

The role of public sector enterprises in Spain: Room for a shadow government?

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Abstract

The main objective of this paper consists of analyzing regional public sector enterprises (PSEs) in Spain. We provide a general overview of 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 on ACs' indebtedness. We investigate the role of PSEs as an alternative to traditional debt mechanisms given that, in line with 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.

Key words: deficit, debt, public sector enterprises, regional governments, Spain

JEL codes: H74, L32

1. INTRODUCTION

The important decentralization process carried out in Spain over the last three decades has led to regional governments (Autonomous Communities or ACs) becoming the most significant managers of public expenditure. However, the relative lack of traditional financial sources to cover investments (current saving, capital grants and borrowing) has raised doubts about ACs' expenditure ability. Consequently, an alternative set of financial mechanisms has been developed in order to maintain a high level of public investment. All those mechanisms should be compatible with the debt restrictions imposed by European and Spanish regulation (Stability and Growth Pact and Budgetary Stability Act). This paper focuses on public sector enterprises (PSEs), which could be used as a way to avoid those hard budget constraints.

There is no unique concept or a single definition to accurately characterize PSEs¹. Rather than focusing on their legal status, the aim of this paper is to analyse the creation of regional public firms in order to elude legal restrictions on public deficit and debt. However, as not all public firms have been created with such an objective, we will try to capture the 'efficiency' or 'value-for-money' effect related to institutional and organizational changes in the provision of public services.

The rest of the paper is organized as follows. In section 2 we review the analytical background of ACs' financing choices taking into account the relative costs of the alternatives. We also discuss the role and delimitation of PSEs. Section 3 includes a literature review which summarizes the main results of previous research, with a particular focus on the USA and Spain. In section 4 we present an empirical model based on a panel data approach for the 17 ACs in the 1994-2008 period. The main conclusions drawn from our analysis are presented in the final section.

2. THE ROLE OF PSES IN REGIONAL FINANCING IN SPAIN

2.1. The weakness of ACs' traditional revenue sources

Over the last 30 years, Spanish ACs have become accountable for an increasing amount of expenditure and responsibilities. In fact, they have become the main agent of public spending in Spain, with their expenditure exceeding the aggregate outlays of Central Government, Social Security and Local Governments (IGAE 2009). However, public revenues in Spain have not been distributed in the same way as expenditures, resulting in a significant vertical fiscal imbalance. The three 'traditional' sources revenues (current saving, grants and borrowing) are experiencing grave difficulties.

Current saving had grown quickly over the decade leading up to the present recession due to a dynamic economic growth and a fast increase in tax revenues. However, the national and international recession which began in 2008 has significantly reduced receipts due to the effect of automatic stabilizers². At the same time, many social expenditures in ACs (health, education and care for dependency) are very difficult or politically costly to reduce in the short run, thereby diminishing their budgetary leeway (Barberán-Ortí 2005). As a consequence, current saving improvements could only be obtained from four sources: public expenditure reduction; tax rates increases; reform in the regional financing system in order to reduce the vertical fiscal imbalance (this was enacted in 2009 but its results are still unclear); efficiency/productivity improvements (these become visible only in the long run).

Capital grants through EU funds have been reduced for Spain for the 2007-2013 period. From 2013 onwards, they will be significantly reduced again because Spain's income level has risen to 100% of EU27 per capita GDP. Also, the national fund for regional development (FCI) had a shortfall equivalent to 0.12% GDP in 2009.

Borrowing is the ‘closing mechanism’ in the budget and it is also an adequate instrument for intergenerational equity (Musgrave 1959). However, Spanish budgetary stability legislation imposed in 2001 the annual budget balance for all tiers of government. From 2006 onwards, budget balance was made flexible and defined over the economic cycle (Herber 1967) in keeping with the renewed Stability and Growth Pact (Beetsma and Debrun 2007). This national fiscal rule improves the access to credit for the ACs but it remains a hard budget constraint³.

According to Marlow and Joulfaian (1989), governments always choose the funding sources with lower ‘relative costs’ within a set of revenues which includes general taxes, grants, service charges, user fees, borrowing and others. Monasterio-Escudero (1996) warned likewise that some selective borrowing constraints could lead to a ‘shift effect’ that would bias the internal structure of the debt from those instruments subject to stringent limitations (e.g. foreign currency debt) to others that are not subject to formal controls (e.g. bank loans). Polackova (1998) argued that policymakers pursuing a deficit or debt target tend to favour off-budget financing that, at least for some time, hides the underlying fiscal cost.

As we mentioned above, ACs are struggling to increase current savings, capital grants 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 their growing level of spending while complying with the objectives of deficit and debt. Among the alternatives are public-private partnership (Heald 2003; European Commission 2004; Grimsey and Lewis 2005), PSEs or various banking mechanisms (e.g. factoring, leasing, renting).

Some of these ‘innovative’ instruments provide additional revenues to the government, diversifying the risks and maintaining the sustainability of public

finances⁴. On the contrary, other ‘spurious’ mechanisms are only based on creative accounting (Milesi-Ferretti 2003), which does not reflect a real improvement in government net wealth. The next sections will focus on the role played by PSEs.

2.2. Delimitation and growth of PSEs

In many cases, ACs and also central and local governments in Spain have created PSEs to accumulate the debt outside the ‘perimeter of consolidation’ of the general government sector. In compliance with Eurostat (2002), only *non-market public institutional units* must be classified in the general government sector and within the ‘scope of consolidation’ of debt. Three conditions must be simultaneously met:

- a) *Institutional unit*: it has autonomy of decision and a complete set of accounts.
- b) *Public*: it is controlled by the general government. This means that government officials have the ability to determine the general corporate policy of an institutional unit. Control can be exercised either by owning more than half the shares of a corporation or as a result of special legislative decrees that empower the government to determine corporate policy or to appoint the chairpersons.
- c) *Non-market*: either the unit redistributes national income and wealth or a maximum of 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 PSEs in two ways. First, it should bring under control the abuse of dominant position by public enterprises which have been granted special or exclusive rights. Second, it should seek to control the financial relations between PSEs and public administrations⁵. Eurostat (2002) also establishes that capital injections into public corporations will have no impact on the public deficit when they are considered as a financial transaction, that is,

when the general government receives in exchange a financial asset of equal value to the payment made to the public enterprise. In any other case, capital injections in PSEs will be considered as a capital transfer with a direct impact on the deficit.

The optimal situation for market discipline (Lane 1993) is when the financial market does not judge PSEs as a mere ‘appendix’ to the general government but as an autonomous entity. Otherwise, the market may perceive PSEs’ solvency as exaggerated given that it is supported by the government. If this happened, there would be a problem of moral hazard due to the perception of a soft budget constraint based on a credible expectation of bailout. As stated by Fitch Ratings (2004), this situation occurs in two cases: (1) if there is a governmental ‘statutory’ or ‘specific’ guarantee to the PSEs; (2) if the government has subscribed to a written and strong commitment with the PSEs. In these two scenarios, the rating of a PSE is being automatically equated to that of its public sector guarantor. Otherwise, both ratings could differ on the basis of legal status and institutional framework, integration of the PSE’s accounts, strategic importance of the PSEs and 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 overseen a net increase in PSEs of 365 (an 89.9% increase). This growth can be explained firstly by the intense process of transfer of responsibilities to the regions (especially in education and health), which has led to the deployment of new administrative and institutional structures in the ACs. Secondly, there is the ‘shift effect’ that may have been caused by the stringent 2001 budgetary stability law.

<TABLE 1>

A simple descriptive analysis provides us some basic insights. We begin by splitting ACs into two categories according to their level of autonomy and the speed at

which they achieve it. The so-called ‘fast lane’ ACs achieve more and faster autonomy, while the ‘slow lane’ ACs undergo a more limited and gradual gain in authority. The seven ‘fast lane’ regions had assumed major spending power (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 their PSEs). In any case, this distinction among ACs is not significant from 2002 onwards. Proceeding in this way, we can get a first approximation of the ‘shift effect’, at least as far as creating PSEs is concerned. The data show us that ‘slow lane’ regions recorded a growth of 156.8% in the number of PSEs, which seems large to be justified only as a mechanism for debt avoidance. In contrast, the number of PSEs in the ‘fast lane’ ACs grew in the same period by 59.4%. Catalonia (+144.4%) and Valencia (+107.4%) clearly stand out within this group. However, Cantabria, Navarre and the Basque Country have the highest levels in terms of population (Graph 1).

<GRAPH 1>

For industries, according to IGAE (2008) the common areas for many ACs are infrastructure, broadcasting and corporate development, and economic promotion. Moreover, in recent years PSEs have become more important in health, education and R+D. The census (*Inventario*) of the Ministry of Economy and Finance (2009) reflects that the activities of government-owned corporations (*sociedades mercantiles*) in the ACs are very diverse. These activities include real estate, renting and business services (20.4%), transportation, storage and communications (15.4%, including broadcasting) and construction (11.8%, including civil engineering works).

<TABLE 2>

To complete this preliminary descriptive approach, Table 2 presents the figures for the outstanding debt of PSEs⁶. 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 check this we distinguish between the period up to 2002 and that from 2003 on in order to take account of the entry into force of the first budgetary stability law (enacted in 2001). The calculations of the *Banco de España* (the Spanish Central Bank) are made using the same methodology in the Protocol on Excessive Deficit to facilitate comparison with public debt in the strict sense.

It appears that the debt of the regional PSEs has continually increased, with few exceptions, since the first year of the series. This growth intensifies from 2003 onwards, after the entry into force of the first budgetary stability law, and is particularly relevant for the ‘fast lane’ ACs. This suggests that these regional governments are using PSEs to get debt out of the ‘perimeter of consolidation’. This ‘shift effect’ is also perceptible in the ‘slow lane’ regions, singularly in the Balearic Islands and Castille-La Mancha.

From 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 fact that their PSEs were created more recently.

3. PREVIOUS RESEARCH

Empirical evidence shows that growth in borrowing through the use of PSEs is directly related to the presence of stringent fiscal rules. In general, since legal restrictions were 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 the US, the relationship between fiscal rules and the ‘shift effect’ began to be analyzed several years ago (Pogue, 1970). The main rationale for this was the variety of fiscal rules across States (ACIR 1987; NASBO 1992; GAO 1993; Gordon 2008). In an early paper, Kimball (1976) suggested that the increase in the number of public authorities may be partially due to a sort of spillover effect whereby states mimic neighbouring states’ behaviour. Bennet and DiLorenzo (1982, 1983) illustrated these issues by describing the default of New York City in 1975. Debt growth was produced due to the failure to comply with fiscal discipline, using financial tricks such as the reclassification of current expenditures into capital expenditures.

Marlow and Joulfaian (1989) showed that tax and expenditure limitations inherited from the 1970’s ‘tax revolt’ led states to shift revenue sources away from general taxes and toward sources such as service charges, user fees and certain off-budget operations. In a national survey, Hackbart and Leigland (1990) reported an increase of almost 60 percentage points in the number of state-level entities that issue revenue-backed debt.

Von Hagen (1991) compared the states that set debt constraints with those that do not have any restriction. On average, it was observed that states with financial constraints had a higher proportion of non-guaranteed debt (1.18 percentage points higher) than those with no restrictions. Similarly, Bunch (1991) found that states with a constitutional debt limit that encompasses both general obligation and revenue bonds had a higher number of public authorities and performed many more activities. Nonetheless, these results did not hold when the constitutional limitation applied 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, ran

an empirical analysis to explore the determinants of the use of these kinds of entities in the US. He concluded that circumventing debt limits ('shift effect'), rather than business-like management, accounted for the proliferation of public authorities which are usually associated with lower levels of creditworthiness.

Similarly, Kiewiet and Szakaly (1996) identify another type of 'shift effect': the states with more stringent fiscal rules had the highest levels of local government 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 meaning 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'). 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, empirical studies assessing the relationship between fiscal rules and PSEs growth are still quite scarce. They are limited to observing and describing the growth of PSEs (Gómez-Agustín 2006) without inquiring into the causes of the phenomenon beyond intuitive explanations.

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 ACs with respect to the targets set.

Fernández-Llera (2005) found significant evidence for the ‘shift’ effect hypothesis in the ACs (1995-2003 data), concluding that ACs use the PSEs more intensively when they are near to (or have exceeded) 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 total public debt (summing up general government debt and PSEs’ debt) in 1998. Prado et al. (2009) focus on the effects of political variables. They show that right-wing regional governments does not increase the number of PSEs (in fact, the opposite effect holds), nor does it have a significant effect on the debt outside the ‘scope of consolidation’.

Unfortunately, studies that analyze the efficiency of the public sector from a global point of view are scarce due to the methodological problems. In this respect, the empirical evidence is even scarcer in the Spanish case, both at local (Balaguer-Coll 2004) and ACs level (Bosch et al. 2003). It is more usual to find empirical studies that have separately evaluated the efficiency of specific public services⁷. In general, the conclusions of these partial studies are mixed: although it might be expected that more specialized organizations were more efficient, this is not always the case.

In relation to PSEs, there exist several theoretical approaches and international evidence on efficiency from a variety of perspectives: competitiveness and predation of competitors (Lott 1990); the role of X-inefficiency in PSEs (De Fraja 1993); efficiency

and privatizations (Anderson et al. 1997); and ownership, efficiency and political interference (Willner 2001). For Spain, see Hernández de Cos (2004), among others.

This paper is directly linked to three 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). Finally, the third area is related to the hypothesis about the soft budget constraint in the case of subnational governments (Inman 2003).

4. A MODEL FOR PSEs' DEBT

4.1. Theoretical patterns

4.1.1. Basic model

Our main purpose is to determine the most relevant factors that have influenced the accumulation of debt through the PSEs. Therefore, we try to test for the 'shift effect' that we have described above. We also test for the 'efficiency effect', that is, we check whether aggregate efficiency improvements might reduce the debt of the PSEs. Eurostat (2002) debt consolidation rules will be considered. Table A1 in the Appendix summarizes the variables we use in the model, including the two instruments for Instrumental Variables (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 as 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 (Bartel and Harrison 2005).

Secondly, we try to relate the deviation from the legal restrictions in terms of deficit with the current level of debt. Following the previous research for the USA and Spain, we suggest that if a regional government significantly exceeded its deficit objective in the previous year, it might have structural financing needs which are –at least, partially- canalized through PSEs. If this were the case, the government would be more prone to use the PSEs in order to obtain additional resources. The final consequence would be increased 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 does not meet its deficit objective in the previous year the variable will take a positive value, whereas if it accomplished its deficit objective (real deficit equal to or below the upper bound of deficit) the variable takes the value zero. We define the variable this way because the requirements in the Spanish Budgetary Stability Act are ‘asymmetric’ in the sense that the law 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*). Prior to 2002 the only and soft coordination schemes in Spain were the so-called Budget Consolidation Scenarios which consisted of bilateral political agreements between the central government and each of the ACs (Vallés-Giménez and Zárate-Marco 2003).

The third independent variable that is introduced into the model tries to relate the aggregate efficiency of public services with the accumulation of debt in public enterprises. The main problem lies in the difficulties in measuring efficiency in the Public Sector (Lovell and Muñiz 2003). Moreover, evaluating the aggregate efficiency

of PSEs is very difficult. Here we introduce the productivity of labour in non-market services (*PRODTV*) as a proxy for global efficiency in every Autonomous Community. These kinds of services are not intended for sale, i.e. they are 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 have an (indirect) effect on the amount of PSE debt given that some of these services are provided by PSEs, together with the regional public administration itself. This is perhaps the most innovative contribution to our efficiency analysis and this coefficient in the model should 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 (*DCYC*), distinguishing only the year in which there were regional parliamentary elections. The second variable indicates a change in the ruling party over the period (*DALT*), 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 is not aligned with the central one. 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 interaction of GDP per capita (*GDPPC*) and the indicator for the ‘fast lane’ ACs. The variable *HIGH* condenses in a single indicator the fiscal capacity of the jurisdiction and the financial differences that depend 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 two-thirds of total regional outlays. Moreover, these expenditures are income elastic, much more so than the expenditures which are common to all ACs (Garcia-Milà et al. 2001). This should be relevant even after 2002 when the homologation of expenditure responsibilities across all regions took place⁸.

The general formulation of the basic model is as follows:

$$PSED = f(FE, NPSE, OBJ, DNEP, PRODCV, P, X) \quad (1)$$

The variables *NPSE*, *OBJ*, *DNEP* and *PRODCV* will be used to test the main hypotheses. The vector *P* contains the four political variables, *FE* represents the individual fixed effects (when they are considered) and *X* is the control variable. As mentioned above, we try to isolate the ‘shift effect’ and the ‘efficiency effect’.

4.1.2. Instrumental variables estimation

It is reasonable to think that the number of PSEs (*NPSE*) and their outstanding debt (*PSED*) may be simultaneously determined. In such a case we would need to control for this potential endogeneity. Therefore, we will estimate equation 1 using instrumental variable (IV) techniques, specifically a two-stage least squares estimator (2SLS). For this we need a vector of variables (*Z*) which are correlated with the instrumented variable (*NPSE*) but not with the error term (ε). 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 our case, we use two instruments for the variable $NPSE$. The first is the one-period lag of the public debt variable ($DEBTL$), i.e. the debt inside the perimeter of consolidation. The second instrument is the one-period lag of the ACs' capital expenditure ($INVL$), that is, real investment outlays which are directly executed by regional governments⁹. It is assumed that the most indebted ACs in the past (using 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 levels of real direct investment in the past now have more current expenditures associated with personnel costs and the maintenance of the quality standards related 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 verify the two conditions for suitability, namely, *relevance* (non-zero correlation between Z_{it} and $NPSE_{it}$) and *exogeneity* (zero correlation between Z_{it} and u_{it}). The former can be simply analyzed from the correlation matrix (Table 4) and is fully verified with a Wald test 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 the null hypothesis (p-value=0.0000), indicating that the inclusion of these variables leads to a statistically significant improvement in the fit of the model. Finally, the exogeneity of the instruments is also fulfilled by construction because u_{it} (the error term in year t) is uncorrelated with $DEBTL$ and $INVL$ (both refer to year $t-1$). In addition, we try to

exploit the time-series cross-section nature of the data by using the IV and 2SLS for panel-data models, with both random and fixed effects.

Finally, our own intuition and 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 which already had broad responsibility for expenditure programs before 2002 (Andalusia, Canary Islands, Catalonia, Comunitat Valenciana, Galicia, Navarre and Basque Country); (2) the 10 remaining ACs. In order to avoid endogeneity problems with the grouping variable we use *HIGH* (which is defined on the basis on such a criterion) instead of *GDPPC* as the control variable. As we will see, the results in the descriptive statistics and in the estimation are conclusive.

4.2. Descriptive statistics

The analysis is focused in the 17 ACs in Spain during the period 1994-2008, using an unbalanced panel for all the regional governments. This period is especially significant for several institutional reasons. First, the Spanish Central Bank became independent from the government in 1994, with exclusive control over monetary policy from that moment on. Second, the Euro was introduced as the common currency in the EMU on the 1st of January, 1999, with common monetary policy in the EMU being implemented by the European Central Bank since that date. Third, ACs' expenditure policies were homogenized, especially from 2002 with the transfer to the ACs of health expenditure management. Finally, new fiscal rules were introduced in Spain consisting initially of annual equilibrium for all levels of government (2002-2007) and then a cyclical management of public finances (from 2007 onwards).

<TABLE 3>

Table 3 presents the descriptive statistics for the variables. Regional consumer price indices (Spanish National Statistics Institute data, base year 2001) are used to deflate all the monetary variables. Moreover, these variables are normalized by population. As we can see, both *NPSE* and *PSED* are highly variable, ranging from 0 to 611.68 euro and 1 to 110 PSEs respectively. The maximum deviation from the deficit target amounted to 1.76% of GDP (about 40% of the total number of observations are positive values). For the remaining variables, the most striking aspects are the variability of *GDPPC*, *PRODCVT* and, especially, *DEBTL*, which is indicative of large interregional differences in terms of per capita debt.

As we mentioned above, the descriptive analysis is supplemented by splitting the sample into two groups of ACs, classified according to their expenditure powers up to 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 euro). 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 euro). On the contrary, the ‘slow lane’ ACs exhibit higher levels both in the deviation from the deficit target and in real investment. There are no major differences between the two groups in either *PRODCVT* or *GDPPC*. By construction, *HIGH* takes zero values for the ‘slow lane’ regions.

<TABLE 4>

4.3. Empirical specification and results

We estimate three versions of the basic model. First, we run the OLS pooled estimation without the variable *PRODCVT* and without the vector of political variables (equation 2). In the second specification, we include the *PRODCVT* variable (equation

3) and in the third we run the OLS estimation with *PRODCTV* and the political variables (equation 4). The general equations will be:

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

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

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

The subscript i refers to ACs and t to years; β_0, γ_0 , and η_0 are the intercepts; P_{it} represents the vector of political variables; X_{it} is the control variable (*HIGH*); and ε_{it} , e_{it} and ξ_{it} are the error terms (we assume white noise). Next, we perform the GLS specification, including the political variables. 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; φ_{it} and ω_{it} are the error terms (again, we assume white noise).

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

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

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). We test whether 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 OLS (p-value=0.0000 for all 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). We therefore use the fixed effects estimation to perform the tests for autocorrelation, heteroskedasticity and contemporaneous correlation (models 3, 6 and 9 in Table 5).

Following 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 this is rejected at the 1% level in all 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 unit and this is also rejected at the 1% level for all models (p-value=0.0000). 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 5).

To simultaneously correct the three problems detected 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. (2010) 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) ‘recommend that researchers use PCSE for hypothesis testing, and Parks [FGLS] if their primary interest is accurate coefficient estimates’. Since both issues are of relevance, and given that this econometric debate remains open, we decide to present the two estimators both with and without political variables.

Finally, in the IV models the Hausman test clearly suggests that the random effects is more accurate because the difference in coefficients is not systematic (p-value=0.4757 for the model 20 in Table 7).

4.4. Results

Table 5 shows the results of the estimations for the OLS and GLS models. In almost all of them, the coefficient of the variable *NPSE* is positive and highly significant¹⁰. This seems to clearly confirm the direct relationship between the number of PSEs and the debt they accumulate outside the perimeter of consolidation. More

evidence of the 'shift effect' is found in the positive sign of the coefficient for *OBJL*, although it is only significant in the 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 its 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 the GLS models are sufficiently conclusive about the 'efficiency effect'. No clear evidence is provided by the *PRODTV* variable, whose coefficient changes sign depending on the specification chosen and in some case is not significant. With regard to the political variables, none of them are significant in the estimations. The R^2 coefficient is quite similar in all these specifications (around 0.30).

<TABLE 6>

The results of the FGLS and PCSE models are presented in Table 6. 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 they ranged between 0.55 and 2.24). However, the coefficient on the variable *OBJL* maintains the expected sign but is only significant in model 12 (FGLS estimation with political variables). The main improvement provided by the FGLS and PCSE estimations with respect to OLS and GLS occurs with the *PRODTV* variable. Its coefficient is negative in all cases and is significant at conventional levels. This result indicates 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 this occurs 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 leftist ideology of the regional government might contribute to raising debt outside the scope of consolidation (this is not the case in the paper by Prado et al. 2009). Nonetheless, the implications of the political variables should be taken with extreme caution. As we remarked before, Chen et al. (2005) recommends PCSE models instead of FGLS for hypothesis testing and in our case the coefficients of the political variables are not significant in PCSE estimations.

<TABLE 7>

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 of their individual and global lack of significance. The endogenous variable is the number of PSEs (*NPSE*) and it 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>

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 using the whole sample and the subsample of ‘fast lane’ ACs (with the sole exception of

model 20 where it is positive but not significant). It is also very relevant that the number of PSEs depends crucially on the volume of general debt in the past (see the 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). In short, there could be a simultaneous increase in the two types of debt, although a lot of general debt is being ‘shifted’ to PSEs.

When we split the sample, the variable *NPSE* changes sign 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. The fact that ‘fast lane’ ACs have more consolidated institutions and more experience in expenditure management appears to induce them to make an intensive use of PSEs in order to circumvent legal requirements.

The results for the *PRODUCTV* 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 *PRODUCTV* 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 only ones 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 argument of experience in public management which we referred to above 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), in line with

Kiewiet and Szakaly (1996) and Prado et al. (2009). Yet again, the best results are obtained for the subsample of ‘fast lane’ ACs (models 15, 18 and 21).

It appears to be clear that the variety of institutional structures in Spain is a crucial issue when studying the determinants of PSE debt. In particular, very distinct profiles exist for ‘fast lane’ ACs and ‘slow lane’ ACs. Our results are quite robust and consistent with the previous approximations of the ‘shift effect’ by Fernández-Llera (2005), Cuadrado-Roura and Carrillo-Neff (2008) and Prado et al. (2009).

5. CONCLUSIONS

The stringent limitations on deficit and debt as well as the wish to avoid some legal requirements on the public management have led to a 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 this 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 this ‘shift effect’. This mechanism may 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 has proposed an empirical model in order to analyse this issue. 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 this, we use the official statistics published by the Spanish Central Bank. The key independent variables are the number of PSEs in the ACs and the deviation from the deficit objective in the past. We also introduce a representative index of productivity to approximate efficiency in the

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 can be used as an instrument for the number of PSEs in order to control for possible endogeneity.

The overall results show a positive and statistically significant relationship between the number of PSEs and the debt outside the consolidation perimeter. This result, robust to alternative specifications of the model and consistent with previous empirical research, leads to the conclusion that there exists an accumulative debt process in a bureaucratic and *Leviathan* state context. Additionally, our expectations regarding the relation between the number of PSEs and deviations from the deficit objectives were confirmed, with a positive and significant link found between these variables. Thus, higher deviations lead to higher levels of public enterprise debt, although the statistical evidence is weaker than in case of the variable *NPSE*. Finally, we find an inverse relationship between aggregate productivity and PSEs’ debt, although this could be due to the *indirect* effect of productivity on the number of PSEs.

The results show that there are very significant differences between two groups of ACs according to whether they had assumed substantial powers over health and education before 2002 or not. In any case, this structural difference is expected to become blurred over the coming years since the ACs are *de facto* managing the same expenditure responsibilities since that date. It will also be of interest in the future to evaluate the impact of the deficit target over the economic cycle (from 2007 onwards).

APPENDIX

Table A1: Description of variables (basic model)

	Brief description	Units	Range	Source
Dependent variable				
PSED	Debt of PSEs (outside the scope of consolidation)	€ / Inhabitant	1994-2008	BDE / INE
Independent variables				
<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 budgetary stability law (=1 if year≥2002; =0 otherwise)	Dummy	1994-2008	Own elaboration
PRODTV	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)**
PRODTV	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 ²	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 (χ^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%. Source: Own elaboration.

FOOTNOTES

¹ In the USA, the term ‘public authority’ is normally used to refer to a quasi-governmental agency created for a specific public sector purpose (Eger 2006). Some 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 such as *Empresas Públicas*, *Entes Públicos*, *Entidades Públicas Empresariales* or *Consortios*.

² Even with the announced increases in tax rates, especially in VAT.

³ An assessment of Spanish budgetary stability legislation can be found in Miaja (2005) and Monasterio-Escudero and Fernández-Llera (2008).

⁴ For instance, the project financing in which the only guarantee for borrowing are the cash flows generated by the project in the future (see, among others, Finnerty 2007).

⁵ Both issues have been regulated by Spanish Law 4/2007, which is mandatory for all tiers of government.

⁶ The generic heading ‘public enterprises’ includes all the entities outside the ‘perimeter of consolidation’.

⁷ See, for example, the case of justice (Pedraja and Salinas 1995), education (Cordero-Ferrera et al. 2005; Mancebón and Muñiz 2008), health (Rodríguez-Álvarez 2003) or refuse collection services (Bosch et al. 2000). Also, the audit institutions have recently introduced this concern in their annual planning.

⁸ At least until 2008, when our study ends.

⁹ 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 our prior intuition.

¹⁰ In model 7 the coefficient of *NPSE* is significant at the 11% level.

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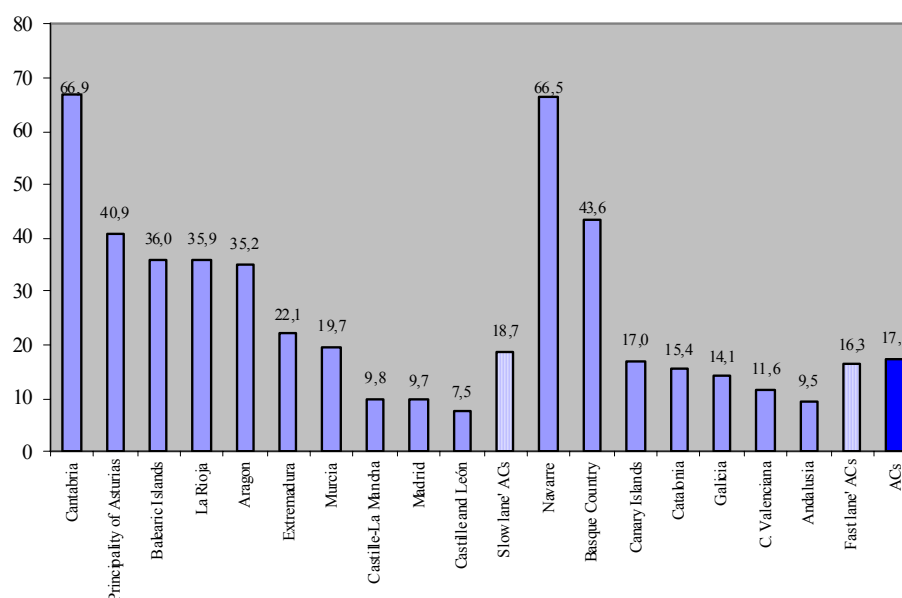
TABLES AND FIGURES

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	Δ 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
'Slow lane' ACs	125	137	139	145	152	173	194	210	279	321	196	156.8
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
'Fast lane' ACs	281	304	318	330	341	355	380	392	423	448	167	59.4
ACs	406	441	457	475	493	528	574	602	702	771	365	89.9

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

Graph 1: PSEs per million inhabitants (2006)



Source: IGAE, National Statistics Institute and own calculations.

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
'Slow lane' ACs	0.18	0.17	0.16	0.18	0.15	0.22	0.09	0.10	0.10	0.19	0.17	0.18	0.25	0.30	0.37	0.15	0.24
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
'Fast lane' ACs	0.37	0.28	0.31	0.34	0.37	0.45	0.57	0.68	0.80	0.96	0.95	1.00	1.05	1.21	1.37	0.46	1.09
Total ACs	0.43	0.36	0.36	0.40	0.42	0.57	0.45	0.51	0.63	0.80	0.79	0.80	0.90	0.99	1.16	0.46	0.91
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
TOTAL	3.58	4.18	3.42	3.01	2.75	2.58	2.46	2.38	2.39	2.68	2.31	2.47	2.72	3.17	3.63	2.97	2.83

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

Table 3: Descriptive statistics (numerical variables)

	Units		Mean	Std. Dev.	Min.	Max.	Obs.
<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>PRODTV</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 4: Descriptive statistics for categories of ACs (numerical variables)

	Units	ACs	Mean	Std. Dev.	Min.	Max.	Obs.
<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>PRODTV</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.

Table 5: 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>	0.7427671 (2.22)**	1.720648 (3.65)**	2.243823 (4.44)**	0.6146058 (1.86)*	1.741016 (3.65)**	2.19684 (4.26)**	0.549565 (1.63)	1.418301 (2.91)**	2.074551 (3.79)**
<i>OBJ_1</i>	62.26969 (3.17)**	9.845981 (0.66)	9.214996 (0.64)	53.285 (2.74)**	9.779267 (0.66)	9.149011 (0.64)	53.52526 (2.71)**	12.75317 (0.83)	10.49931 (0.72)
<i>DNEP</i>	43.06311 (3.82)**	35.48627 (4.20)**	16.17514 (1.76)*	57.21511 (4.79)**	36.68354 (3.70)**	13.66202 (1.28)	60.95672 (4.94)**	42.05609 (4.13)**	16.1356 (1.48)
<i>PRODCTV</i>				-0.009027 (-3.10)**	-0.0010351 (-0.25)	0.0020578 (0.46)	-0.0100196 (-3.14)**	-0.0024511 (-0.59)	0.0016046 (0.36)
<i>DCYC</i>							7.223354 (0.60)	4.320357 (0.52)	5.906811 (0.76)
<i>DALT</i>							-9.453603 (-0.81)	3.817155 (0.15)	(dropped)
<i>DIDEOL</i>							14.15107 (1.15)	18.67787 (1.32)	10.30063 (0.71)
<i>DALIG</i>							16.87701 (1.50)	10.08562 (1.28)	9.323377 (1.27)
<i>HIGH</i>	0.0031882 (3.49)**	0.0042714 (2.34)**	0.0157706 (4.63)**	0.0044163 (4.51)**	0.0043757 (2.35)**	0.0157503 (4.61)**	0.004578 (4.47)**	0.0042914 (2.46)**	0.0159677 (4.66)**
<i>constant</i>	-5.682843 (-0.60)	-32.97715* (-1.68)	-118.4615 (-5.11)**	202.2077 (2.99)**	-9.931585 (-0.10)	-165.2552 (-1.60)	214.1853 (2.76)**	17.12591 (0.17)	-163.4795 (-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. * p<0,10; ** p<0,05; *** p<0,01. Source: Own calculations.

Table 6: 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>	1.118126 (24.57)**	1.084224 (2.29)**	0.968701 (11.00)**	0.9894096 (2.16)**
<i>OBJ_1</i>	0.5230926 (0.33)	4.445255 (0.46)	4.125646 (1.85)*	6.403201 (0.61)
<i>DNEP</i>	29.36016 (16.16)**	31.92978 (3.39)**	33.78562 (13.39)**	34.24597 (3.72)**
<i>PRODCTV</i>	-0.0045627 (-9.20)**	-0.0050514 (-1.84)*	-0.0045694 (-6.03)**	-0.0052213 (-1.86)*
<i>DCYC</i>			4.410609 (3.85)**	5.945143 (1.05)
<i>DALT</i>			1.848981 (0.25)	0.4362505 (0.03)
<i>DIDEOL</i>			11.93111 (3.81)**	11.4378 (1.10)
<i>DALIG</i>			1.603665 (1.41)	3.870683 (0.65)
<i>HIGH</i>	0.0033197 (7.37)**	0.0033996 (2.54)**	0.0034008 (7.06)**	0.0036365 (2.78)**
<i>constant</i>	107.9198 (10.05)**	117.3914 (1.75)*	100.6917 (5.79)**	113.9494 (1.61)
R ²	---	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. * p<0,10; ** p<0,05; *** p<0,01. Source: Own calculation

Table 7: 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>	2.767158 (5.78)***	1.639365 (3.48)***	-0.9197611 (-0.86)	2.271217 (2.10)**	4.831056 (3.28)***	-0.3654903 (-0.16)	1.260846 (0.89)	4.14295 (3.03)***	0.8840216 (0.33)
<i>DNEP</i>	34.81483 (2.17)**	51.17004 (2.36)**	39.39698 (1.67)*	26.18469 (2.19)**	18.88649 (1.00)	18.67082 (1.01)	28.95442 (2.06)**	21.08376 (1.13)	15.41689 (0.85)
<i>PRODCVT</i>	-0.0093016 (-2.83)***	-0.0263693 (-5.20)***	-0.039471 (-1.00)	-0.0012213 (-0.27)	-0.0302377 (-3.47)***	0.0110261 (2.11)**	0.0017895 (0.34)	-0.0281949 (-3.09)***	0.0194578 (3.29)***
<i>GDPPC</i>	0.0032233 (1.60)	0.0183009 (5.56)***	0.0448722 (3.38)***	0.003978 (1.11)	0.016739 (3.47)***	0.001051 (0.20)	0.0053895 (1.24)	0.0182399 (3.79)***	-0.0076559 (-0.99)
<i>constant</i>	137.1989 (1.84)*	357.422 (3.78)***	54.98502 (0.60)	-50.01557 (-0.49)	334.5754 (1.88)*	-237.3863 (-2.08)**	-114.7253 (-1.03)	292.3649 (1.59)	-319.9704 (-2.64)***
R ²	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: *PSSED*. RE: random effects. FE: fixed effects. Standard errors and z-statistics in parentheses; p-value in brackets. * p<0,10; ** p<0,05; *** p<0,01. Source: Own calculations.