14	0.24	0.22	0.45	0.48	0.39	0.39	1.03	0.87	1.39	1.57	0.24	0.94
Basque Country	0.18	0.05	0.03	0.03	0.03	0.04	0.19	0.14	0.32	0.69	0.74	0.63	0.58	0.83	0.81	0.11	0.71
Canary Islands	0.16	0.12	0.22	0.53	0.58	0.57	0.74	0.80	0.95	0.96	0.97	0.57	0.52	0.51	0.58	0.52	0.69
Galicia	0.37	0.02	0.02	0.02	0.02	0.02	0.05	0.04	0.03	0.04	0.04	0.04	0.35	0.44	0.54	0.07	0.24
Andalusia	0.25	0.24	0.24	0.24	0.22	0.23	0.22	0.16	0.15	0.12	0.12	0.10	0.09	0.11	0.13	0.22	0.11
<b>'Fast lane' ACs</b>	<b>0.37</b>	<b>0.28</b>	<b>0.31</b>	<b>0.34</b>	<b>0.37</b>	<b>0.45</b>	<b>0.57</b>	<b>0.68</b>	<b>0.80</b>	<b>0.96</b>	<b>0.95</b>	<b>1.00</b>	<b>1.05</b>	<b>1.21</b>	<b>1.37</b>	<b>0.46</b>	<b>1.09</b>
<b>Total ACs</b>	<b>0.43</b>	<b>0.36</b>	<b>0.36</b>	<b>0.40</b>	<b>0.42</b>	<b>0.57</b>	<b>0.45</b>	<b>0.51</b>	<b>0.63</b>	<b>0.80</b>	<b>0.79</b>	<b>0.80</b>	<b>0.90</b>	<b>0.99</b>	<b>1.16</b>	<b>0.46</b>	<b>0.91</b>
Central government	2.79	3.49	2.75	2.33	2.07	1.77	1.69	1.54	1.43	1.50	1.14	1.27	1.43	1.72	1.95	2.21	1.50
Local governments	0.35	0.33	0.30	0.28	0.26	0.23	0.32	0.33	0.34	0.38	0.38	0.40	0.40	0.45	0.52	0.30	0.42
<b>TOTAL</b>	<b>3.58</b>	<b>4.18</b>	<b>3.42</b>	<b>3.01</b>	<b>2.75</b>	<b>2.58</b>	<b>2.46</b>	<b>2.38</b>	<b>2.39</b>	<b>2.68</b>	<b>2.31</b>	<b>2.47</b>	<b>2.72</b>	<b>3.17</b>	<b>3.63</b>	<b>2.97</b>	<b>2.83</b>

Source: Banco de España, National Statistics Institute and own calculations.

In order to complete this first descriptive approach, Table 2 presents the figures of the outstanding debt of PSEs<sup>11</sup>. The hypothesis is that the budgetary stability law has encouraged more intensive use of this type of debt outside of the 'perimeter of consolidation' of the ACs. To test, a cut-off point between 2002 and 2003, coinciding with the time of entry into force of the first budgetary stability law (enacted in 2001).

<sup>11</sup> The generic heading 'public enterprises' includes all the entities outside the government sector and, therefore, outside the 'perimeter of consolidation'.

The calculations of the *Banco de España* (the Spanish Central Bank) are made by means of the same methodology of the *Protocol on the Excessive Deficit* to facilitate comparison with the public debt in the strict sense.

Indeed, it appears that the debt of the regional PSEs has continued increasing, with minimal exceptions, since the first year of the series. This growth strengthens from 2003 onwards, after the full entry into force of the first budgetary stability law. This is particularly relevant in the ‘fast lane’ ACs group. Actually, that fact suggests that these regional governments are being used to get debt out of the ‘perimeter of consolidation’. This ‘shift effect’ is also perceptible in the ‘slow lane’ regions, singularly in Balearic Islands and Castilla-La Mancha. Local governments seem to have followed a similar pattern, but not the central government for the reasons noted above. In 2008 the total outstanding debt of Spanish PSES was walking towards 4% of GDP, one third of the ACs.

Given the descriptive analysis, it can be concluded that the ACs have created more PSEs and they have moved more borrowing outside the ‘perimeter of consolidation’. Both effects have increased since the entry into force of the first budgetary stability law. The smaller pace of debt accumulation in the ‘slow lane’ regions may perhaps be due to the limited time frame which runs from the creation of their PSEs.

### 3.2. Public sector efficiency and PSEs

In the field of public sector efficiency, one of the most intense discussions has focused on the comparison of several managerial schemes. However, almost all the

studies have emphasized the comparison between public and private management. In this respect, Lovell and Muñiz (2003) pointed out that efficiency depends more on the degree of competition in the sector analyzed than on other institutional or managerial factors. However, there are no studies which have found out about the most adequate institutional framework in efficiency terms, with the exception of some formulas of joint management, especially applied by the local governments to take advantage of economies of scale. As the objective of this paper is evaluate the impact of public firms on regional sector efficiency, the way to test that hypothesis will consist of analyzing efficiency from a global point of view. That is, it would be necessary to evaluate the whole activity of regional governments.

Previous literature has shown that the measurement of public sector efficiency from a global point of view is not an easy task. The most correct methodological orientation would lead to evaluate the efficiency of each public service, especially focusing on those public services which have a significant weight in public sector budget. Separate analysis is the best option due to the existence of different technologies in each case. Thus, cost and production functions are not the same in the case education, health or cultural services. However, data requirements to do that are really exigent. As a consequence, other kind of methodologies has been proposed, which consider the whole public sector as a multi-output producer.

Initially, it is necessary to set which kind of efficiency is more adequate in each context. When we have the aim of calculating efficiency from a global point of view we found that, several studies have considered cost efficiency analysis, instead of technical efficiency. Giménez and Prior (2003), pointed out two main reasons to specify cost efficiency models. First of all, they argued the financial constrains in the public sector which lead to reduce public expenditure. This aim would not be reached if we used

technical efficiency. Second, cost efficiency is clearly linked to results, so usually cost deviations are the instrument to control public sector, from an economic and financial point of view.

Additionally, there is another significant problem in this field. Usually, public services output is actually very difficult to measure (García-Valiñas, 2000; García-Valiñas *et al.*, 2005). Generally speaking, services outputs are intangibles and not too much easy to quantify. In this respect, quality issues matter and it is necessary to measure them too. Moreover, a multi-objective public sector tries to produce several outputs at the same time. As Rueda-López (2003) pointed out, sometimes it is not possible to set public sector output and to use market prices to value it. Thus, the valuation of public sector production is a really complicated aim. In the Spanish case, National and Regional Accounts approximate the value of public sector output by means of production costs. So, that fact makes impossible to consider Added Value calculated in National or Regional Accounts as an output variable in an efficiency analysis.

Due the difficulties of setting accurate output variables, sometimes variables of intermediate output have been proposed. Those variables are easy to calculate, but they are not represent the real output. For example, to evaluate the efficiency of local governments, several output indicators have been considered (Hayes and Chang, 1990; Vanden Eackaut *et al.*, 1993; De Borger and Kerstens, 1996; Gimenez and Prior, 2003; Balaguer, 2004). Among others, we can mention the population, the number of kilometres of municipally roads, the number of people older than 65, the number of students in primary schools or the volume of waste in the municipality. As it is possible to observe, all are related to the demand of services, but they are not outputs.

In the same direction goes Rueda-López (2003), who proposed a set of indicators for each category of public services or functions, in order to evaluate the production of Spanish public sector. The number of cases solved by the law system (justice) or by the health system (health services), the number of students (education), the number of unemployed and retired people (social services), the number of travellers per km (transportation), or the number of subsidized housing (housing and urban planning) are some examples to approximate public sector output. Anyway, with this kind of indexes we are assuming an error when we try to measure public services output.

With regard to the specific method to calculate efficiency indexes, there is a broad diversity of parametric and non-parametric techniques<sup>12</sup>. However, Data Envelopment Analysis (DEA) is a non-parametric technique especially suited to analyze efficiency in the public sector. In fact, the majority of previously mentioned studies have applied that technique. DEA, based on mathematical programming, has evolved significantly since it originally appeared in the paper by Charnes et al. (1978). Assuming homogeneous productive units, a frontier formed by efficient units is designed. Thus, several extensions of the basic methodology have since appeared, adapting the original technique to the features of different sectors, to the nature of the variables used, or to the objectives involved<sup>13</sup>.

However, sometimes not so much complex methodologies have been applied, such as ratios or aggregated indexes analysis. This is a more operative method usually applied from an institutional point of view. Thus, Rueda-López (2003) carried out a multi-country comparison, pointing out that the efficiency ranking using DEA was

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<sup>12</sup> For example, see Álvarez-Pinilla (2001)

<sup>13</sup> See Cooper *et al.* (2004) and Thanassoulis (2001).

similar to the efficiency ranking obtained from ratios or global indicators. However, with DEA analysis, efficiency levels were a little bit higher.

Definitively, measuring public sector output is complicated, especially if we talk about public services supplied through PSEs. Several methodologies have been proposed, but the most difficult task will be to define and calculate indexes or proxies which approximate accurately that output. Usually, some of the techniques previously mentioned are extraordinary sensitive to the variables included into the analysis. So, it is necessary to be careful in this respect.

#### **4. Previous research**

There is a broad literature related to the ‘shift effect’, which in this context broadly means to use both budget and off-budget mechanisms to avoid the stringent borrowing constrains. Empirical evidence shows that borrowing growth by means of PSEs is directly related to the presence of very stringent fiscal rules. In general, since the legal restrictions are passed to control subnational debt, many governments have used different ‘public authorities’ and PSEs in order to ‘shift’ borrowing and debt outside the scope of consolidation.

In US, the relationship between fiscal rules, borrowing and the ‘shift effect’ began to be analyzed several years ago (Pogue, 1970). The main rationale for this fact is the variety of fiscal rules across States (ACIR, 1987; NASBO, 1992; GAO, 1993; Gordon, 2008). Many years ago, Kimball (1976) suggested that the increase in the number of public authorities (a form of special-purpose government) may be partially due to a sort of spillover effect, whereby states mimic the neighbouring states’ behaviour. According to the previous idea, Bennet y DiLorenzo (1982, 1983) illustrates the topic describing the bankruptcy of New York City in 1975. Debt growth was

produced due to the failure in compliance with the fiscal discipline, using financial tricks like the reclassification of current expenditures in capital expenditures, resulting in an excessive borrowing and debt.

Marlow and Joulfaian (1989) show that tax and expenditure limitations inherited from the 1970's tax revolt –including the famed California *Proposition 13*- lead States to shift revenue sources away from general taxes and toward revenue sources such as service charges, user fees and, also, some off-budget operations. In a national survey, Hackbart and Leigland (1990) report an increase in the number of state-level entities that issue revenue-backed debt of almost 60 percentage points.

The literature was especially profuse during the 1990s. Von Hagen (1991) compares the States that set debt constraints with those states that do not have any restriction. On average, it is observed that States with financial constraints showed a higher proportion of non-guaranteed debt (1.18 percentage points higher) than States with no restrictions. Similarly, Bunch (1991) tests the impact of constitutional debt limits on the number of public authorities, the scope of their activities, the existence of a public building authority, and the state's reliance on these entities to issue debt for infrastructure creation. The author finds that States with a constitutional debt limit that encompasses both general obligation and revenue bonds have a higher number of public authorities and they perform much more activities. Nonetheless, such results do not exist if the constitutional limitation applies only to general obligation debt. States with debt limits are also more likely to have a public building authority and to finance their public infrastructure debt through public authorities. Leigland (1994), after reviewing the vague concept of public authority, runs an empirical analysis to explore the determinants of the use of this kind of entities in US. He concludes that arounding debt limits ('shift effect'), rather than business-like management, accounts for the



proliferation of public authorities which are usually associated with lower levels of creditworthiness.

The results by Merrifield (1994) are quite similar, but in this case the statistical significance is quite poor. Similarly, Kiewiet y Szakaly (1996) identify another type of ‘shift effect’: the states with more stringent fiscal rules show the higher levels of the local governments’ debt. For local governments, Wallis and Weingast (2008) argue that some public authorities (the special-purpose districts) may be a consequence of the limits to local borrowing paired with an evolution of financing needs.

All these results for the US must be analyzed with caution, given the fact that the sense and the magnitude of the ‘shift effect’ depends critically on the sample and the time series data. For example, Trautman (1995) finds that restrictions on general obligation debt alone do not have a significant impact on the number of public authorities. Also, Frant (1997) fails to find a relationship between debt restrictions and either the number of public authorities or their issued debt (he says public authorities are not mere ‘borrowing machines’). The author hypothesizes that purely fiscal motivations are not primary determinants of the use of public authorities. More recently, Bourdeaux (2005) also finds that it is not only financial concerns that bring about the creation of a public authority. In addition, politically competitive environments are also a relevant factor.

In Spain, some authors have provided intuition about the ‘shift effect’ (Monasterio-Escudero, 1996). However, the empirical works assessing the relationship between fiscal rules (deficit or debt limitations) and PSEs growth (number of entities and indebtedness) is yet quite scarce. Several papers, articles and books are limited to observe and describe the growth of PSEs, without inquiring into the causes of the

phenomenon, beyond the intuitive explanations<sup>14</sup>. We can justify this lack of empirical studies because, unlike what happens in the U.S., ACs and local governments in Spain are subject to the same legal restrictions (budgetary stability law). There is another reason in the case of ACs: the relatively recent formation of PSEs (accelerated since 2002, as seen in Table 1), although in some regions the process began much earlier. Both reasons make difficult a comparative analysis among jurisdictions.

Thus, Monasterio-Escudero *et al.* (1999) attempted to delve into the reasons for the growing number of PSEs (corporations only) and off-budget debt in the ACs. The authors found a significant growth in both variables between 1990 and 1997, attributing it to the deviations of debt in the CCAA with respect to the targets set, although they were not able to prove this hypothesis, due to lack of disaggregated data by ACs.

Fernández-Llera (2005) found significant evidence for the ‘shift’ effect hypothesis in the ACs (1995-2003 data), concluding that ACs use more intensively the PSEs when they are beset by the proximity (or overflow) to their deficit and debt limitations. The author also found a significant positive relationship between the number of PSEs and the long-term debt outside the ‘scope of consolidation’. The results in Cuadrado-Roura and Carrillo-Neff (2008) are to some extent consistent with the previous ones. The authors’ endogenous variable is the change in the number of PSEs (1998-2004) and they detect a direct and significant correlation between this variable and the total public debt (summing up general government debt and PSEs’ debt) in 1998. In other words, the most indebted regions at the beginning of the period also have significantly increased the size of its public business sector as a way to obtain additional financial resources.

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<sup>14</sup> See, among others, Gómez-Agustín (2006) and Utrilla de la Hoz (2006). Also the web page of the Spanish Ministry of Economy and Finance ([www.meh.es](http://www.meh.es)).

Unfortunately, the studies that analyze efficiency of public sector from a global point of view are not very usual. As we mentioned previously, the empirical evidence is even slighter in the Spanish case, both at local level and at ACs' level<sup>15</sup> (Bosch *et al.*, 2003). Many of them use municipal data (Giménez and Prior, 2003; Balaguer, 2004), and it is very infrequent to find studies evaluating efficiency in the regional level of government in Spain<sup>16</sup>. In general, the conclusions of these partial studies are not clear at all. Although it could be expected that more specialized organizations were more efficient, such an intuition is not always true.

Specifically with relation to PSEs there exist several theoretical approaches and international evidence on efficiency: competitiveness and predation of competitors (Lott, 1990); the role of X-inefficiency in PSEs (De Fraja, 1993); efficiency and privatizations (Anderson *et al.*, 1997); ownership, efficiency and political interference (Willner, 2001). For Spain, see Urueña Gutiérrez (2004), Hernández de Cos (2004) and Vergés-Jaime (2007), among others.

This paper is directly linked to relevant research areas in the field of Public Economics, from both international and Spanish points of view. The first area is related to the determinants of borrowing (Bayar and Smeets, 2009). The second one is linked to fiscal rules about debt and deficit (Ter-Minassian and Craig, 1997). The third is related to the hypothesis about the soft budget constraint in the case of subnational governments (Inman, 2003). Finally, the fourth area is linked to the evaluation of public sector efficiency (Lovell and Muñiz, 2003).

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<sup>15</sup> In this respect, and due to the methodological problems linked to global analysis efficiency, is more usual to find empirical studies that have separately evaluated the efficiency of specific public services. There are some empirical studies in Spain which have analyzed justice (Pedraja and Salinas, 1995), education (Mancebón, 1998; Muñiz, 2001; Giménez, 2004; Cordero-Ferrera *et al.*, 2005; Mancebón y Muñiz, 2008), health (Rodríguez-Álvarez, 2003) or refuse collection services (Bosch *et al.* 2000).

<sup>16</sup> Some regional –and also the supreme- external audit institutions in Spain have recently introduced this concern in their respective annual planning and their audit reports. See, for instance, Cámara de Cuentas de Andalucía (2004) on pharmaceutical spending in public hospitals.

## **5. A model for public sector enterprises debt**

### 5.1. Theoretical patterns

#### *A) Basic model*

Our main purpose is to investigate which are the most relevant factors that have influenced the accumulation of debt through the PSEs. Therefore, we try to test for the ‘shift effect’ (Monasterio-Escudero, 1996) that we have exposed above. On the other hand, we also test for the ‘efficiency effect’, to be exact, we check if aggregate efficiency improvements might reduce the debt of the PSEs. In any case, Eurostat consolidation debt rules (Eurostat, 2002) will be considered. Table A1 in the Appendix summarizes the variables we use in the model, including the two instruments for IV estimation.

The first hypothesis states that the number of PSEs (*NPSE*) may increase debt accumulation outside the scope of consolidation, as the descriptive analysis (tables 1 and 2) seems to suggest. In some sense, regional governments and the PSEs themselves are using these legal structures in a way to increase their activities and consequently their debt, following the classical arguments on bureaucracy (Niskanen, 1971) and the *Leviathan* process (Brennan and Buchanan, 1980). While private firms’ aim is profit maximization, PSEs may contribute to inefficient production through budget maximization processes and agency costs (Krishnaswamy *et al.*, 1994; Bartel and Harrison, 2005).

Secondly, we try to connect the deviation from the legal restrictions in terms of deficit with the current level of debt. Following the previous research for USA and Spain, we suggest that if a regional government significantly overflowed its deficit objective in the last year, it might present structural financing needs which are –at least,

partially- canalized through PSEs. If this was the case, the government would be more prone to use the PSEs in order to obtain additional resources. The final consequence would be increasing borrowing and higher debt outside the scope of consolidation. We define a new variable (*OBJ*) as the positive deviation from the deficit objective, computed in terms of regional GDP. If an Autonomous Community breaks his deficit objective in the previous year, the variable will take a positive value. Otherwise, if an Autonomous Community accomplish its deficit objective (real deficit is equal or bellow the upper bound of deficit), the new variable equals zero. This is because the requirements in the Spanish Budgetary Stability Act are ‘asymmetric’, in the sense that the law only provides sanctions for defaulters, but no ‘awards’ for fulfilment. In order to complete this test, we control for the entry into force of the Budgetary Stability Act in 2002 by using a dummy variable (*DNEP*). Previously to 2002 the coordination of deficit and debt was much more slightly in Spain. The unique coordination schemes were the so-called *Budget Consolidation Scenarios* which consist in bilateral political agreements between the central government and each of the ACs. Many of those agreements were unfulfilled or even revised in favour of the most indebted ACs. Nevertheless, the *Budget Consolidation Scenarios* have contributed to general fiscal consolidation in Spain during the nineteen’s (Vallés-Giménez and Zárata-Marco, 2003).

The third independent variable that is introduced into the model tries to connect the aggregate efficiency of public services with the accumulation of debt in public enterprises. The main problem lies precisely in the difficulties to measure efficiency in the Public Sector, as we previously mentioned. Moreover, the difficulty for evaluating the aggregate efficiency of PSEs is very high. Here we introduce the apparent productivity of labour in the non-market services (*PRODCIV*) as a proxy for global efficiency in every Autonomous Community. This kind of services are not intended for

sale, i.e. all the 'free' services for the citizen-user, mostly financed by taxes and offered by the Public Sector (including PSEs). This category includes basic public services (e.g. education, health and social services), public goods (e.g. street lighting, security) or natural monopolies (e.g. basic road and water infrastructures). It is expected that lower productivity in non-market services may result in (indirect) effect on the amount of PSEs debt given that some of those services are provided by PSEs, together with the regional Public Administration itself. Maybe this is the most innovative –and risky– issue of our paper. However, it is relevant in the sense that this coefficient in the model will give us some clues about the so-called 'efficiency effect' in relation to PSEs and their debt.

We also include a vector of political indicators which includes a set of four dummy variables. The first one reflects the electoral cycle in each of the ACs (*CYC*), distinguishing only the year in which there are regional parliamentary elections. The second variable indicates the alternation of ruling party during the period (*DALTGOB*), namely, the existence of at least one change in the party in charge of government between 1994 and 2008. Thirdly, the ideology of the regional government (*DIDEOL*), disregarding the Spanish party system and electoral rules (Llera-Ramo, 1998) and the existence of regional political parties with significant influence in national politics (Lago-Peñas and Montero, 2008). Finally, the fourth political variable is partisan alignment (*DALIG*), a dummy indicating if the regional government is or not aligned with the central one in terms of ideology. Following Solé-Ollé and Sorribas (2008) and Arulampalam *et al.* (2009) we consider the two governments are aligned when they are controlled by the same party (either as a majority party in regional parliament or as the leader of a broader coalition).

In the basic specification of the model we have included the indicator *HIGH* as a control variable, which is the combination between the GDP per capita (*GDPPC*) and the indicator for the ‘fast lane’ ACs. The variable *HIGH* condenses in a unique indicator the fiscal capacity of the jurisdiction and the financial differences that are dependent on the expenditure competences. It is plausible that high-responsibility regions show a different pattern, given the fact that health, education and social services expenditures together take up 2/3 of total regional outlays. Also, these expenditures are income elastic, much more than the expenditures which are common to all ACs (Garcia-Milà *et al.*, 2001). This intuition is even likely after 2002 when the homologation of expenditure responsibilities among all the regions took place<sup>17</sup>.

The general formulation of the basic model is as follows:

$$PSED = f(EF, NPSE, OBJL, NEP, PRODTV, P, X) \quad (1)$$

The variables *NPSE*, *OBJL*, *DNEP* and *PRODTV* will be used to test the main hypotheses of the model. The vector *P* contains the four political variables, *EF* represents the individual fixed effects (when they are considered) and *X* is the control variable (*HIGH*). Indeed, we try to isolate the ‘shift effect’ and the ‘efficiency effect’ as we previously mentioned.

#### *B) Instrumental variables estimation*

Although the results for the basic model are quite satisfactory, it could be reasonable to think that the number of PSEs (*NPSE*) and their outstanding debt (*PSED*) should be simultaneously determined. In such a case we will need to control for this potential endogeneity in order to improve the efficiency of the model. Therefore, we fit a linear regression of equation 1 using instrumental variables (IV) with a two-stage least

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<sup>17</sup> At least until 2008, when our study ends.

square estimator (2SLS). We need a vector of variables ( $Z$ ) which are correlated with the instrumented variable ( $NPSE$ ) and they are not with the error term ( $\varepsilon$ ). The 2SLS estimator chooses the linear combination of  $Z$  that is most highly correlated with the first-stage endogenous variable ( $NPSE$ ). In that way, we obtain the most efficient IV estimator in the case.

In our case, we make use of two instruments for the variable  $NPSE$ . The first instrument is the one lag of the public debt variable ( $DEBTL$ ), i.e. the debt inside the perimeter of consolidation. The second instrument is the one lag of the ACs' capital expenditure ( $INVL$ ), to be precise, real investment outlays which are directly executed by regional governments<sup>18</sup>. It is assumed that the most indebted ACs in the past (using the consolidated debt) should appeal more to the creation of PSEs in order to deviate certain activities and diversify financial revenues. By the same reasoning, the regions with highest level of real direct investment in the past now have more current expenditures associated with personnel costs and the maintenance of the quality standards relating to the delivery of the public service.

In order to correct the standard errors for heteroskedasticity, we compute the robust covariance matrix with the Huber-White sandwich estimator for the pooled-IV model in place of the traditional calculation of errors (Hardin, 2003).

We also check that the instrumental variables do verify the two conditions for suitability, namely, the *relevance* (correlation between  $Z_{it}$  and  $NPSE_{it}$  differs from 0) and the *exogeneity* (correlation between  $Z_{it}$  and  $u_{it}$  equals to zero). The former can be simply analyzed from the matrix of correlations (Table 4) and they are full verified with a Wald test in order to check whether the coefficients for the variables  $DEBTL$  and  $INVL$  are simultaneously equal to zero in the first-stage estimation. We are able to reject

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<sup>18</sup> Capital grants paid by ACs to other entities are excluded because many of the potential receptors are the just the PSEs. The auxiliary estimations we run endorse the prior intuition.



the null hypothesis (p-value=0.0000), indicating that the coefficients for *DEBTL* and *INVL* are not simultaneously equal to zero, meaning that the inclusion of these variables create a statistically significant improvement in the fit of the model. Finally, the exogeneity of the instruments is also fulfilled by construction because  $u_{it}$  (error term in year t) is uncorrelated with *DEBTL* and *INVL* (both referred to year t-1). In addition, we try to capture and compare the combined time-series cross-section data by using the IV and 2SLS for panel-data models, both with random and fixed effects.

Finally, our own intuition and the previous research suggest that the range of competences in the ACs clearly determines the behaviour of the regional governments in terms of creation of PSEs and debt accumulation outside the scope of consolidation. Therefore, we split the sample into two groups of regions and the model is estimated separately for the two subsamples: (1) ACs with broad responsibility over expenditure programs since before 2002 (Andalusia, Canary Islands, Catalonia, C. Valenciana, Galicia, Navarre and Basque Country); (2) the remaining 10 ACs. In order to avoid endogeneity problems with the grouping variable we replace *HIGH* (which is defined on the basis on such a criterion) for *GDPPC* as the control variable. As we will see, the results in the descriptive statistics and in the estimation are conclusive in this sense.

## 5.2. Descriptive statistics and correlations

The analysis is focused in the 17 ACs in Spain during the period 1994-2008, using an unbalanced panel for all the regional governments. The time series is especially significant for several institutional reasons. First of all, because the Spanish Central Bank became independent from the government in 1994, leaving monetary policy solely in its hands from onwards that moment. Secondly, the Euro was set as the common currency in EMU at 1-1-1999, so the common monetary policy in EMU will

be implemented by the European Central Bank since that date. Third, the homogenization of ACs' expenditure policies was carried out, especially from 2002, with the transfer to AC of health expenditures management. And, finally, a new fiscal rule was introduced in Spain consisting in annual equilibrium for all levels of governments (2002-2007) and, afterwards a cyclical management of public finances (from 2007 onwards).

**Table 3: Descriptive statistics (numerical variables)**

	<b>Uds.</b>		<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>	<b>Obs.</b>	
<i>PSED</i>	€ / inhabitant	overall	77.83	109.95	0.00	611.68	N	255
		between		77.99	1.13	292.68	n	17
		within		79.63	-77.16	508.61	t	15
<i>NPSE</i>	number	overall	30.4	23.5	1.0	110.0	N	221
		between		22.4	5.1	88.3	n	17
		within		8.9	-0.4	69.6	t	13
<i>OBJ</i>	% regional GDP	overall	0.13	0.29	0.00	1.76	N	255
		between		0.13	0.01	0.50	n	17
		within		0.26	-0.38	1.59	t	15
<i>PRODCTV</i>	€ / employee	overall	24146.24	2307.63	20611.10	30725.56	N	238
		between		1956.44	21010.62	27912.48	n	17
		within		1306.70	20819.89	29275.97	t	14
<i>DEBTL</i>	€ / inhabitant	overall	825.62	399.49	248.61	1962.98	N	238
		between		347.93	432.44	1582.91	n	17
		within		212.56	113.98	1478.27	t	14
<i>INVL</i>	€ / inhabitant	overall	223.66	108.04	50.33	586.66	N	238
		between		83.24	115.80	371.24	n	17
		within		71.58	-53.22	553.43	t	14
<i>GDPPC</i>	€ / inhabitant	overall	16136.91	3781.77	8177.84	25337.73	N	255
		between		3243.22	10707.89	21356.67	n	17
		within		2088.78	9577.57	21252.66	t	15
<i>HIGH</i>	€ / inhabitant	overall	6818.70	8548.26	0.00	25337.73	N	255
		between		8672.65	0.00	20647.80	n	17
		within		1415.47	1719.53	11934.45	t	15

Source: Own elaboration.

Table 3 shows the descriptive panel statistics for the numerical variables and Table 4 encloses the correlation matrix. Regional consumer price index (Spanish National Statistics Institute data, base 2001=100) is used to deflact all the monetary variables. Also, these variables are normalized by population. As we can see, both

*NPSE* and *PSED* have a high variability that comprises from zero to 611.68 Euros in the former and from 1 to 110 PSEs in the latter. The maximum deviation from the deficit target amounts to 1.76% of GDP (about 40% of the total number of observations are positive values). For the rest of variables, perhaps the highlight is the important variability of *GDPPC*, *PRODCTV* and even more *DEBTL*, indicative of large interregional differences in terms of per capita debt.

**Table 4: Matrix of correlations**

	<i>PSED</i>	<i>NPSE</i>	<i>OBJ_I</i>	<i>DNEP</i>	<i>PRODCTV</i>	<i>DCYC</i>	<i>DALT</i>	<i>DIDEOL</i>	<i>DALIG</i>	<i>DEBTL</i>	<i>INVL</i>	<i>GDPPC</i>	<i>DAMP</i>	<i>HIGH</i>
<i>PSED</i>	1.0000													
<i>NPSE</i>	0.4516	1.0000												
<i>OBJ_I</i>	0.2158	-0.0226	1.0000											
<i>DNEP</i>	0.3259	0.2306	0.1542	1.0000										
<i>PRODCTV</i>	0.1108	0.3110	-0.0709	0.3405	1.0000									
<i>DCYC</i>	0.0095	-0.0192	-0.0777	-0.0837	-0.0677	1.0000								
<i>DALT</i>	-0.0321	-0.0534	-0.0766	0.0000	-0.3699	0.0106	1.0000							
<i>DIDEOL</i>	0.0230	0.0251	-0.0084	0.1237	-0.0219	0.0473	-0.1350	1.0000						
<i>DALIG</i>	0.0661	0.0550	-0.0710	-0.1704	0.0008	-0.0651	0.0988	-0.2887	1.0000					
<i>DEBTL</i>	0.4997	0.6141	0.1416	0.1245	0.0699	-0.0158	0.2297	-0.1287	0.1615	1.0000				
<i>INVL</i>	-0.1821	-0.2145	0.0575	0.3044	0.3727	-0.0202	0.0852	0.1013	-0.0415	-0.0514	1.0000			
<i>GDPPC</i>	0.4120	0.4056	0.0679	0.3755	0.3458	-0.0731	0.2994	-0.3189	0.0671	0.4269	-0.0184	1.0000		
<i>DAMP</i>	0.3480	0.6611	0.0160	0.0000	0.3334	0.0134	-0.1690	-0.1496	0.1455	0.6112	-0.0479	0.1009	1.0000	
<i>HIGH</i>	0.4457	0.7180	-0.0068	0.0695	0.4445	0.0114	-0.1133	-0.1882	0.1501	0.6432	-0.0261	0.2829	0.9591	1.0000

Source: Own elaboration

As we earlier announced, the descriptive analysis is supplemented by splitting the sample into two groups of ACs, classified according to their expenditure powers by 2002. Clearly, ‘fast lane’ ACs have on average much more debt outside the scope of consolidation than the ‘slow lane’ ones (116.78 *versus* 50.57 Euros). The former also have more PSEs than the latter (48.70 *versus* 17.60) and a higher level of debt inside the perimeter of consolidation (1092.20 *versus* 639.01 Euros). On the contrary, the ‘slow lane’ ACs exhibit higher levels both in the deviation of the deficit target and real investment. There are no major differences between the two groups neither in

*PRODCTV* nor in *GDPPC*. Finally, as it is obvious by construction, the variable *HIGH* takes null values for the ‘slow lane’ regions.

**Table 5: Descriptive statistics for categories of ACs (numerical variables)**

	<b>Uds.</b>	<b>ACs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min.</b>	<b>Max.</b>	<b>Obs.</b>
<i>PSED</i>	€ / inhabitant	‘Fast lane’	116.78	128.46	1.80	611.68	105
		‘Slow lane’	50.57	85.27	0	526.32	150
<i>NPSE</i>	number	‘Fast lane’	48.70	24.64	17	110	91
		‘Slow lane’	17.60	10.85	1	58	130
<i>OBJ</i>	% regional GDP	‘Fast lane’	0.1172	0.2578	0	1.2736	105
		‘Slow lane’	0.1402	0.3079	0	1.7623	150
<i>PRODCTV</i>	€ / employee	‘Fast lane’	24994.10	2532.16	20989.01	30725.56	98
		‘Slow lane’	23552.74	1934.83	20611.10	29578.79	140
<i>DEBTL</i>	€ / inhabitant	‘Fast lane’	1092.20	415.31	248.61	1962.98	98
		‘Slow lane’	639.01	258.02	276.91	1504.03	140
<i>INVL</i>	€ / inhabitant	‘Fast lane’	208.78	90.15	103.94	451.18	98
		‘Slow lane’	234.07	118.18	50.33	586.66	140
<i>GDPPC</i>	€ / inhabitant	‘Fast lane’	16559.70	3950.57	9389.34	25337.73	105
		‘Slow lane’	15840.95	3643.15	8177.84	24937.00	150
<i>HIGH</i>	€ / inhabitant	‘Fast lane’	16559.70	3950.57	9389.34	25337.73	105
		‘Slow lane’	0	0	0	0	150

Source: Own elaboration.

### 5.3. Empirical specification and results

We run the estimation of the basic model in two different ways. First of all, we run the OLS pooled estimation without the variable *PRODCTV* and without the vector of political variables (equation 2). Secondly, we also include the *PRODCTV* variable (equation 3) and, finally, we run the OLS estimation with *PRODCTV* and political variables (equation 4). The general equations will be:

$$PSED_{it} = \beta_0 + \beta_1 NPSE_{it} + \beta_2 OBJ_{it-1} + \beta_3 DNEP_{it} + \beta_4 X_{it} + \varepsilon_{it} \quad (2)$$

$$PSED_{it} = \gamma_0 + \gamma_1 NPSE_{it} + \gamma_2 OBJ_{it-1} + \gamma_3 DNEP_{it} + \gamma_4 PRODCTV_{it} + \gamma_5 X_{it} + e_{it} \quad (3)$$

$$PSED_{it} = \eta_0 + \eta_1 NPSE_{it} + \eta_2 OBJ_{it-1} + \eta_3 DNEP_{it} + \alpha \eta_4 PRODCTV_{it} + \eta_5 P_{it} + \eta_6 X_{it} + \xi_{it} \quad (4)$$

The subscript *i* refers to ACs and *t* to years;  $\alpha_0$ ,  $\beta_0$  and  $\eta_0$  are the intercepts;  $P_{it}$  represents the vector of political variables;  $X_{it}$  is the control variable (*HIGH*);  $\varepsilon_{it}$ ,  $e_{it}$  and  $\xi_{it}$

$\zeta_{it}$  are the error terms (we assume white noises). Next, we include the political variables and we perform the GLS specification. Equation 5 shows the generalized *random effects* model and equation 6 shows the generalized *fixed effects* specification. Note that  $\alpha_i = \alpha + u_i$ ;  $v_i$  is a vector of individual fixed effects;  $\varphi_{it}$  and  $\omega_{it}$  are the error terms (we assume white noises).

$$PSED_{it} = \alpha_i + \lambda_1 NPSE_{it} + \lambda_2 OBJ_{it-1} + \lambda_3 DNEP_{it} + \lambda_4 PRODC TV_{it} + \lambda_5 P_{it} + \lambda_6 X_{it} + \varphi_{it} \quad (5)$$

$$PSED_{it} = v_i + \phi_1 NPSE_{it} + \phi_2 OBJ_{it-1} + \phi_3 DNEP_{it} + \phi_4 PRODC TV_{it} + \phi_5 P_{it} + \phi_6 X_{it} + \omega_{it} \quad (6)$$

The Breusch-Pagan Lagrange multiplier test for random effects clearly recommends this alternative instead of OLS estimation in all the specifications (p-value=0.0000 in all the models). Also, we test for all state dummies are equal to zero in the fixed effects model. The F-test indicates that we reject the null hypothesis, so it is preferable to use the fixed effects model instead of the OLS regression (p-value=0.0000 in all the models). Additionally, the Hausman specification test concludes that the fixed effects model is preferred to random effects estimation (the highest p-value is 0.0003). So we use the fixed effects estimation to perform the tests for autocorrelation, heteroskedasticity and contemporaneous correlation (models 3, 6 and 9 in Table 6).

According to Wooldridge (2002) and Drukker (2003), we control for serial correlation in the idiosyncratic errors of the panel data model. The null hypothesis is no first-order autocorrelation and we reject it at the 1% level in all the cases (the highest p-value is 0.0040 in model 3). To test for the variances, we calculate a modified Wald statistic for groupwise heteroskedasticity in the residuals, following Greene (2000: 598). The null hypothesis is that all the variances are equal for every cross-sectional units and we reject it at 1% level in all the models (p-value=0.0000). Finally, the Breusch-Pagan statistic for cross-sectional independence in the residuals (Greene, 2000:

601) indicates that there is a problem of contemporaneous correlation in models 3, 6 and 9 (Table 6).

To simultaneously correct the three detected problems we run regressions with Feasible Generalized Least Squares (FGLS) and Panel Corrected Standard Errors (PCSE). According to Beck and Katz (1995) it is better to use PCSE models, since the standard errors of PCSE fit better than the FGLS ones. Chen *et al.* (2008) show that PCSE estimators are less efficient than FGLS, except when the number of time periods in the panel is close to the number of individuals, which is our case ( $n=17$ ;  $t=15$ ). Also, Chen *et al.* (2005: 18) offers the following suggestion to researchers dealing with panel data: ‘we recommend that researchers use PCSE for hypothesis testing, and Parks [FGLS] if their primary interest is accurate coefficient estimates’. Since both questions are interesting in the analysis and, given this econometric controversy remains open and it is not the aim of this paper, we decide to present the two estimators, both with and without political variables.

Finally, in the IV estimations models the Hausman test clearly suggests that the random effects is more accurate because the difference in coefficients is not systematic ( $p\text{-value}=0.4757$  for the model 20 in Table 8).

#### 5.4. Results

Table 6 shows the results of the estimations for OLS and GLS models. In almost all of them, the coefficient of the variable *NPSE* is positive and highly significant<sup>19</sup>. It seems to clearly confirm the direct relationship between the number of PSEs and the debt they accumulate outside the perimeter of consolidation. A second evidence of the ‘shift effect’ is found in the positive sign of the coefficient for *OBJL*, although only it is

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<sup>19</sup> In the model 7 the coefficient of *NPSE* is significant at 11% level.

significant in OLS estimates. Also, the coefficient of *DNEP* is significant at the standard levels (except in fixed effects estimations 6 and 9). It appears that the stringent legal requirements contained in the Spanish budgetary stability law (at least in the 2001 formulation, i.e. annual equilibrium) have encouraged the levels of debt outside the scope of consolidation of the ACs as a means of circumvention. On the contrary, neither the OLS nor GLS models are sufficiently conclusive about the 'efficiency effect'. There is no a clear effect of *PRODCTV* variable whose coefficient changes its sign depending on the chosen specification and some of them are not significant. However, the worst results were obtained with the political variables, as none of them is significant in the estimations. Finally, note that the  $R^2$  coefficient is quite similar in these nine specifications (around 0.30 on average).

**Table 6: Results of OLS and GLS estimations**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	<i>OLS</i>	<i>GLS-RE</i>	<i>GLS-FE</i>	<i>OLS</i>	<i>GLS-RE</i>	<i>GLS-FE</i>	<i>OLS</i>	<i>GLS-RE</i>	<i>GLS-FE</i>
<i>NPSE</i>	<b>0.7427671</b> (2.22)**	<b>1.720648</b> (3.65)***	<b>2.243823</b> (4.44)***	<b>0.6146058</b> (1.86)*	<b>1.741016</b> (3.65)***	<b>2.19684</b> (4.26)***	<b>0.549565</b> (1.63)	<b>1.418301</b> (2.91)***	<b>2.074551</b> (3.79)***
<i>OBJ_1</i>	<b>62.26969</b> (3.17)***	<b>9.845981</b> (0.66)	<b>9.214996</b> (0.64)	<b>53.285</b> (2.74)***	<b>9.779267</b> (0.66)	<b>9.149011</b> (0.64)	<b>53.52526</b> (2.71)***	<b>12.75317</b> (0.83)	<b>10.49931</b> (0.72)
<i>DNEP</i>	<b>43.06311</b> (3.82)***	<b>35.48627</b> (4.20)***	<b>16.17514</b> (1.76)*	<b>57.21511</b> (4.79)***	<b>36.68354</b> (3.70)***	<b>13.66202</b> (1.28)	<b>60.95672</b> (4.94)***	<b>42.05609</b> (4.13)***	<b>16.1356</b> (1.48)
<i>PRODCTV</i>				<b>-0.009027</b> (-3.10)***	<b>-0.0010351</b> (-0.25)	<b>0.0020578</b> (0.46)	<b>-0.0100196</b> (-3.14)***	<b>-0.0024511</b> (-0.59)	<b>0.0016046</b> (0.36)
<i>DCYC</i>							<b>7.223354</b> (0.60)	<b>4.320357</b> (0.52)	<b>5.906811</b> (0.76)
<i>DALT</i>							<b>-9.453603</b> (-0.81)	<b>3.817155</b> (0.15)	<b>(dropped)</b>
<i>DIDEOL</i>							<b>14.15107</b> (1.15)	<b>18.67787</b> (1.32)	<b>10.30063</b> (0.71)
<i>DALIG</i>							<b>16.87701</b> (1.50)	<b>10.08562</b> (1.28)	<b>9.323377</b> (1.27)
<i>HIGH</i>	<b>0.0031882</b> (3.49)***	<b>0.0042714</b> (2.34)**	<b>0.0157706</b> (4.63)***	<b>0.0044163</b> (4.51)***	<b>0.0043757</b> (2.35)**	<b>0.0157503</b> (4.61)***	<b>0.004578</b> (4.47)***	<b>0.0042914</b> (2.46)**	<b>0.0159677</b> (4.66)***
<i>constant</i>	<b>-5.682843</b> (-0.60)	<b>-32.97715*</b> (-1.68)	<b>-118.4615</b> (-5.11)***	<b>202.2077</b> (2.99)***	<b>-9.931585</b> (-0.10)	<b>-165.2552</b> (-1.60)	<b>214.1853</b> (2.76)***	<b>17.12591</b> (0.17)	<b>-163.4795</b> (-1.55)
$R^2$	0.3198	0.2861	0.2404	0.3481	0.2904	0.2358	0.3480	0.3139	0.2399
F-test	24.86 [0.00]	---	33.41 [0.00]	22.68 [0.00]	---	26.66 [0.00]	13.04 [0.00]	---	16.93 [0.00]
Wald $\chi^2(k)$	---	109.38 [0.00]	---	---	109.09 [0.00]	---	---	---	---
Breusch-Pagan $\chi^2(1)$	---	301.24 [0.00]	---	---	265.74 [0.00]	---	---	262.82 [0.00]	---
F-test for all $v_i=0$	---	---	20.62 [0.00]	---	---	19.07 [0.00]	---	---	18.57 [0.00]
Hausman $\chi^2(k)$	---	---	21.29 [0.00]	---	---	29.35 [0.00]	---	---	168.39 [0.00]
Obs.	204	204	204	204	204	204	204	204	204

Dependent variable: *PSED*. RE: random effects. FE: fixed effects. Standard errors and z-statistics in parentheses; p-value in brackets.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Source: Own calculations.

The results of FGLS and PCSE models are presented in Table 7. Once we have corrected the data problems (autocorrelation, heteroskedasticity and cross-section correlation), the signs and significance of the coefficients of *DNEP* and *NPSE* are consistent with the OLS and GLS models. In addition, the coefficients for *NPSE* are all very close to unity (in the OLS and GLS models ranged between 0.55 and 2.24). However, the coefficient on the variable *OBJL* maintains the expected sign but it is only significant in model 12 (FGLS estimation with political variables). The biggest gain of the FGLS and PCSE estimations with respect to OLS and GLS ones occurs in *PRODCVT* variable. Now, this coefficient is negative in all cases and it is also significant at usual levels. This result would indicate that less productive ACs in non-market services are accumulating more public debt outside the scope of consolidation, probably to redirect some public services outside the regular control of the government. As regards the political variables, we can see that all of them have positive coefficients but only two of them are significant and they are only in the FGLS estimation. The variable *DCYC* may be indicative of a slight electoral cycle in the ACs which is reflected (among other effects) in a higher level of debt in the PSEs. Similarly, the ideology of the regional government might contribute to raise the debt outside the scope of consolidation. Nonetheless, the implications of the political variables should be taken into account with extreme caution. As we remarked before, Chen *et al.* (2005) recommends PCSE models instead of FGLS for hypothesis testing. Unfortunately, in this case the coefficients of the political variables are not significant in PCSE estimations.



**Table 7: Results of FGLS and PCSE estimations**

	(10)	(11)	(12)	(13)
	<i>FGLS</i>	<i>PCSE</i>	<i>FGLS</i>	<i>PCSE</i>
<i>NPSE</i>	<b>1.118126</b> (24.57)***	<b>1.084224</b> (2.29)**	<b>0.968701</b> (11.00)***	<b>0.9894096</b> (2.16)**
<i>OBJ_1</i>	<b>0.5230926</b> (0.33)	<b>4.445255</b> (0.46)	<b>4.125646</b> (1.85)*	<b>6.403201</b> (0.61)
<i>DNEP</i>	<b>29.36016</b> (16.16)***	<b>31.92978</b> (3.39)***	<b>33.78562</b> (13.39)***	<b>34.24597</b> (3.72)***
<i>PRODCVT</i>	<b>-0.0045627</b> (-9.20)***	<b>-0.0050514</b> (-1.84)*	<b>-0.0045694</b> (-6.03)***	<b>-0.0052213</b> (-1.86)*
<i>DCYC</i>			<b>4.410609</b> (3.85)***	<b>5.945143</b> (1.05)
<i>DALT</i>			<b>1.848981</b> (0.25)	<b>0.4362505</b> (0.03)
<i>DIDEOL</i>			<b>11.93111</b> (3.81)***	<b>11.4378</b> (1.10)
<i>DALIG</i>			<b>1.603665</b> (1.41)	<b>3.870683</b> (0.65)
<i>HIGH</i>	<b>0.0033197</b> (7.37)***	<b>0.0033996</b> (2.54)**	<b>0.0034008</b> (7.06)***	<b>0.0036365</b> (2.78)***
<i>constant</i>	<b>107.9198</b> (10.05)***	<b>117.3914</b> (1.75)*	<b>100.6917</b> (5.79)***	<b>113.9494</b> (1.61)
R <sup>2</sup>	---	0.1676	---	0.1921
Wald $\chi^2(k)$	2888.85 [0.00]	75.12 [0.00]	781.61 [0.00]	88.41 [0.00]
Obs.	204	204	204	204

Dependent variable: *PSED*. z-statistics in parentheses; p-value in brackets.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Source: Own calculations.

Table 8 displays the results of IV-2SLS regression while the output of the first-stage estimations are presented in the Appendix (Table A2). All the political variables have been removed because their individual and global lack of significance. The instrumented variable is the number of PSEs (*NPSE*) which is instrumented by the one-period lag of the public debt (*DEBTL*) and the public real investment (*INVL*). We have estimated 9 different models, i.e. the same specification with three different estimators (pooled, random effects and fixed effects) and three samples (full sample, subsample of ‘fast lane’ ACs and subsample of ‘slow lane’ ACs).

**Table 8: Results of IV estimations**

	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	<i>IV-pooled</i>	<i>IV-pooled</i>	<i>IV-pooled</i>	<i>IV-RE</i>	<i>IV-RE</i>	<i>IV-RE</i>	<i>IV-FE</i>	<i>IV-FE</i>	<i>IV-FE</i>
	<i>All ACs</i>	<i>'Fast lane' ACs</i>	<i>'Slow lane' ACs</i>	<i>All ACs</i>	<i>'Fast lane' ACs</i>	<i>'Slow lane' ACs</i>	<i>All ACs</i>	<i>'Fast lane' ACs</i>	<i>'Slow lane' ACs</i>
<i>NPSE</i>	<b>2.767158</b> (5.78)***	<b>1.639365</b> (3.48)***	<b>-0.9197611</b> (-0.86)	<b>2.271217</b> (2.10)**	<b>4.831056</b> (3.28)***	<b>-0.3654903</b> (-0.16)	<b>1.260846</b> (0.89)	<b>4.14295</b> (3.03)***	<b>0.8840216</b> (0.33)
<i>DNEP</i>	<b>34.81483</b> (2.17)**	<b>51.17004</b> (2.36)**	<b>39.39698</b> (1.67)*	<b>26.18469</b> (2.19)**	<b>18.88649</b> (1.00)	<b>18.67082</b> (1.01)	<b>28.95442</b> (2.06)**	<b>21.08376</b> (1.13)	<b>15.41689</b> (0.85)
<i>PRODCTV</i>	<b>-0.0093016</b> (-2.83)***	<b>-0.0263693</b> (-5.20)***	<b>-0.039471</b> (-1.00)	<b>-0.0012213</b> (-0.27)	<b>-0.0302377</b> (-3.47)***	<b>0.0110261</b> (2.11)**	<b>0.0017895</b> (0.34)	<b>-0.0281949</b> (-3.09)***	<b>0.0194578</b> (3.29)***
<i>GDPPC</i>	<b>0.0032233</b> (1.60)	<b>0.0183009</b> (5.56)***	<b>0.0448722</b> (3.38)***	<b>0.003978</b> (1.11)	<b>0.016739</b> (3.47)***	<b>0.001051</b> (0.20)	<b>0.0053895</b> (1.24)	<b>0.0182399</b> (3.79)***	<b>-0.0076559</b> (-0.99)
<i>constant</i>	<b>137.1989</b> (1.84)*	<b>357.422</b> (3.78)***	<b>54.98502</b> (0.60)	<b>-50.01557</b> (-0.49)	<b>334.5754</b> (1.88)*	<b>-237.3863</b> (-2.08)**	<b>-114.7253</b> (-1.03)	<b>292.3649</b> (1.59)	<b>-319.9704</b> (-2.64)***
R <sup>2</sup>	0.2054	0.4883	0.1076	0.2760	0.3118	0.0260	0.2796	0.3449	0.0008
F-test	24.79 [0.00]	22.44 [0.00]	12.07 [0.00]	---	---	---	---	---	---
Wald $\chi^2(k)$	---	---	---	87.98 [0.00]	117.34 [0.00]	23.98 [0.00]	421.09 [0.00]	592.70 [0.00]	120.08 [0.00]
Hausman $\chi^2(k)$	---	---	---	---	---	---	2.50 [0.48]	0.40 [0.98]	4.19 [0.38]
Obs.	204	84	120	204	84	120	204	84	120

Dependent variable: *PSED*. RE: random effects. FE: fixed effects. Standard errors and z-statistics in parentheses; p-value in brackets.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Source: Own calculations.

The results for the full sample with variable *DNEP* are robust and consistent with OLS, GLS, FGLS and PCSE estimations. The sign of the coefficient for this variable is always positive, although it is not significant in models based on panel data estimation with subsamples (models 18, 19, 21 and 22).

The coefficient for *NPSE* is positive and statistically significant in all the models based either on the whole sample and in the subsample for 'fast lane' ACs (with the unique exception of model 20 where it is positive but it is not significant). It is also very relevant that the number of PSEs depends crucially on the volume of general debt in the past (see first-stage results in Appendix for more details). Taking the two results together, we can explain the debt of PSEs on the basis of a *direct* effect (the growing number of PSEs) which is also *indirectly* determined by the growing volume of general debt (inside the scope of consolidation). To be short, there could be a simultaneous rising of the two types of debt, although much general debt is being 'shifted' to PSEs.

When we split the sample, the variable *NPSE* changes the sign of its influence for the subsample of 'slow lane' ACs but the coefficient is no longer significant. This reveals that the effect of a higher number of PSEs on the debt outside the scope of consolidation differs clearly between the two groups of ACs. Maybe, the broad

experience in ‘fast lane’ ACs with their institutional Public Sector induces them to make an intensive use of PSEs in order to circumvent the legal requirements.

The results for the *PRODCVT* variable are more erratic both for the whole sample (models 14, 17 and 20) and the ‘slow lane’ ACs subsample (models 16, 19 and 22). Conversely, the coefficients of *PRODCVT* are always negative and statistically significant in models based on the ‘fast lane’ regions (models 15, 18 and 21). In fact, the results for the latter ACs are the unique that are fully coherent in signs with FGLS and PCSE estimations. In the case of ACs with higher expenditure powers before 2002, the lower the apparent productivity of labour in non-market services, the higher the debt of PSEs. This could be due to the pejorative argument of experience in public management which has been also used in the comments for the *NPSE* variable.

Finally the control variable (*GDPPC*) has a positive influence on the debt outside the perimeter of consolidation, with the exception of model 22 (non significant). Yet again, the best results are obtained for the subsample of ‘fast lane’ ACs (models 15, 18 and 21). In general, it seems that higher-income ACs are also the ones that more intensively shift debt from the general government to PSEs.

It appears to be clear that the variety of institutional structures in Spain is a crucial issue when studying the determinants of PSEs debt. In particular, there exists very distinct profiles for ‘fast lane’ ACs and ‘slow lane’ ACs. Our results are quite solid and consistent with the previous research, in particular with the approximations made by Fernández-Llera (2005) and Cuadrado-Roura and Carrillo-Neff (2008).

## **6. Conclusions**

The stringent limitations to deficit and debt as well as the facility to avoid some legal requirements for the public management have excited the growing number of

PSEs in subnational governments. This should not be a worrying issue unless the subcentral governments were using the PSEs only as a way to elude the legal limitations. The case of ACs in Spain appears to be a good example in that sense, especially since the entry into force of the budgetary stability law in 2002.

The descriptive analysis has shown significant growth in PSEs of the ACs because of that 'shift effect'. This mechanism could be considered as a way to hide debt, with the ultimate goal of maintaining the investment effort, while circumventing the budgetary stability law.

The paper proposes an empirical model in order to analyse that concern. The endogenous variable in the econometric model is the ACs' public enterprises debt, that is, the debt which is out of the consolidation scope. To obtain it, we use the official statistics published by the Spanish Central Bank. The key independent variable is the number of PSEs in the ACs, and also the deviation from the deficit objective in the past. We also introduce a representative index of productivity to approximate the efficiency in regional public sector. Finally, in a dynamic context, a negative and significant link between general public debt and PSEs debt would confirm the 'shift effect' previously mentioned. In this case, the general public debt would have been used as an instrument for the number of PSEs in order to control for possible endogeneity.

The general results show a positive and statistically significant relationship between the number of PSEs and the debt outside the consolidation perimeter. This is a solid result, robust to alternative specifications of the model and consistent with previous empirical research. In the same way, which lead to conclude that there exists an accumulative debt process, in a bureaucratic and *Leviathan* state context. Additionally, we confirm our expectations in relation to the deviations from the deficit objectives, finding a positive and significant link between both variables. Thus, higher

deviations lead to high levels of public enterprises debt, although the statistical evidence is weaker than in case of the variable *NPSE*. Finally, we capture a inverse relationship between aggregate productivity and PSEs' debt even though this fact could be due to the *indirect* effect of productivity on the number of PSEs.

The results show that there are very significant differences between the two groups of ACs, as they had assumed great powers of health and education before 2002 or not. Anyway, it is expected that this structural difference is becoming blurred along next years, since the CCAA are de facto managing the same program expenditures since that date. In any case, it will be suitable in the future the evaluation of the actual impact of the deficit target over the economic cycle, valid in Spain from 2006 onwards.

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## Appendix

**Table A1: Description of variables (basic model)**

	Brief description	Units	Range	Source
<b>Dependent variable</b>				
PSED	Debt of PSEs (outside the scope of consolidation)	€ / Inhabitant	1994-2008	BDE / INE
<b>Independent variables</b>				
<i>Central hypotheses</i>				
NPSE	Number of PSEs	Number	1994-2006	IGAE / INE
OBJ	Deviation of the deficit target (=0 if the actual deficit is less than or equal to the target)	% Regional GDP	1995-2008	IGAE / INE / Own elaboration
DNEP	Dummy for years with stability budgetary law (=1 if year≥2002; =0 otherwise)	Dummy	1994-2008	Own elaboration
PRODCTV	Apparent labour productivity in non-market services	€ / Employee	1994-2008	INE
<i>Political variables</i>				
DCYC	Dummy for electoral cycle (=1 if there is regional elections in the year; =0 otherwise)	Dummy	1994-2008	Own elaboration / MIR
DALT	Dummy for political alternation in regional government (1=if there was at least one change of party in the regional government during the 1994-2008 period; =0 otherwise)	Dummy	1994-2008	Own elaboration / MIR
DIDEOL	Dummy for ideology of regional government (1=left-wing; 0=otherwise, including rightists, regionalists and nationalists)	Dummy	1994-2008	Own elaboration / MIR
DALIG	Dummy for partisan alignment between central and regional governments (=1 if the regional government is politically or ideologically aligned with the central one; =0 otherwise)	Dummy	1994-2008	Own elaboration / MIR
<i>Instrumental variables</i>				
DEBTL	Public debt (inside the scope of consolidation)	€ / Inhabitant	1994-2008	BDE / INE
INVL	Real investment executed by regional government		1994-2008	BADESPE / MEH
<i>Control variables</i>				
GDPPC	GDP per capita	€ / Inhabitant	1994-2008	BADESPE / INE
HIGH	=0 for 'slow lane' ACs =GDPPC for 'fast lane' ACs (regions with responsibility over common public services as well as the major services of health and education)	€ / Inhabitant	1994-2008	Own elaboration / BADESPE / INE

BDE: Bank of Spain. INE: Spanish National Statistics Institute. IGAE: General Comptroller of the State Administration. BADESPE: Economic Database of the Spanish Public Sector. MEH: Ministry of Economy and Finance. MIR: Ministry of Interior. All monetary variables are in constant 2001 euros.  
Source: Own elaboration.

**Table A2: First-stage estimations in IV models**

	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
	<i>IV-pooled</i>	<i>IV-pooled</i>	<i>IV-pooled</i>	<i>IV-RE</i>	<i>IV-RE</i>	<i>IV-RE</i>	<i>IV-FE</i>	<i>IV-FE</i>	<i>IV-FE</i>
	<i>All ACs</i>	<i>'Fast lane' ACs</i>	<i>'Slow lane' ACs</i>	<i>All ACs</i>	<i>'Fast lane' ACs</i>	<i>'Slow lane' ACs</i>	<i>All ACs</i>	<i>'Fast lane' ACs</i>	<i>'Slow lane' ACs</i>
DEBTL	0.033991 (10.76)	0.0145469 (2.62)	0.0317746 (8.60)***	0.0160073 (6.39)***	0.0151777 (4.06)	0.0159728 (4.11)	0.0137272 (5.74)	0.0160633 (4.28)***	0.012187 (3.06)***
INVL	-0.0891475 (-6.96)	-0.1900412 (-9.73)	0.0273691 (3.63)***	-0.0188231 (-2.07)**	0.0123406 (0.45)	0.0031941 (0.38)	-0.0101353 (-1.19)	0.0462048 (1.66)	-0.0069095 (-0.74)
DNEP	7.615744 (2.94)	5.112768 (1.40)	2.921237 (1.68)*	5.23361 (3.38)***	8.189461 (3.04)	3.762259 (2.31)	5.385717 (3.63)	8.127369 (3.02)***	3.375611 (2.06)**
PRODCTV	0.0039915 (6.60)	0.0033699 (3.01)	-0.0014242 (-3.23)***	0.0007909 (1.24)	0.0011116 (0.81)	-0.0002549 (-0.45)	0.0002029 (0.31)	0.0005208 (0.36)	-0.0001461 (-0.23)
PIBCH	-0.0001749 (-0.45)	0.0014052 (1.86)	0.0002157 (0.91)	0.0015169 (3.62)***	0.0013157 (1.60)	0.0011657 (2.90)	0.0016698 (3.78)	0.0015943 (1.89)*	0.0018906 (3.29)***
constant	-74.23188 (-5.66)	-36.31553 (-1.59)	21.19374 (2.06)**	-23.474 (-1.70)*	-22.28128 (-0.79)	-6.431526 (-0.50)	-11.82307 (-0.87)	-20.0517 (-0.69)	-15.62832 (-1.18)
R <sup>2</sup>	0.5635	0.6240	0.6569	---	---	---	0.3791	0.0493	0.4458
F-test	51.13 [0.00]	28.55 [0.00]	46.57 [0.00]	---	---	---	43.78 [0.00]	19.90 [0.00]	30.50 [0.00]
Wald $\chi^2(k)$	---	---	---	204.00 [0.00]	88.00 [0.00]	156.00 [0.00]	---	---	---
Wald test for DEBTL and INVL ( $\chi^2$ )	54.86 [0.00]	96.63 [0.00]	35.46 [0.00]	---	---	---	---	---	---
Obs.	204	84	120	204	84	120	204	84	120

Instrumented variable: NPSE. RE: random effects. FE: fixed effects. Standard errors and z-statistics in parentheses; p-value in brackets

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

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