Sub-national public debt in Spain: political economy issues and the role of fiscal rules and decentralization[*]

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Abstract

Sub-sovereign public debt in Spain more than doubled over the period 2007-2011 leading to growing concerns on its sustainability and the potential negative spillovers for general government public finance consolidation targets, in particular by rating agencies and international organizations, in the context of the more general public debt crisis suffered by the euro area. Spain offers an interesting case study to understand the fundamental determinants of sub-sovereign debt for a number of reasons. Firstly, the country has witnessed successive waves of fiscal decentralization that have increased the amount of public services provided directly by sub-national governments in a framework of increased fiscal co-responsibility (fiscal autonomy). Secondly, this decentralization process took place in a period in which a number of supra-national and national fiscal rules were put in place in the country. Thirdly, while fiscal rules provide some explicit coordination among the different levels of government, there is also a high degree of market-imposed discipline, as most regional government's debt is regularly scrutinized by rating agencies. Within this framework, we analyze the evolution and the determinants of sub-sovereign public debt, focusing on regional government debt determinants, including of liabilities accounted for outside the extant definition of EDP public debt. Among the set of determinants we pay special attention to institutional factors (fiscal decentralization, fiscal autonomy, fiscal rules) and market discipline. We do so by estimating empirical models in which we exploit the pool structure of our data (17 regions, over the period 1995-2010) within a GMM econometric approach.

Keywords: Sub-sovereign public debt; fiscal rules; fiscal federalism.

1   Introduction

The analysis of sub-national public debt developments has been growing in importance, given the rising share of sub-national finance in the overall financing needs of the general government sector in a number of countries, and given the rising trend towards fiscal decentralization (towards lower levels of government) all over the world (Canuto and Liu, 2010). Within this framework, the analysis of the Spanish case is of relevance for a number of reasons.

First, since the late 1970s Spain has become a highly decentralized country. The current Spanish Constitution (1978), in its second article, recognizes the rights to self-government of "regions and nationalities", within the Spanish nation. The 17 regional governments ("Comunidades Autónomas", CCAA henceforth) currently manage, among other competencies, education (including universities), health and social services. In order to develop the Constitutional mandate, the country has been subject over the past few decades to successive waves of fiscal decentralization that have led to one of the strongest processes of fiscal decentralization witnessed in the recent history in any developed country. Thus, in 2011, sub-national governments (CCAA plus municipalities, AATT henceforth) managed some 50% of total government expenditure, up from 35% in 1995 and a share below 20% in the early 1980s. In parallel to expenditure decentralization, there has also been a process of increased fiscal co-responsibility (fiscal autonomy).

Secondly, this decentralization process took place in a period in which a number of supranational and national fiscal rules were put in place in the country. In particular, under the current legislation sub-national governments need prior authorization by the central government on all its borrowing operations, while borrowing is banned on sub-national governments that do not comply with their public deficit targets and do not present – and commit to – fiscal adjustment plans. Over the last years these rules should have had to be applied strictly in several occasions, thus providing a natural experiment framework suitable for empirical testing.[1] In addition, while there is some explicit coordination among the different

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[1] As signalled in IMF (2011), in the decade leading up to the financial crisis, the fiscal framework in Spain appeared broadly adequate. In this respect, Spain scored in the top 5% group of countries covered by the European Commission's index of fiscal rules' institutional strength. The institutional design included a

levels of government on the application of fiscal rules affecting debt issuance, there is also a high degree of market-imposed discipline, as central and most regional government's debt is regularly scrutinized by rating agencies.

Third, Spain is the sixth sub-sovereign bond issuer world-wide, after the US, Germany, Japan, China and Canada (see Canuto and Liu, 2010, Romeu, 2011). In the second quarter of 2012 total outstanding regional and local public debt amounted to some 187 bn euro (about 18% of Spanish GDP), of which some 36% was in the form of securities (other than shares). Current debt levels are at historical highs, after sub-sovereign debt decreased steadily up to 2007Q4 to some 8% of GDP since its previous peak at 10.8% in 1997Q4. Thus, in the period 2007Q4 to 2012Q2, regional and local debt as a percent of GDP doubled, even though its share of total public debt remained broadly stable over the same period. Given this sharp increase in the financing needs of these levels of government, an understanding of these developments' determinants is warranted.

Fourth, Spain is the fourth biggest euro area economy by GDP weight (fifth in the EU, and 12th in the world-wide ranking), and is within the group that has been affected to a greater extent by the sovereign-sovereign contagion induced by the so-called euro area public debt crisis. Among other factors, it is now widely recognized that idiosyncratic fiscal fundamentals have played and are still playing a role. In the latter respect, given the sizeable share of public spending in the hands of CCAA and local governments (two-thirds of overall public employment, 50% of total spending as mentioned before), mainly linked to the provision of basic services, the later levels of government have been signalled as being a potential obstacle to the successful achievement of the ambitious fiscal consolidation targets the Spanish government is currently committed to comply.

Finally, Spains credibility in the bond markets has been hit at several moments over the past year since the time of the regional and local elections held in May 2011 given
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combination of EU-wide fiscal rules with national fiscal rules constraining public deficits and public debt for all the levels of the general government sector. Nevertheless such a framework was not able to prevent the strong deterioration of public finances for all levels of the general government witnessed since the end of 2007 – see Bank of Spain (2011) for a more general discussion on these issues–. One may wonder if irrespective of the recent failure, the framework of national fiscal rules did exert a positive role in public debt control, i.e. if in the absence of rules public finance outcomes would have been better or worse than envisaged.

some concern on the possible existence of "hidden" public debt [...] likely to be revealed by incoming regional and local administrations (see FT 16 May 2011). Even though the numbers of concern rather than being "hidden" have been published regularly by the Bank of Spain over the past decades, the point raised is worth some analysis, on political economy grounded arguments. Public debt not considered with the EDP concept[2] mainly comprises, on the one hand, debt issued by companies controlled by local and subnational governments and, on the other hand, accounts payable outstanding and commercial obligations. It would be worth checking if these type of instruments have or have not been used by sub-national governments to circumvent the constraints on debt issuance they are subject to (and that only apply to conventional channels of financing) as some political economy arguments would suggest.

Against this framework, we study in this paper the evolution and the determinants of sub-national's debt net financing needs (measured by the change in public debt). While we provide a descriptive and institutional analysis of the aggregate of sub-national governments as a whole, we constraint ourselves in the main empirical part of the paper to the study of the determinants of CCAA debt due to data constraints. We do so by estimating empirical models in which we exploit the pool structure of our data (17 regions over the period 1995-2010). Among the set of determinants we pay special attention to: (i) institutional factors, such as fiscal decentralization and fiscal rules; (ii) market-disciple indicators, such as the change in the implicit cost of debt and the structure of debt itself; (iii) non-EDP debt, focusing on public corporations controlled by CCAA and its role in the determination of CCAA's EDP debt. We find that deeper fiscal decentralization, on the one hand, and, in particular market-induced discipline, on the other, have been associated in the sample under study with heightened fiscal discipline. We also find a tight link between CCAA's EDP debt and CCAA's public corporations debt.

In this paper we move beyond the available literature that analyzes the role of fiscal federalism variables in the determination of regional public debt, mainly from a theoretical point

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[2]EDP stands for Excessive Deficit Procedure. Public debt is defined in the Protocol No. 12 on the excessive deficit procedure (EDP) annexed to the Treaty on the Functioning of the European Union and in Article 1(3) of Council Regulation (EC) No 479/2009.

of view, that in any case is related and precedes in certain respects our work. Contributions along these lines are Vallés (2002), that also includes and excellent survey of pre-2002 papers on the issue, Lago-Peñas (2005), Argimón and Hernández de Cos (2011) or Simón-Cosano et al. (2012), among others.[3]

Our paper is organized as follows. In sections 2 to 4 we provide our first contribution, of a descriptive nature, including some descriptive data analysis and a detailed description of the evolution of fiscal institutions in Spain. In this regards, in Section 2 we provide some stylized facts on sub-sovereign public debt in Spain, while in Section 3 we describe the process of fiscal decentralization in Spain since the early 1980s, as well as the changes in the financing arrangements between the Central government and the regional and local governments. On related grounds in Section 4 we describe the evolution of fiscal rules affecting sub-national levels of government in Spain. In Section 5, in turn, we perform the main empirical analysis of the paper, covering first the standard approach of papers on fiscal federalism, to move to a deeper look at the role of fiscal rules and market discipline indicators, to end up with some results on the link between regional EDP debt and regional public corporations' debt. Finally, in Section 6 we provide some conclusions.

2   Some stylized facts on sub-sovereign public debt in Spain

2.1   Some trends

Spanish General Government EDP debt increased in the period 2007Q1-2012Q2 more than 50 points of GDP. As can be seen in Figure 1 the increase in debt was visible in all the subsectors of the General Government. In particular Central Government (AC) and Regional Government debt (CCAA) moved from the pre-crisis values of 26.8 y 5.6 percent of GDP,

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[3]The institutional determinants of local governments' indebtedness has been more widely analyzed in the literature, mainly from a less aggregated-macro perspective than the standard in papers looking at the determinants of CCAAs debt. See for example Cabasés et al. (2007) or Bastida et al. (2001), and the references quoted therein.

respectively, to historical maxima of 58,3% and 14,2% of GDP, more than doubling their registers in that period of time. Local governments' debt (CCLL) in turn, suffered an increase in their aggregate debt at the beginning of the crisis, but soon were able to stabilize their levels of debt as a percent of GDP, maybe due to market or institutional constraints that prevented them from following the rising trend of the other ublic administrations.

From a longer-term perspective, the pre-2007 period was one of substantial debt reduction in the case of the AC, that halved its debt in the period 1996Q4 (local maximum) and 2007Q2. Also the CCLL reduced their debt by some 35% in the same period, while the CCAAs only saw their debt decrease by 10%. Thus, it is apparent from the chart that the economic expansion period of the 1990s was used quite differently by the different administrations to reduce the 1990s-crisis-related debt hike.

In Figure 2, in turn, we display the evolution of other liabilities not covered by the extant definition of EDP debt, namely the aggregates of public corporations' debt and other accounts payable, also by subsectors of the General Government. Information on public corporations' debt is publicly available for the period starting in 1995, for each regional government but only for the aggregate of CCLL (and the AC), while data on Other Accounts Payable is available only for the aggregates of each subsector (AC, CCAA, CCLL). In the case of territorial governments (AATT = CCAA + CCLL) these non-EDP liabilities show a somewht monotonic trend increase over the period 1995-2011, even though the absolute numbers, at least from the aggregate General Government point of view, are not high in comparative terms with the European Union (see Aspachs and Pina, 2012).

2.2   A standard decomposition of debt changes

It is worth looking at the evolution of debt in the period under scrutiny through the lens of the government budget constraint. Let Y_t be real GDP at t and let D_t be the real value of government debt. The government budget constraint accounts for how a nominal interest rate i_t, net inflation π_t, net growth in real GDP, gdp_t, the net-of-interest deficit as a percent of Y_t, def_t, and the deficit-debt adjustment, DDA_t combine to determine the evolution of

the government debt-to-GDP-ratio,

$$\frac{D_t}{Y_t} = \frac{1 + i_t}{(1 + \pi_t)(gdp_t)} \frac{D_{t-1}}{Y_{t-1}} + def_t + \frac{DDA_t}{Y_t} \tag{1}$$

were the nominal yield i_t and the real stock of debt D_t are averages of pertinent objects across terms to maturity. Its log-linearized version, suitable for accounting decomposition of the fundamental determinants of debt, takes the form

$$\frac{D_t}{Y_t} = (i_t - \pi_t - gdp_t) \frac{D_{t-1}}{Y_{t-1}} + \frac{D_{t-1}}{Y_{t-1}} + def_t + \frac{DDA_t}{Y_t} \tag{2}$$

With this decomposition at hand it is possible to analyze the determinants of changes in the debt-to-GDP ratio. In Figure 3 we decompose these determinants for each year over the period 1997-2011 for the General Government sector as a whole, for the aggregates of CCAA and CCLL and, as a residual, for the aggregate of AC and Social Security. Focusing in a first stage in the period 1997-2007, the General Government primary balance contributed to an average debt reduction of 2.3 percentage points per year, an amount similar in size to the average contribution of real GDP (2.1 percentage points per year on average) and inflation (1.9 points per year on average). These three factor were partly compensated by an average 0.5 points per year debt-increasing contribution stemming from deficit-debt adjustments, and the interest payments, that amounted to some 2.8% of GDP per year on average. As regards the 2008-2011 period, in the first 3 years the sizeable increase in debt occurred in a period of still benign interest rates dynamics, and was basically due to the worsened primary balance, while the year 2011 combined the latter with adverse interest rate contributions.

This evolution of the General Government aggregate factors hides a differentiated behavior by subsectors, even though the average per-year contribution of the primary balance to the change in debt was almost the same for the aggregates of AATT and AC (3.2 percent of GDP vs 3.3). Differences between the determinant of sub-national debt changes and national debt changes pertain, first, to the much elevated contribution of interest payments in the case of the AC. In this respect it is worth mentioning that the fiscal decentralization process in Spain was not accompanied by a parallel process of decentralization of the historical debt burden, but that it was decided that the AC was to keep the inherited burden of debt. The second differentiated factor is the contribution of deficit-debt adjustments that, in the case

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of the AATT, reduced their debt by 6.2 percent of GDP over the period 2008-2011 (-1.6% on average per year), against the positive contribution of 5.9 percent of GDP in the case of the AC. This can be explained by the application of the financing arrangements between the central government and the AATTs whereby the former agreed to postpone due payments by the latter.

Figure 4, in turn, shows the same information as before, but cumulated, i.e. calculated by means of equation:

$$\frac{D_t}{Y_t} = \sum_{s=0}^{\tau-1} \left[(i_{t-s} - \pi_{t-s} - gdp_{t-s}) \frac{D_{t-s-1}}{Y_{t-s-1}} + def_{t-s} + \frac{DDA_{t-s}}{Y_{t-s}} \right] + \frac{D_{t+\tau}}{Y_{t+\tau}} \qquad (3)$$

Between 1997 and 2007, the 31 percentage points of General Government debt reduction can be break down as follows: (i) 25 percentage points of reduction due to the adjustment of the primary balance; (ii) 22.6 points of reduction due to favorable real GDP growth; (iii) 20.4 percentage points of reduction due to inflation; (iv) these three factors more than compensated the increase by 30.7 points due to the interest payments effected during the period, and the 5.2 percentage points due to the deficit-debt adjustments. The debt-increasing contribution of the interest burden veils a favorable evolution of the implicit interest rate. Interestingly, implicit interest rate dynamics, that averages interest rates of newly issued, including refinanced debt, and rates of non-maturing debt issued in the past, contributed to contain the increase in the General Government debt ratio in 2008, 2009 and 2010, only turning to a positive contribution in 2011, when rates at issuance increased substantially. Beyond this latter factor, in the course of the four years that span from 2008 to 2011 the abrupt reversal of all positive factors, most notably the significant primary deficits, undid the results of the 1997-2007 consolidation period.

As apparent from the chart the substantial debt reduction process carried out since the mid-1990s allowed to cushion the substantial increase of debt due to the recent crisis, insofar as the cumulated change in debt since 1995 only turned out to be positive (increased of debt) in 2011. In fact, the AC and CCLL debt burdens were still in 2011 below the mid-1990s levels, in particular in the case of CCLL, while the case of the regional governments is completely different. Indeed, from an aggregate point of view, the CCAAs reduced only marginally their stock of debt in the period till 2007, with positive factors (real GDP growth

and inflation) broadly compensating over the period 1995-2007 the debt-increasing effect of interest payments and, to a much lesser extent, primary deficits. With the burst of the most recent crisis, though, the latter equilibrium was broken and a significant contribution of public deficits pushed public debt upwards.

Beyond the interest of the descriptive analysis in itself, one lesson that can be drawn from the previous discussion is that changes in debt can be a preferred object of study vs budget balances, as the former turned out to be a broader measure of net financing needs and debt accumulation, and also because deficit-debt adjustments (stock-flow reconciliation) can be arbitrarily large as in the period 2008-2011 – see also Campos et al., 2006 for an international perspective.

2.3 The structure of sub-sovereign debt

The analysis of the structure of sub-sovereign debt can be instrumental to the analysis of market-induced fiscal discipline. As shown in Figure 6 for the case of Regional debt, a number of debt-structure ratios – namely, the ratio of short term to long term debt, the ratio of loans to securities, and the ratio of loans by residents to those by non-residents – showed positive (unconditional) correlations over the period 1995-2011 (quarterly data) with implicit interest rate on overall regional debt. While the latter is not a perfect measure of the cost associated with new debt issued, it is the only comprehensive measure of the cost of financing available and, in any case, its evolution should be a fair proxy of it.[4] As shown in Figure 7, implicit rates benefited from EMU accession, as discussed in the previous subsection, and decreased more or less steadily for CCAA debt over 1995-2010, also in line with the implicit rates faced by the Central Government. Local governments' aggregate implicit interest rate remained anchor around some 2% over the whole period, with marked cyclical fluctuations that were particular marked in 2007 and 2008.

Traditionally, sub-central governments in Spain have relied more intensively on loans rather than on securities as witnessed in Figure 5 (Panel 1), most noticeably in the case of local entities whose ratio of loans-to-securities almost doubled between 2000 and 2011.

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[4]The source of the debt data is the Bank of Spain. The source of interest payments' data is the IGAE. Implicit interest rates are computed as the ratio of interest payments to overall debt.

Regional governments managed to reduce in a steadily manner the ratio of loans-to-securities from some 160% around 1995 to close to 80% by 2007. In that period, nevertheless, the ratio showed some cyclical variation, a behavior that has been quite noticeable since the beginning of the most recent crisis by mid 2007. Since then, the downward trend has been reversed, and in 2012Q2 the stock of regional loans amounted to some 130% of the stock of regional debt in the form of securities. A similar behavior is displayed by the ratio of short-term to long-term sub-central debt, as can be seen in Figure 5, Panel 2.

Excessive reliance on a structure of debt leaned towards short-term instruments or easy-to-access ("captive") markets (i.e loans by residents, in particular local banking systems, vs securities in the market) might be a symptom of an increased perception of risk on the part of investors. In particular, empirical studies have found short-term debt to be an indicator of vulnerability to international financial crises (Borensztein et al., 2004; Rodrick and Velasco, 1999; Bussire and Mulder, 1999). Increased reliance on short-term debt may make a government more vulnerable in a crisis framework, because of the need to rollover increased amounts of debt. As signalled by Borensztein et al. (2004), in a case in which a debt crisis mixes elements of illiquidity and insolvency, the government would be vulnerable to a piece of bad news, whose real impact would be amplified by creditors' unwillingness to roll over their claims (see also Jeanne, 2004). In addition, short-term debt introduces another level of vulnerability for the fiscal accounts because interest payments would increase faster the higher the fraction of short-to-long-term debt.

From an empirical point of view, in an economic and fiscal crisis episode, and in case market access were not fully compromised, a shift in the composition of debt as reflected by increased ratios of short-to-long-term debt, on the one hand, and loans-to-securities, on the other, might be expected. First, because these instruments might be the only ones available to keep on covering financing needs. Indeed, investors might be willing to hold short-term debt even in a situation in which they assign a non-zero probability to default as they may expect the sub-central government to repay them before the eventual default takes place. Second, in the case of sub-central governments' debt, investors may expect that the central government bails-out the administration under pressure, thus assigning to the default option a low probability. In the case of Spain some studies suggest that there have been de facto

bail-outs of regions by the center over the past decades (see Lago-Peñas, 2005; Sorribas, 2012). Third, as Missale et al. (1997) and Campbell (1995) argue, a government committed to fiscal consolidation and debt stabilization may reduce the cost of debt servicing by issuing short-term debt. This is the case in a framework of asymmetric information in which the government and private investors do not share the same information (or perception) and thus long-term debt instruments pay too high interest rates as a reflection of credibility problems. A government can thus issue short-term debt to signal its resolution to carry out its fiscal consolidation plans.

3   The process of fiscal decentralization in Spain

As mentioned in the Introduction, Spain is currently one of the most decentralized countries in the European Union. In particular, as described before, in 2010 close to 50% of general government expenditure was carried out by subnational governments, with about 35% and 13% in the hands of regional governments and local governments, respectively (see Figure 8). This is the result of a gradual transfer of responsibilities for the management of specific services from the Central Government to the CCAAs since the beginning of the 1980s. In particular, subnational governments are currently responsible for close to 100% of public expenditure on health care and education, and they manage a significant part of other expenditure functions.

The transfer of expenditure responsibilities from the Central Government to the CCAAs has, however, neither come about at the same pace, nor have they been on the same scale in all CCAAs.[5] The main differences concern the time at which the various CCAAs took over education and health competencies. On the one hand, the regions that gained autonomy through article 143 of the Spanish Constitution did not assume the respective management of educational and health services until the 1990s and early twenty-first century. On the other, Andalusia, the Canary Islands, Catalonia, Galicia and the Valencia Community, along with the Basque Country and Navarre, namely the regions that gained autonomy through article 151 of the Constitution and those with their own specific status due to their historical

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[5]See Gordo and Hernndez de Cos (2003) for a review.

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jurisdiction (the so-called "Régimen Foral"), assumed health and education responsibilities practically from the beginning of the 1980s.

In parallel to this process of devolution of expenditure responsibilities to the regions, a financing system for the subnational governments was also progressively developed (see Figure 9). Again, the process was not completely homogeneous across regions. In particular, a distinction should be drawn between the ordinary-regime RGs (all except the Basque Country and Navarre), with limited fiscal autonomy, and the specific-status CCAAs (the Basque Country and Navarre), which have full fiscal autonomy with the exception of customs tariffs.[6]

The financing arrangements for the ordinary-regime CCAAs have developed over time on the basis of five-year agreements. Initially, until the approval of the autonomy charters, the administrative structures (pre-autonomous entities) of the CCAAs were financed with Central Government transfers. Subsequently, the transition period running from the approval of the respective autonomy charters to the 1986 agreement saw the transfer of most powers and the definition of financing channels, in the main through Central Government transfers,[7] supplemented with various taxes.[8] The next financing agreement (1987-1991) established a more objective and automatic distribution system for Central Government transfers, with bilateral Central Government/RG negotiations disappearing; and it broadened the assignment of taxes to the regions to registration tax ("Impuesto sobre Actos Jurídicos Documenta-

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[6]In essence, the Basque country provincial authorities (Álava, Guipúzcoa y Vizcaya) and the Navarre RG have the power to maintain, establish and regulate, inside their territory, the tax regime, taking into account some coordinating provisions established with the Central Government, which basically imply that the effective overall tax burden arising from their regulatory power must not be lower than the existing in the rest of the country. Accordingly, they are responsible for collecting all taxes except those included in Customs Revenue and those raised through Fiscal Monopolies. As a consequence of the fact that the taxes collected by these regions include almost all those existing but the State provides some services in these regions (defense, diplomatic representation, etc.), the Basque Country and Navarre transfer some of their resources, by means of the so-called "Cupo", to the Central Government in order to contribute to the financing of these services.

[7]Participation of the CCAAs in Central Government revenues and the Inter-Territorial Compensation Fund.

[8]Taxes assigned by the Central Government, own taxes and surcharges on Central Government taxes.

dos").[9] The agreement for the 1992-1996 period continued to base the financing of the CCAAs essentially on the share in Central Government revenues. However, from 1994 it allowed the Central Government to transfer fifteen percent of the estimated territorial revenues for personal income tax. This percentage was increased to thirty percent in the 1997-2001 agreement, but only at the end of the five-year period, once the transfer of education-related responsibilities was complete. This agreement also granted CCAAs regulatory powers over their assigned taxes and over the tranche relating to shared personal income tax. The increase in fiscal co-responsibility and in regulatory autonomy for the CCAAs was, however, limited by the simultaneous establishment of a system of guarantees, which meant that the minimum increase in financing received by each RG would be equal to GDP growth, unless the amendment of personal income tax rates or the setting of new deductions by the regions were to bring about a loss of revenue in the RG tranche.

A new agreement came into force in 2002 that widened the CCAAs' tax resources. The assigned percentage of personal income tax was raised to thirty three percent and, in addition, thirty five percent of net VAT revenues, forty percent of excise duties and 100 percent of the tax on electricity, of a new tax on retail hydrocarbon sales and of the excise duty on specific means of transport were all assigned. Furthermore, the new system extended the regulatory powers of the CCAAs in relation to assigned taxes.[10] Lastly, Central Government guarantees as to the minimum growth of the financial resources received by each RG were eliminated.[11]

The last reform of the financing agreements of the CCAAs was approved at the end of 2009, which resulted in additional resources for the regions. The new system raised the amount of taxes transferred (to 50% in the case of the personal income tax and VAT;

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[9]It also amended the Economic-Fiscal Regime for the Canary Islands, creating the Canary Islands General Indirect Tax.

[10]The most significant amendment was in personal income tax, since following this agreement the only constraint on potential rate changes by CCAAs was that such changes had to be progressive and retain the same number of brackets as was the case for the Central Government. Until then, limits were set in terms of the variation in tax payable brought about by the change. Regulatory powers in respect of VAT and excise duties were not granted, however, except in the case of the tax on specific means of transport, where CCAAs have the power to change the rate within certain limits, and that of the new tax on hydrocarbons.

[11]With the exceptions of health spending in the first three years in which the agreement was in force and certain revenue-modulating rules.

to 58% in the case of excise duties on manufactured production of alcohol, tobacco and hydrocarbons)[12] and CCAAs received additional powers to modify their rates in some of these taxes.[13] In addition, the criteria for distributing the different tax revenues and transfers to the regions changed. As a result, and for the base year, each RG receive 25% of its tax revenue, plus its participation in the so-called Guarantee Fund,[14] plus its share on the so-called Global Sufficiency Fund.[15] [16]

Generally, then, it can be said that there has been a gradual increase in the CCAAs' fiscal co-responsibility, meaning a progressive increase in the capacity of the CCAAs to depend on their own tax and a parallel reduction in their dependence from State transfers. Above all, this change is apparent from the late nineties and, in particular, from the 2002 financing agreement, which entailed an effective increase in the CCAAs' regulatory power of their assigned taxes and the elimination of the State guarantees for revenue growth. Accordingly, the CCAAs came to assume the risks of revenue losses associated with the assigned taxes.

In the case of local governments, the spending responsibilities assigned to them are regulated by the Local Government Act of 1985, which establishes a minimum list of services to be provided by them (the so-called compulsory services): the list of "compulsory services" increases with population size.[17] As a result, the financing system of local governments also

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[12]CCAAs keep the 100% collection of the hydrocarbon-oil retail sales, electricity tax, property and stamp duty tax, tax of registration of motor vehicles, taxes on gaming, wealth tax and inheritance and gift tax.

[13]With the exception of the VAT, excise duties and electricity tax.

[14]This Fund is formed by the contribution of 75% of the tax revenues assigned to CCAAs plus some additional fund added by the Central Government in the base year. Then the fund is distributed among CCAAs on the basis of the weighted average of 7 variables, of which population related variables are the most relevant. These variables are revised annually and the Central Government contribution to the guarantee Fund is linked to the growth rate of the Central Government's tax revenues.

[15]For the base year, this fund is calculated for each RG as the difference between their overall financing needs and the sum of their tax revenues and the transfer from the Guarantee Fund. In subsequent years, the Guarantee Fund evolves with the growth rate of the Central Governments tax revenues.

[16]Two additional funds were created, of lower quantitative importance, the Competitiveness fund and the Cooperation fund to promote regional income convergence.

[17]In particular, all local governments provide public lighting, street cleaning, refuse collection, water supply, paving of local roads, food and drink control. Local governments with population ¿ 5,000 provide parks, libraries, marketplace, solid waste treatment. Local governments with population ¿ 20,000 provide fire protection and emergencies, social services, sport facilities, slaughterhouse. Finally, local governments

changes with size. In particular, under the current system that entered into force in 2004, local governments revenues come from own taxes, property, fees and surcharges on central and regional taxes, subsidies, regulated prices, fines and sanctions. In the case of local governments that are capitals of a province or RG, or which have over 75,000 inhabitants, they are also assigned a part of the personal income tax, VAT and taxes on alcohol, hydrocarbons and tobacco.[18]

4 The fiscal rules framework affecting sub-national governments in Spain

From the outset, sub-national governments were subject to some constraints and limitations on their capacity to borrow and/or generate budget deficits. In the case of the CCAAs, they were empowered to take on debt, albeit subject to certain limits. Specifically, credit operations at less than one year must be used to cover temporary treasury requirements, while credit operations at over one year, should meet the following requirements: (i) that the total amount of the credit is earmarked for financing investment spending; and (ii) that the annual amount of debt repayments plus interest does not exceed twenty five percent of the CCAAs' current revenues. For the arrangement of credit operations abroad and for debt issuance and any other resort to public credit, the CCAAs require the authorization of the Central Government. In the same vein, local governments can finance current expenditure considered as necessary and urgent but with certain limits; among others, these credits should be lower than 5% of current budgetary revenues and interest payments should not be higher than 25% of current revenues. Moreover, temporary treasury requirements of local governments can be financed with short-term debt, but with the limit of 30% of current revenues. As in the case of CCAAs, credit operations at over one year should be earmarked for financing investment spending and interest payments cannot exceed twenty five percent

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with population ¿ 50,000 include urban passenger transport, environmental protection under their spending responsibilities. In any case, in most cases, local governments intervene voluntarily in the provision of services even if they do not have the population size required (see Solé-Ollé and Bosch, 2007).

[18]Between 1% and 2% depending on the tax and whether it is a municipal or provincial one.

of current revenues of the local government. [19]

CCAAs' credit operations should be coordinated among the CCAAs themselves and in keeping with the Central Governments debt policy, with the CCAAs obliged to submit an annual debt programme to the government. Once the programme has been agreed, it entails the automatic authorization of all the operations contained therein. The application of the programme may be changed by a CCAA following a new proposal to the government. Further, the Central Government itself may suspend the programme on a precautionary basis should there be exceptional circumstances that might hamper the Treasury's financial policy or involve imbalances in the relationship between the level of external and domestic debt. Again, in the case of local governments certain credit operation at over one year require authorization by the Central Government.

From 1992, following the publication in March of Spain's Convergence Programme, the so-called Budgetary Consolidation Scenarios (BCS) were signed by the Central Government and each of the CCAAs, further to bilateral negotiations, in which an specific maximum deficit and debt allowed for each RG were determined. In March 1995, further to the revision of the Convergence Programme in July 1994, the commitments contained in the BCS were also revised, and the ceilings for the period 1995-1997 were specified. These were changed once again following the approval of the first Stability and Growth Programme in December 1998.

The budgetary stability law that came into force in 2002 set a single limit for all CCAAs, though not in terms of debt but rather in terms of the budget balance, where under the CCAAs and local governments must meet the principle of budgetary stability, defined as the need to post a budget outturn that is in balance or surplus. This law also defined the scheme of sanctions that may be imposed in the event of non-compliance to the CCAAs.[20] The law also provided that, in authorizing the arrangement of credit operations abroad and

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[19]Latter in 1999 this limit was defined as total debt over one year not being allowed to be higher than 110% of total revenues. In 2010, and only for that year this percentage was increased to 125%, and in 2011 was reduced to 75%.

[20]Specifically, it states that if the CCAAs do not meet the obligations established under the law and if this leads, in turn, to non-compliance with the obligations of the Stability and Growth Pact, the CCAAs shall assume, in the portion attributable to them, the responsibilities arising from their conduct.

the issuance of debt and any other resort to public credit, the Central Government shall bear in mind compliance with the principle of budgetary stability.

A reform of the budgetary stability law was approved in May 2006, which entered into force on 1 January 2008, enabling the Central Government and CCAAs to adapt their deficit and surplus targets to the economys cyclical position. Specifically, it allows the CCAAs (local governments[21]) to run a deficit of 0.75 (0.05) percent of GDP if economic growth is below a certain threshold, to which a further 0.25 (0.05) percent of GDP may be added to finance increases in productive investment. It likewise establishes that a significant portion (in no case less than thirty percent) of investment programmes shall be financed with gross saving of the CCAA in question, with only partial resort to debt being permitted. In addition to the extension of the fiscal rules to the lower tiers of government, the BSL has a clause that says that the State shall not take responsibility for the financing of the deficits or public debt of the lower levels of government (no bail-out clause). Lastly, it stipulated that, if a deviation from targets prompts a breach of the Stability and Growth Pact, the tier of government involved shall assume the attendant proportion of the responsibilities that should arise from the breach. In addition, in the case of the regional governments and municipalities, compliance shall be taken into account in the States authorization of credit operations and debt issues. Specifically, if the failure to meet the stability target takes the form of a greater-than targeted deficit, all the regional governments debt operations shall require State authorization.

Finally, a constitutional reform was approved in September 2011 that enshrines in the Constitution the obligation for all levels of government to adjust their conduct to the principle of budgetary stability. The reform was followed by the approval of a new Law in 2012 that details that the general government deficit in structural terms cannot exceed 0.4% of GDP, sets a limit on government debt of 60% of GDP[22] (both of which should be achieved following a transition period up to 2020) and an expenditure rule. In the case of local governments, however, they should keep a balance or surplus position and it is not allowed a deficit in

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[21]Specifically, those that are provincial or regional capitals, or that have a population equal to or higher than 75,000 inhabitants. The rest of local governments should keep a balance or surplus position in any case.

[22]The 60% debt to GDP limit is distributed: 44% of GDP for the Central Government; 13% for all and each of CCAAs and 3% of local governments.

structural terms. Moreover, the no bail-out clause is maintained and the law includes new instruments to guarantee compliance with budgetary targets by all levels of government (including sanctions), the automatic adjustment of regional government spending and, if need be, central government intervention in regional and local government budgets.

5   Empirical analysis

5.1   Data and hypotheses to be tested

Control variables: economic factors   In line with the extant literature, we include in our analysis economic, political and institutional that may be instrumental in explaining the change in CCAAs over time. In this section, as regards economic, political and institutional factors, we follow closely the definitions and variables of Argimón and Hernández de Cos (2011).

As regards economic factors, economic theory has highlighted the economic cycle as a fundamental determinant, first, of budget balances. In economic downturns budget deficits increase, either through the operation of automatic stabilizers or though the impact of countercyclical discretionary fiscal policies designed to stabilize the economy, while the opposite occurs in expansions. In addition to the impact of debt accumulation though the flow of yearly deficits/surpluses, economic growth erodes the stock of public debt when measured as a percent of GDP. In fact, even high debt ratios can be sustainable in a framework of healthy economic growth, while in a situation of low or negatie growth even low debt ratios can turn out to be non-sustainable. We include in our analysis the yearly growth rate of each CCAA GDP as a measure of the economic cycle (variable *Economic cycle*), taken from the Annual Regional Accounts published by the Spanish Statistical Office (INE). Among the set of economic factors, we also include as control variable a measure of the degree of economic development, as measured by per capita income.

Another relevant economic factor behind debt accumulation is the evolution of prices, as prescribed by the government budget constraint. Here the literature usually distinguishes between asset prices, that may affect fiscal outcomes basically through the tax system (taxes

on capital gains and losses, taxes on transaction, and tax relief, in particular, in the Spanish case, for house purchases). In the case of Spain, financial and nonfinancial assets form the basis of certain taxes managed and collected by CCAAs. Available information for variables that could capture asset prices at the regional level is scarce. Because of its relevance in the boom period (1995-2007) and its availability, housing prices might be a good proxy to capture the incidence of assets on regional public finances. We define a variable as follows: deviation of the change in each region's index of housing prices with respect to the national mean.

More generally, overall inflation is a factor typically advocated to have an impact on debt, both indirectly through its effect on tax revenues and directly through its deflating effect on the debt-to-GDP ratio. The incidence of price changes (measured by the change sin the CPI) will be captured by a variable defined as the deviation of each region's inflation in relation with the national mean, in such a way that possible common trends are taken care of.

Control variables: political and institutional factors The literature has proved that it is necessary to include political and institutional factors in the standard analysis (typically focused on the study of budget balances) to be able to explain the persistence of budget deficits and the accumulation of debt in advanced economies. In our analysis we include a number of political variables: (i) ideology, measured, first, by the % of left-wing MPs over the total seats of regional parliaments, and second, by the percent of regionalist parties' MPs (parties that only operate in a given region, and do form part explicitly or implicitly, of national party) over the total number of seats of the regional parliament; (ii) dummy to measure the political concordance of the center and the periphery (region), a measure of political alignment between the government of a given region and the central government; (iii) electoral cycle, measure by an elections variables (distance-to-electoral-year).

Most importantly, we include a number of dummy variables measuring the strength of fiscal rules: (i) European Commission Fiscal Rules Index; (ii) dummy variables for the different regimes of rules, more specifically the above-mentioned Budgetary Consolidation Scenarios (BCS) and Budgetary Stability Law (BSL) of 2002, leaving aside the most recent

BSL because it only entered into force in 2011.

Control variables: fiscal federalism   The territorial organization of a country has also
been signalled by the extant literature as a further determinant of the fiscal situation, either
measured by the fiscal balance or by the stock of debt. In particular, the responsibilities
assumed by the regions, the instruments for financing them, and the relationships between
regional and central governments are all factors that certainly affect the aggregate fiscal
outcomes of a given country and, more specifically, the distribution of fiscal outcomes among
the different layers of government. In particular, the literature has devoted some effort to
the existence of a so-called *soft budget constraint problem* whereby a subnational government
may have incentives to conduct an undisciplined fiscal policy under the expectation that the
central government will intervene in case of trouble (see Qian and Roland, 1998; Kornai et
al., 2003; Sorribas, 2012).

Following the literature we include in our analysis the following variables within this
particular group: (i) fiscal co-responsibility (measured by the ratio of taxes over which the
regions do have normative power, over their total non-financial revenues); (ii) an alternative
way of capturing the impact on regional public finances of the changes experienced in the
level of fiscal co-responsibility is to create directly dummies for the financing arrangements
between the center and the regions that took place over the period, as described above
(1992-1996, 1997-2001, 2002-2009).[23]

Control variables: market discipline and endogenous control mechanisms   Be-
yond the factors analyzed in the previous paragraphs, the ability to increase debt by a given
level of administration is fully determined by its ability to raise the necessary funds. In
addition to increasing taxes or decreasing expenditure, the latter necessarily entails finding
(national or international) investors willing to buy the debt of a given administration. Thus
one may conjecture that market pressure might be a key determinant of the change in public

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[23]We also included in the analysis dummies to account for the different degrees of devolution of each
regional ("forales" and article 151 vs the rest). Nevertheless, this type of time-invariant dummies turned out
to be immaterial for the econometric estimation insofar as the latter will be carried out in first differences,
as will be explained below.

debt.

To approach the influence of market discipline, either directly or through the induced effect on the endogenous reaction of governments to built up the sufficient credibility not to lose market access, we explore the following control variables: (i) budgetary deviation in the previous period - one may expect that under market pressure, a given deviation from the budgetary target in year t-1 tends to be at least partially corrected in year t; in this respect we include a variable defined as the difference between the projected budget balance (initial budget) and the observed balance, both as a ratio of total (projected and observed, respectively) revenues; (ii) change in the implicit interest rate, as a measure of market pressure; (iii) a number of variables linked to the composition of debt, as follows. On the one hand, the ratio of short-to-long run debt. Short-term debt could be associated with the reaction to sudden changes in market sentiment. In a framework of worsened perception about a given sovereign, though, increased reliance on short-term debt can lead to a heightened vulnerabilities, as worsening perceptions of a given region's creditworthiness can quickly feed into higher interest costs (see also IMF, 2004). On the other hand, the ratio of securities to loans, with the prior in mind that loans could be more easily obtained in somewhat "captive" markets vs open competition to capture investors in securities. In the particular case of the regions of Spain, regional Savings Banks ("Cajas de ahorros") typically assumed a role as CCAAs bankers. Finally, the ratio of debt held by non-resident vs that held by residents, might be also a measure of stress in the markets as, a priori, in the case of undisciplined governments that are perceived as pursuing unsustainable fiscal policies, non-residents tend to react more quickly and shift portfolios towards more secure assets than residents.

Control variables: pressure from units accounted for outside the boundaries of the General Government sector In particular, within this group, we consider the dynamics of the debt of public corporations owned by a given region (non-EDP) over the EDP debt of that very region. Indeed, the related literature would suggest that: (i) under tight budgetary rules a government may try to circumvent the constraints by cutting transfers public corporations that, in turn, can finance the same spending by issuing debt that is not

computed by means of the same accounting standards used to define the rule (typically as in National Accounts); (ii) an excessive level of non-EDP debt may end up creating pressure on the government to bail-out the external indebtedness vehicle.

5.2 The empirical model

The empirical analysis is carried out using the available annual data for the period 1995-2010. The incidence of the different determinants on the changes in public debt mentioned in the previous section will be tested by means of a standard econometric model that can be specified in quite general terms as:

$$\Delta\frac{D_{it}}{Y_{it}} = \alpha_i + \sum_{j=1}^{N} \beta_j \ \Omega_{jit} + \epsilon_{it} \tag{4}$$

Under the proposed approach, the change in public debt of each regional government, i, at time t, $\Delta\frac{D_{it}}{Y_{it}}$, depends on a set of control variables, Ω, encompassing the economic, political, institutional, market-induced and non-EDP factors mentioned above. Following the traditional fixed-effects model, α_i in equation (4) aims at capturing all the unobservable CCAA effects that are time-invarying, while ϵ_{it} is an error term assumed to be white noise.

As for the estimation method, and in order to avoid any biases stemming from the possible correlation between the individual effects and the regressors, we estimate the level model in first differences. Moreover, given the possible simultaneity of some of the control variables and the dependent variable, the estimation is carried out by the Generalized Method of Moments (Arellano and Bond, 1991), using as instruments lagged regressors. Under GMM, the assumption that in the model in levels the error term is white noise implies that the first difference specification will have a 1-order moving average structure in the residuals. Therefore, for the endogenous variables the acceptable instruments are their own lagged values for two or more periods. For these instruments to be appropriate, it is required that the error term is white noise, which requires in turn that the residuals do not show second-order serial correlation in the equation estimated in first differences. The statistic m2 is asymptotically distributed as a normal, and it is used to test for this hypothesis (null of no autocorrelation). We also present the results of the Sargan test, a test of overidentification

restrictions, asymptotically distributed as a χ^2.

5.3   Results

The results are shown in tables , , and .

In Table we explore the role of more traditional factors, namely fiscal federalism variables and standard measures of fiscal rules, controlling for economic and political determinants. In Table , in turn, we expand the analysis of the role of fiscal rules by focusing on a number of interactions of fiscal rules' variables with "vulnerability" or market-pressure variables. As regards, Table , we study in detail the effect of different measures of market discipline, while in Table we consider the bi-directional influence between the debt (non-EDP) of public corporations controlled by CCAA and CCAA's EDP debt.

As regards a detailed reading of Table , we show the estimations of three models, all of which consider the same macroeconomic and political factors, persistence of changes in debt ("lagged dependent variable"), the level of debt in the previous period[24], and the budgetary deviation incurred in $t-1$ with respect to the initial budget. The three columns differ, though, on the fiscal co-responsibility proxies used and/or the type of proxy for fiscal rules used. The following results of Table are worth highlighting: (i) As regards the impact of the economic cycle, the estimations in columns [1], [2] and [3] point to a debt-reducing effect whereby an additional 1% of real GDP growth in a given period would be associated with a reduction of debt of some 0.2 percent of GDP. This number is not far from standard sensitivities of the public deficit (an imperfect, though fair measure of the change in debt) to the state of the business cycle. (ii) The variable measuring inflation deviations presents a negative sign, even though the coefficients are estimated with low precision and thus only in one case the estimates turn out to be different from zero in statistical terms. A negative sign means that inflation is conductive to reducing, when significant, public debt. This is consistent with the expected direct, deflating effect on the stock of debt. At the same time, one may think of this factor as in Argimón and Hernández de Cos (2011), whereby the extra tax revenue obtained through the absence of tax indexation in the Personal Income Tax

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[24]For a given regions, one may expect that the larger the level of debt, the more difficult would be to increase debt in a subsequent period.

in the Spanish case seem to fully offset the additional costs associated with rising prices, which are channeled through expenditure as a result of the automatic indexation of certain spending items. (iii) the level of development (measured by GDP per capita deviations of each region with respect to the national mean) seems to be also associated, on average, with less accumulation of debt. (iv) Within the political variables, only the one that measures the fraction of regionalist parties' MPs is significant in a robust way, and indicates that regions with more regionally-oriented political rules tend to accumulate more debt, maybe because of the need to finance extra goods and services for their citizens, related to a higher preference for autonomy. (v) The fiscal co-responsibility index presents the expected sign, but it is not significant in any of the empirical specifications; on the contrary, the set of dummies measuring the different financing arrangements between regions and the center are strongly significant and present the expected negative sign. Interestingly, the coefficients associated to each dummy are higher the more recent the financing arrangement, a result that is in line with the standard result of the fiscal federalism literature that a higher degree of fiscal co-responsibility tends to be associated with increased fiscal discipline. (vi) Finally, it is worth mentioning that the "endogenous" stress variables, namely, the lagged level of debt and the budgetary deviations incurred in the previous year (known in the current year) are both conductive to, on average, reduce debt in the subsequent year.

The measures of fiscal rules in Table are either non-significant or show (model [3]) the "wrong" sign. One may try to find a theoretical justification to a positive coefficient for FRI, on the grounds that too strict fiscal rules may not be credible ex-ante and thus end up being associated with a less disciplined approach to fiscal outcomes than other type of (implicit, market-based) rules. Nevertheless, the weak evidence for this in the table does not allow to put forward this point as a sufficiently robust one. On related grounds, in Table we further explore the role of fiscal rules, by interacting FRI with a number of variables. Interestingly, when FRI is interacted with the budgetary deviation variable, the result is negative (conductive to fiscal discipline) and strongly significant in the six alternative models shown. In addition, when interacted with a direct measure of fiscal discipline, the implicit interest rate, the sign is also negative, while in this case the coefficient is close-to-borderline significant, although not at the usual levels. The interaction of FRI with the ratio of short-

to-long term debt is also interesting: an increase in the reliance on short term debt vs long-term debt can indicate, according with the theoretical arguments outlined in a previous section, that a government committed to living-up to the rules (interaction with FRI) can keep market access through the short-end of the portfolio available. As regards the FRI times securities over loans ratio, the negative and significant sign may indicate that a government with more market (competitive) access (i.e. with an increase in the ratio of securities to loans) tend to be more stability-oriented.

Table digs deeper on the role of market-discipline-related variables, not necessarily linked to their interaction with FRI. The following additional results in this table can be underlined: (i) increases in the implicit interest rate seem to be strongly associated with increased fiscal disciplined (debt reductions). A close to 1% increase in the implicit rate would lead by itself to a reduction of debt by 0.1 percent of GDP[25]; (ii) as mentioned in the previous paragraph, provided that market access is not lost, regional governments find it feasible to increase their debt levels by relying more on short-term debt (in relative terms to long-term instruments); thus, market pressure that forces a given government to issue more short-to-long term debt does not induce a more disciplined fiscal behavior of those governments provided they can finance themselves with this new debt structure more biased to short-term instruments.; (iii) the ratio of securities over loans presents a negative sign in all specifications (significant at the usual confidence levels only in two) reinforcing the idea that regional governments with better access to less "captive" investors (those buying securities) tend to be more disciplined from the fiscal point of view.

Finally, in Table we show, as mentioned before, the linkages between regional governments' EDP debt and their public corporations' (EEPP) debt. Columns [1] to [3] show in a robust way that the lagged level of public corporations' (EEPP) debt as a percent of nominal GDP tend to anticipate increases in EDP debt. At the same time, the changes in both types of debt tend to be positively correlated (positive sign of $\Delta EEPPdebt$, with a paralel result in columns [4] to [6]) even though lagged increases of $\Delta EEPPdebt$ would anticipate a decrease of $\Delta EDPdebt$. Trying to square all these results, one may claim that EEPP debt contains information on the future evolution of EDP debt, whereby an excessive accumulation of

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[25]Please notice that the variable in the table is multiplied by 10.

EEPP debt ends up inducing an upward pressuer on within-the-EDP-boundaries debt.

6   Conclusions

In this paper we study the evolution and the determinants of sub-national's debt net financing needs (measured by the change in public debt). While we provide a descriptive and institutional analysis of the aggregate of sub-national governments as a whole, we constraint ourselves in the main empirical part of the paper to the study of the determinants of CCAA debt due to data constraints.

The main results of the empirical models in which we exploit the pool structure of our data (17 regions over the period 1995-2010) are as follows. First, institutional factors, such as fiscal decentralization and fiscal rules play a limited role, even though standard results in the literature are confirmed. Second, market-disciple indicators, such as the change in the implicit cost of debt, the structure of debt itself, and measures of induced self-discipline, play a significant role in disciplining regional governments attitude towards increasing debt. Third, the debt (non-EDP) of public corporations controlled by CCAA play a role in the determination of CCAA's EDP debt.

All in all, we find that deeper fiscal decentralization, on the one hand, and, in particular market-induced discipline, on the other, have been associated in the sample under study with heightened fiscal discipline. We also find a tight link between CCAA's EDP debt and CCAA's public corporations debt.

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Table 1: The determinants of regional governments' debt changes (changes as a percent of GDP): baseline models.

Dependent variable: Δ EDP debt	[1]	[2]	[3]
Lagged dependent variable	0.160 [c]	0.170 [c]	0.181 [c]
	(0.096)	(0.099)	(0.101)
Economic cycle	-0.219 [a]	-0.215 [a]	-0.203 [a]
	(0.024)	(0.024)	(0.024)
Inflation deviation	-0.211	-0.200	-0.311 [c]
	(0.186)	(0.178)	(0.181)
GDP per capita deviation	-0.206 [c]	-0.203 [c]	-0.118
	(0.115)	(0.120)	(0.112)
Housing inflation deviation	0.008	0.007	0.010
	(0.008)	(0.008)	(0.009)
% Left-wing parties MPs	-0.005	-0.007	-0.012
	(0.015)	(0.015)	(0.013)
% Regionalist parties' MPs	0.032 [b]	0.035 [b]	0.025 [c]
	(0.016)	(0.017)	(0.015)
Concordance centre-periphery	0.087	0.088	0.140
	(0.168)	(0.167)	(0.167)
Elections	0.005	0.004	0.031 [c]
	(0.024)	(0.025)	(0.018)
Fiscal corresponsibility	-0.001	-0.046	-
	(0.040)	(0.034)	
Financing agreement 1992-1996	-	-	-1.170 [a]
			(0.400)
Financing agreement 1997-2001	-	-	-1.333 [a]
			(0.332)
Financing agreement 2002-2009	-	-	-1.966 [a]
			(0.253)
Fiscal rules: BCS	0.088	-	-
	(0.144)		
Fiscal rules: BSL	-0.170	-	-
	(0.208)		
Fiscal rules index (FRI)	-	-0.003	0.049 [c]
		(0.018)	(0.027)
Budgetary deviation (t-1)	-0.197 [c]	-0.178 [c]	-0.285 [a]
	(0.010)	(0.105)	(0.100)
EDP debt (t-1)	-0.244 [a]	-0.231 [a]	-0.154 [b]
	(0.834)	(0.081)	(0.070)
Number of observations	238	238	254

[a], [b], [c]: significance at the 1%, 5% and 10% levels.

Table 2: The determinants of regional governments' debt changes (changes as a percent of GDP): fiscal rules.

Dependent variable: Δ EDP debt	[1]	[2]	[4]	[5]	[5]	[6]
Lagged dependent variable	0.202 [b]	0.177 [b]	0.219 [a]	0.211 [a]	0.219 [a]	0.214 [a]
	(0.080)	(0.082)	(0.067)	(0.067)	(0.068)	(0.069)
Economic cycle	-0.177 [a]	-0.184 [a]	-0.189 [a]	-0.189 [a]	-0.190 [a]	-0.190 [a]
	(0.017)	(0.019)	(0.024)	(0.021)	(0.024)	(0.024)
% Regionalist parties' MPs	0.034 [b]	0.032 [b]	0.036 [b]	0.036 [b]	0.035 [b]	0.037 [b]
	(0.015)	(0.013)	(0.016)	(0.015)	(0.015)	(0.016)
Elections	0.016	0.012	0.020	0.020	0.019	0.017
	(0.024)	(0.023)	(0.023)	(0.022)	(0.024)	(0.023)
Fiscal corressponsibility	-0.006 [c]	-0.002	-0.004	-0.003	-0.004	-0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Fiscal rules index (FRI)	0.013	-	-	-	-	-
	(0.018)					
Fiscal rules: BCS	-	0.157	0.148	0.119	0.161	0.146
		(0.129)	(0.131)	(0.127)	(0.128)	(0.129)
Fiscal rules: BSL	-	-0.009	0.047	0.016	0.031	0.072
		(0.221)	(0.219)	(0.204)	(0.216)	(0.241)
Budgetary deviation (t-1)	-0.105	-0.128	-	-	-	-
	(0.101)	(0.101)				
EDP debt (t-1)	-0.205 [a]	-0.219 [a]	-0.241 [a]	-0.238 [a]	-0.231 [a]	-0.233 [a]
	(0.072)	(0.074)	(0.077)	(0.069)	(0.081)	(0.079)
FRI x Budgetary deviation	-0.222 [a]	-0.230 [a]	-0.030 [a]	-0.024 [a]	-0.298 [a]	-0.296 [a]
	(0.072)	(0.070)	(0.008)	(0.007)	(0.084)	(0.082)
FRI x Short/long	0.076 [a]	0.075 [a]	-	0.077 [a]	-	-
	(0.016)	(0.015)		(0.017)		
FRI x Securities / Loans	-0.013	-0.018	-	-	-0.021 [c]	-
	(0.012)	(0.012)			(0.012)	
FRI x Non-residents/residents	-0.006	-0.003	-	-	-	-0.006
	(0.012)	(0.011)				(0.011)
FRI x Implicit interest rate	-0.405	-0.299	-0.286	-0.374	-0.241	-0.292
	(0.268)	(0.259)	(0.260)	(0.270)	(0.263)	(0.261)
Number of observations	238	238	238	238	238	238

[a], [b], [c]: significance at the 1%, 5% and 10% levels.
Control variables included in the regressions but not shown for the sake of simplicity:
Inflation deviation, GDP per capita deviation, Housing inflation deviation, % Left-wing
parties MPs, Concordance centre-periphery.

Table 3: The determinants of regional governments' debt changes (changes as a percent of GDP): market discipline.

Dependent variable: Δ EDP debt	[1]	[2]	[4]	[5]	[5]	[6]
Lagged dependent variable	0.28 [b]	0.22 [b]	0.29 [a]	0.23 [a]	0.33 [a]	0.26 [a]
	(0.12)	(0.10)	(0.09)	(0.08)	(0.11)	(0.08)
Economic cycle	-0.22 [a]	-0.23 [a]	-0.21 [a]	-0.22 [a]	-0.21 [a]	-0.23 [a]
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
% Regionalist parties' MPs	0.00	0.02	0.00	0.03 [c]	0.00	0.03 [c]
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Elections	0.01	0.02	-0.01	0.01	-0.02	0.00
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)
Fiscal co-responsibility	0.01 [c]	0.01 [c]	0.01	0.01 [c]	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)
Fiscal rules: BCS	-0.12	-0.13	-0.11	-0.04	-0.11	-0.01
	(0.11)	(0.11)	(0.09)	(0.13)	(0.12)	(0.14)
Fiscal rules: BSL	-0.23	-0.28	-0.23	-0.30	-0.22	-0.28
	(0.16)	(0.20)	(0.16)	(0.19)	(0.16)	(0.22)
EDP debt (t-1)	-	-0.16 [c]	-	-0.22 [a]	-	-0.24 [a]
		(0.09)		(0.08)		(0.09)
Δ Implicit interest rate	-0.90 [b]	-0.92 [b]	-0.96 [b]	-0.92 [b]	-1.03 [b]	-0.94 [b]
	(0.42)	(0.43)	(0.43)	(0.43)	(0.47)	(0.46)
Ratio short/long term debt	0.10 [b]	0.15 [a]	0.18 [a]	0.18 [a]	-	-
	(0.04)	(0.05)	(0.03)	(0.04)		
Δ Ratio short/long term debt	0.082 [b]	0.042	-	-	-	-
	(0.033)	(0.037)				
Ratio Securities / Loans	-0.27 [b]	-0.05	-0.16 [b]	-0.14	-	-
	(0.12)	(0.23)	(0.06)	(0.13)		
Δ Ratio Securities / Loans	0.104	0.027	-	-	-	-
	(0.073)	(0.120)				
Ratio debt non-residents / residents	-0.02	-0.01	-	-	-0.03 [b]	-0.02
	(0.02)	(0.03)			(0.01)	(0.02)
Δ Ratio non-residents / residents	-0.013	-0.011	-	-	-	-
	(0.016)	(0.018)				
Number of observations	221	221	238	238	238	238

[a], [b], [c]: significance at the 1%, 5% and 10% levels.
Control variables included in the regressions but not shown for the sake of simplicity:
Inflation deviation, GDP per capita deviation, Housing inflation deviation, % Left-wing parties MPs, Concordance centre-periphery.

Table 4: The determinants of regional governments' debt changes (changes as a percent of GDP): public corporations owned by regional governments.

	Dependent variable: Δ EDP debt			Dependent variable: Δ EEPP debt		
	[1]	[2]	[3]	[4]	[5]	[6]
Lagged dependent variable	0.18 [b]	0.14	0.10	0.02	0.00	0.18 [c]
	(0.08)	(0.09)	(0.09)	(0.09)	(0.09)	(0.11)
Economic cycle	-0.22 [a]	-0.20 [a]	-0.21 [a]	-0.01	0.00	0.00
	(0.03)	(0.02)	(0.03)	(0.01)	(0.01)	(0.01)
% Regionalist parties' MPs	0.03 [c]	0.00	0.03 [b]	-0.01	0.00	0.00
	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Elections	0.02	0.04 [c]	0.04 [b]	-0.01	0.00	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)
Fiscal co-responsibility	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Fiscal rules: BCS	0.13	-0.02	0.11	-0.05 [b]	-0.08 [b]	-0.06 [c]
	(0.16)	(0.13)	(0.13)	(0.02)	(0.04)	(0.03)
Fiscal rules: BSL	-0.33	-0.20	-0.32 [c]	0.10	0.12	0.10
	(0.22)	(0.12)	(0.17)	(0.09)	(0.09)	(0.10)
EDP debt (t-1)	-0.26 [a]	-	-0.22	0.00	0.02	0.02
	(0.08)		(0.09)	(0.03)	(0.03)	(0.04)
EEPP debt (t-1)	0.61 [a]	0.76 [a]	0.82 [a]	-0.19	-	-0.41 [a]
	(0.21)	(0.16)	(0.18)	(0.00)		(0.06)
Δ EEPP debt	-	0.36 [b]	0.44 [a]	-	-	-
		(0.15)	(0.15)			
Δ EEPP debt (t-1)	-	-0.46 [c]	-0.39 [c]	-	-	-
		(0.27)	(0.21)			
Δ EDP debt	-	-	-	-	0.02 [c]	0.07 [a]
					(0.01)	(0.01)
Δ EDP debt (t-1)	-	-	-	-	-0.01	0.02
					(0.05)	(0.05)
Number of observations	238	221	221	221	221	221

[a], [b], [c]: significance at the 1%, 5% and 10% levels.
Control variables included in the regressions but not shown for the sake of simplicity: Inflation deviation, GDP per capita deviation, Housing inflation deviation, % Left-wing parties MPs, Concordance centre-periphery.

Figure 1: The evolution of General Government EDP debt in Spain, by subsectors of the General Government.

Variables expressed as percent of GDP
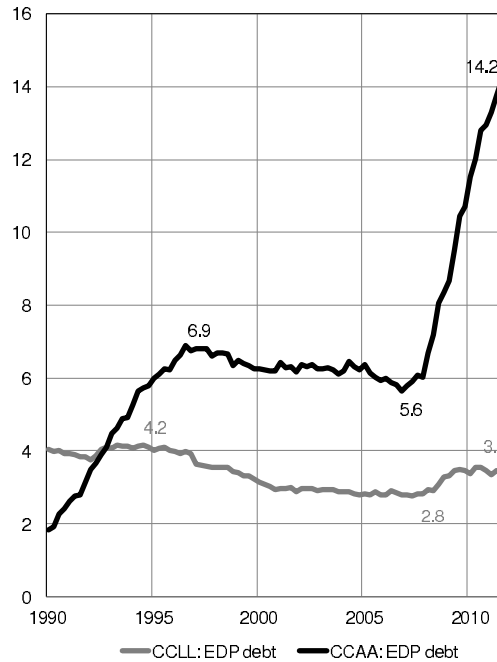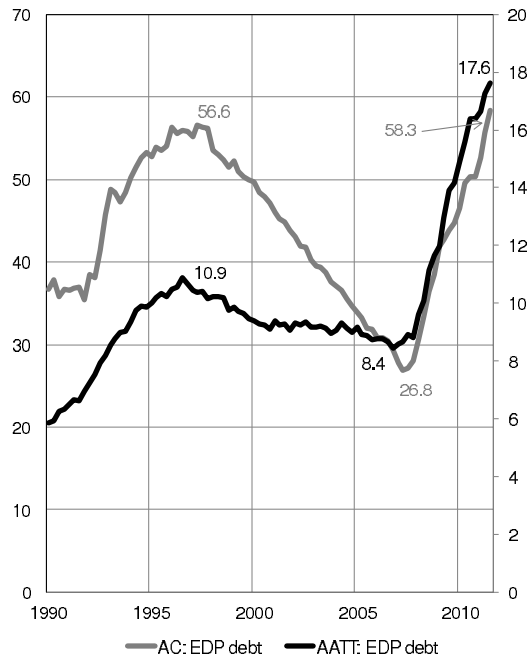
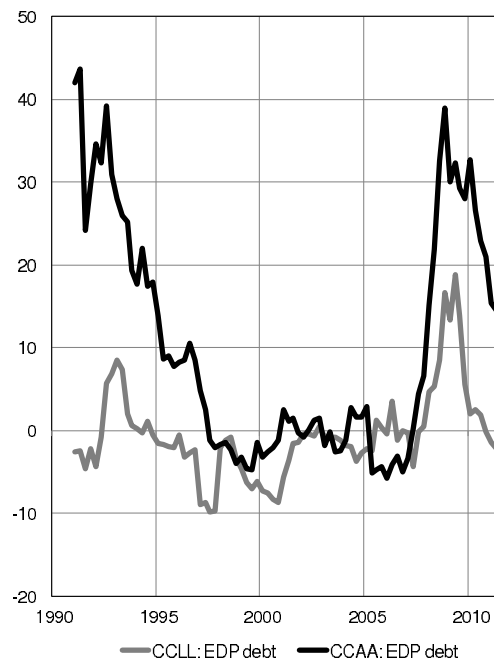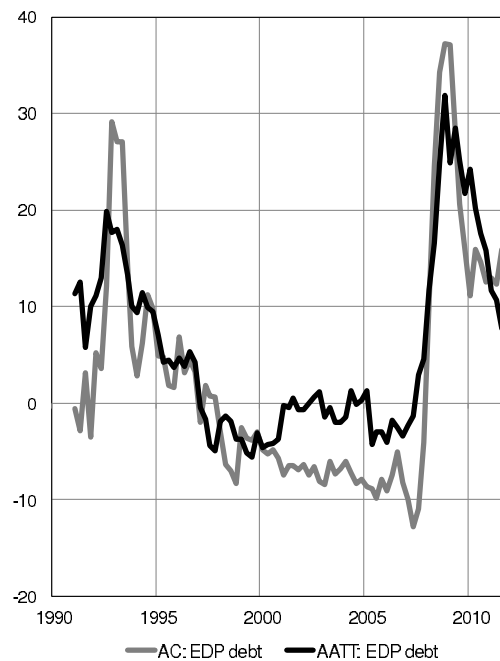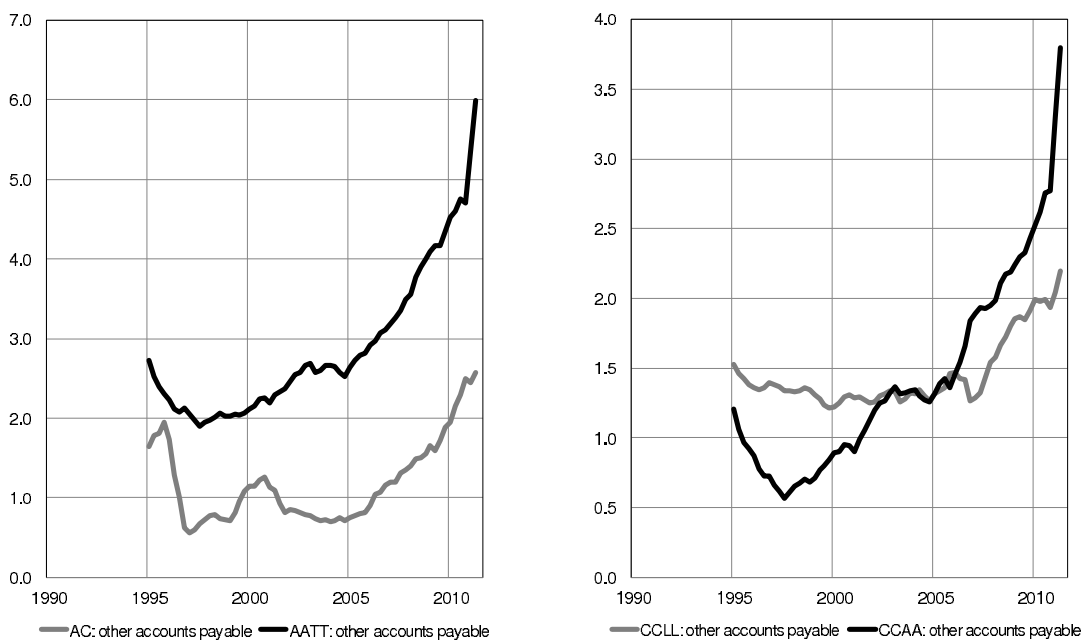Change in the variables as a percent of GDP

Figure 2: Other liabilities not included in the extant definition of Government EDP debt, by subsectors of the General Government.

Panel 1. Other Accounts Payable, percent of GDP

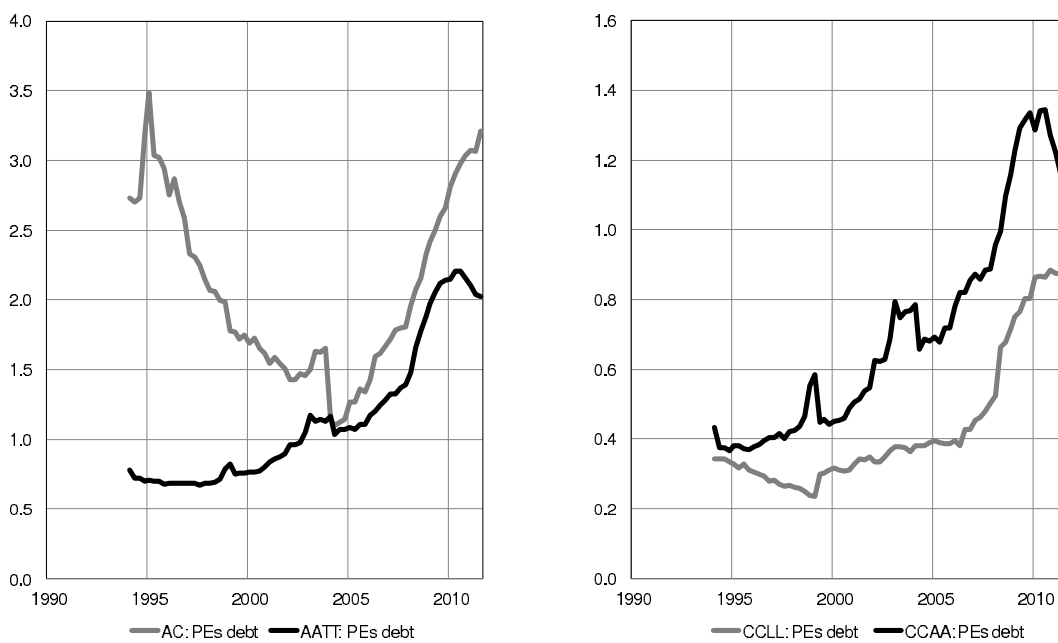

Panel 2. Public enterprises' debt, percent of GDP

34

1

Figure 3: The determinants of changes in General Government EDP debt (as a percent of GDP) in the period 1995-2011, by subsectors of the General Government: year-by-year changes.

Variables expressed as percent of GDP
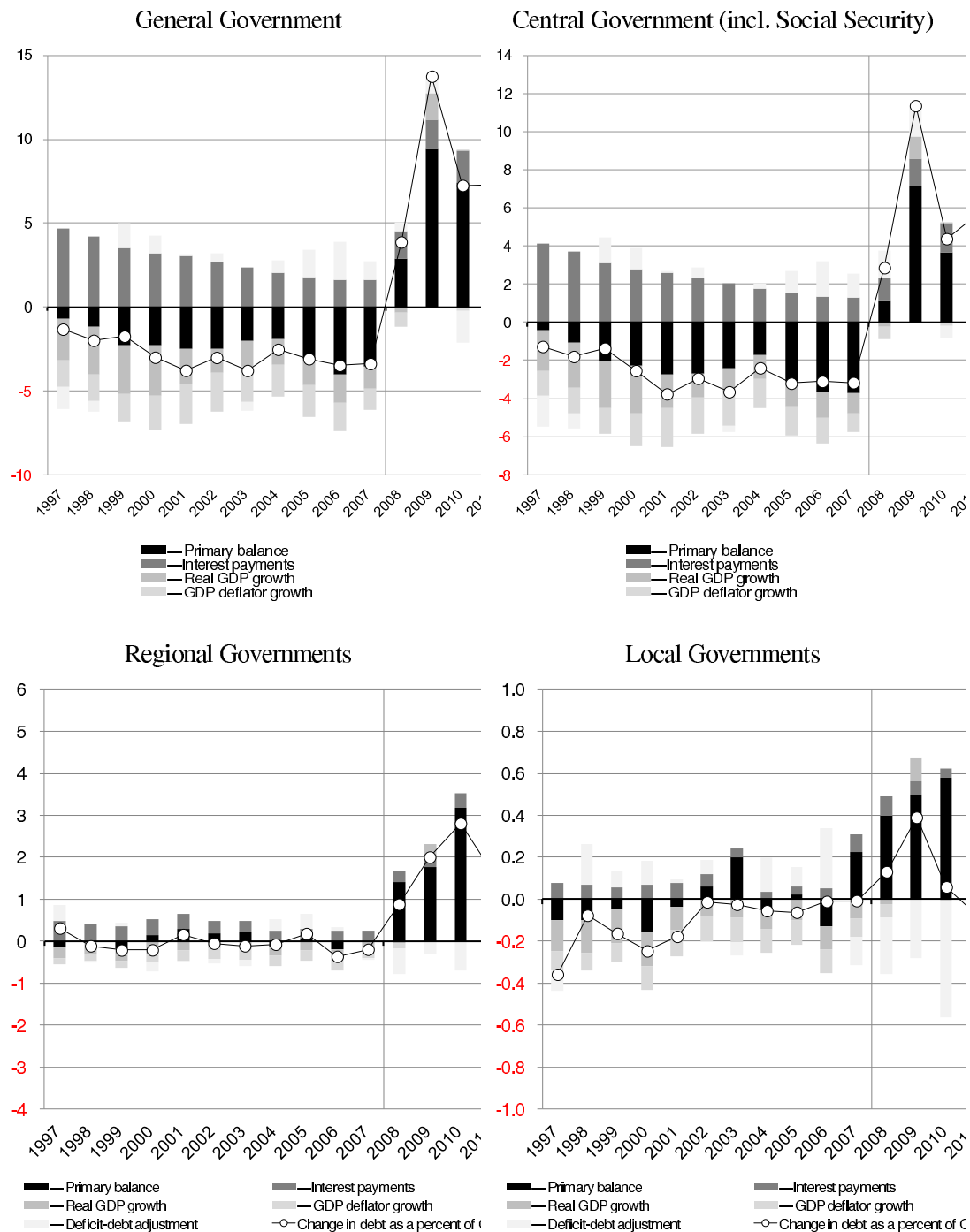
Figure 4: The determinants of changes in General Government EDP debt (as a percent of GDP) in the period 1995-2011, by subsectors of the General Government: cumulative changes.

Variables expressed as percent of GDP

General Government

Central Government (incl. Social Security)

Regional Governments

Local Governments
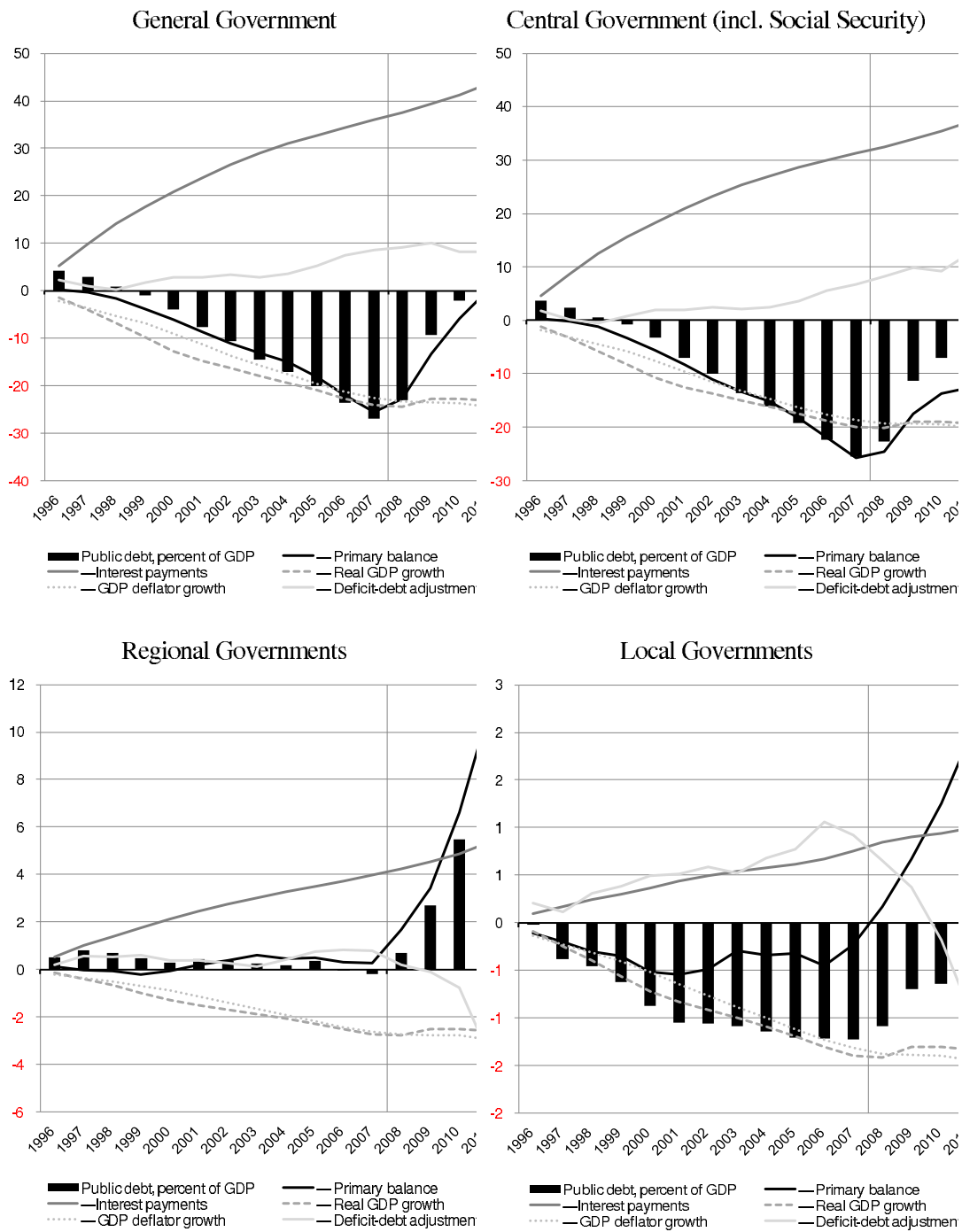
Figure 5: The breakdown of subnational EDP debt by type of debt (loans vs securities), and by maturity (short-run vs long-run).

Panel 1. Loans as a percentage of Securities

AATT: loans/securities   AC: loans/securities

CCAA: loans/securities   CCLL: loans/securities
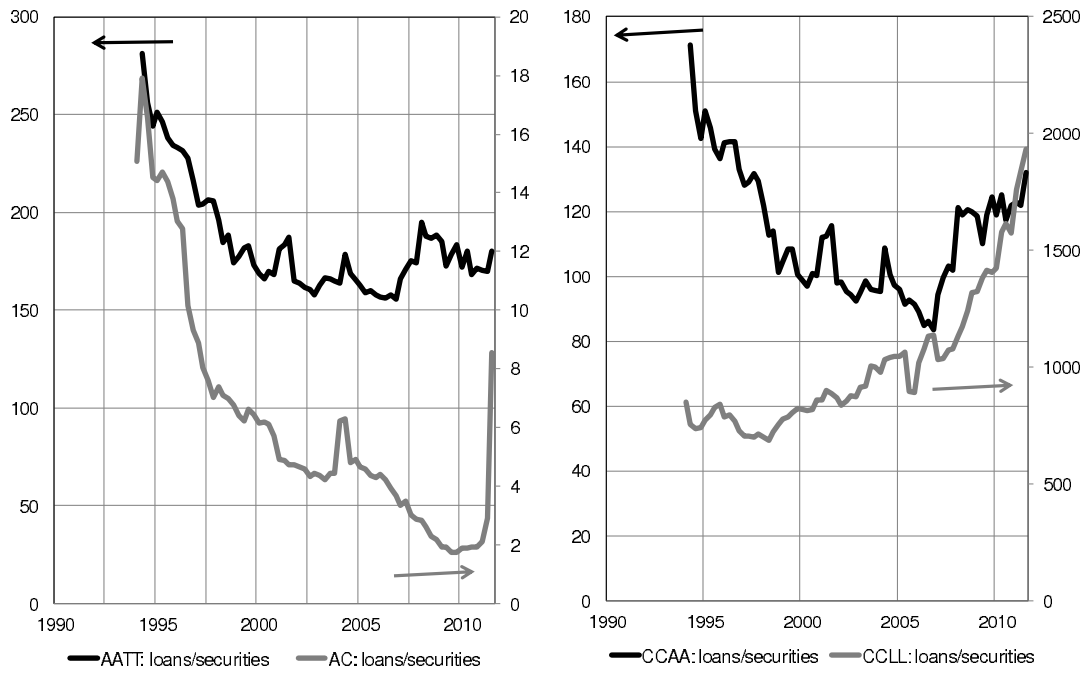
Panel 2. Short-run debt as a percentage of Long-run debt

AATT: sr / lr (securities and loans residents)
AC: sr / lr (securities)

CCAA: sr / lr (securities and loans residents)
CCLL: sr / lr (securities and loans residents)
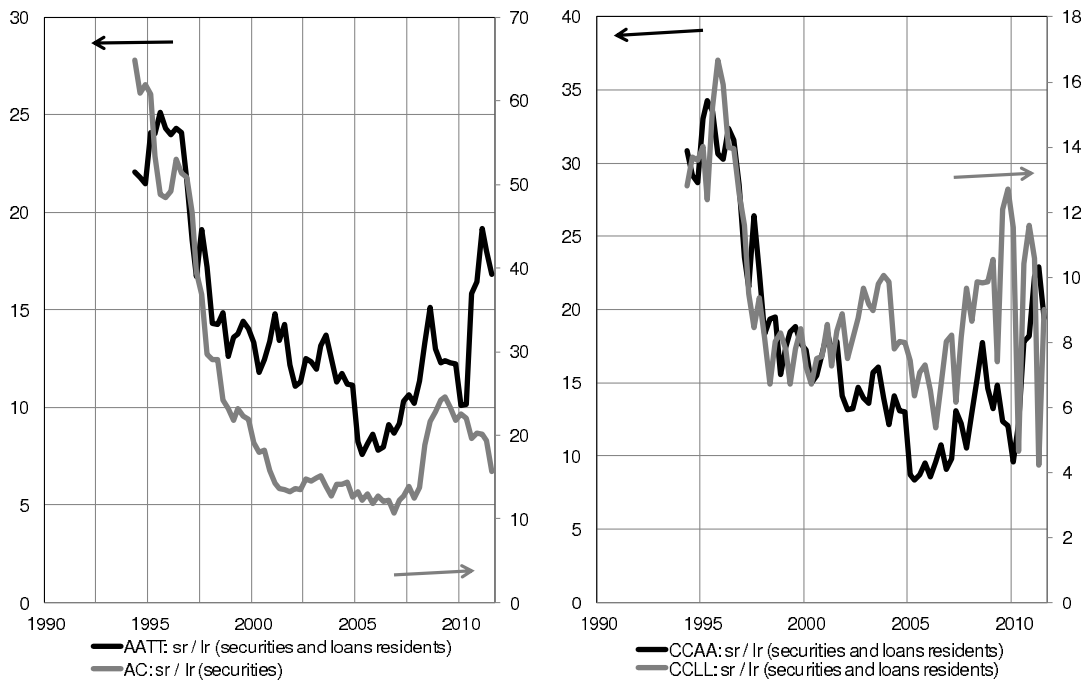
Figure 6: Regional governments' debt: vulnerability indicators.
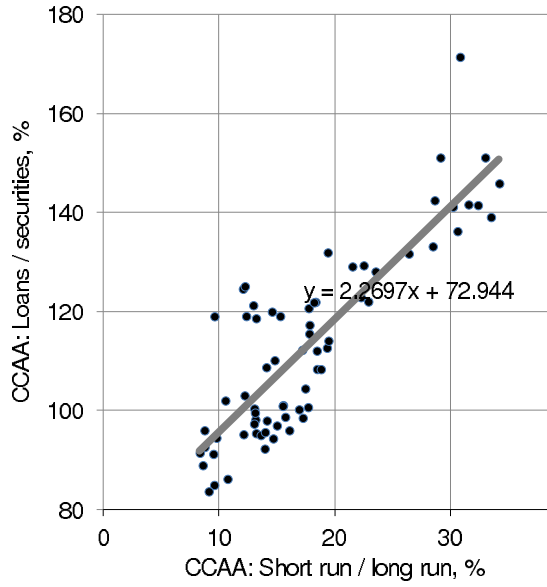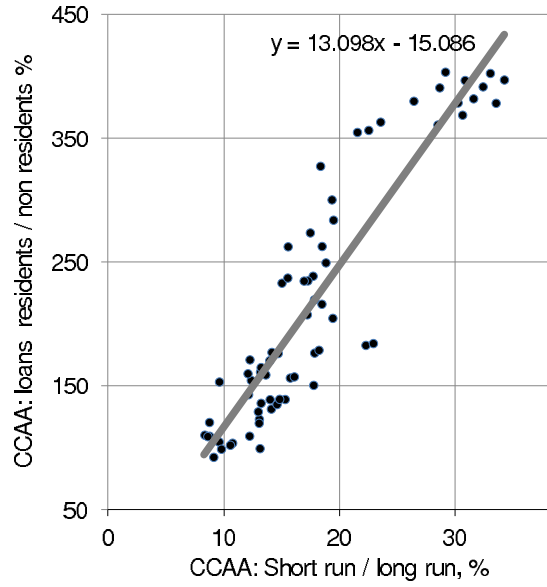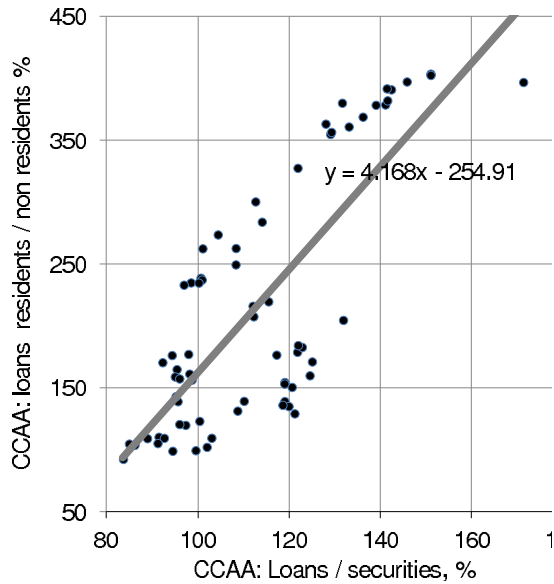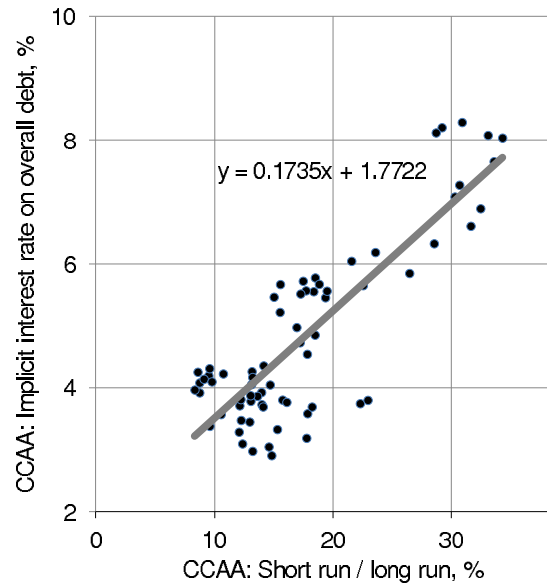
Figure 7: Implicit interest rates on Spanish government debt, by subsectors of the General Government.

Percent

Implicit interest rates (AC + SS) • Implicit interest rate (CCAA)
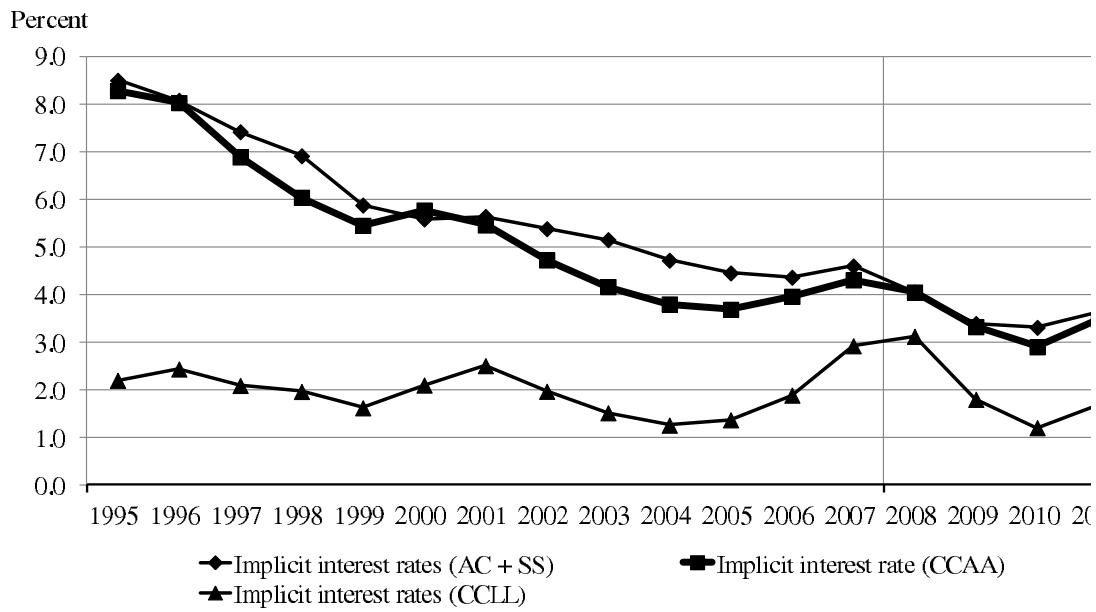Implicit interest rates (CCLL)

Figure 8: Subnational government revenues. Percentage of general government revenues in 2010. Source: European Commission.
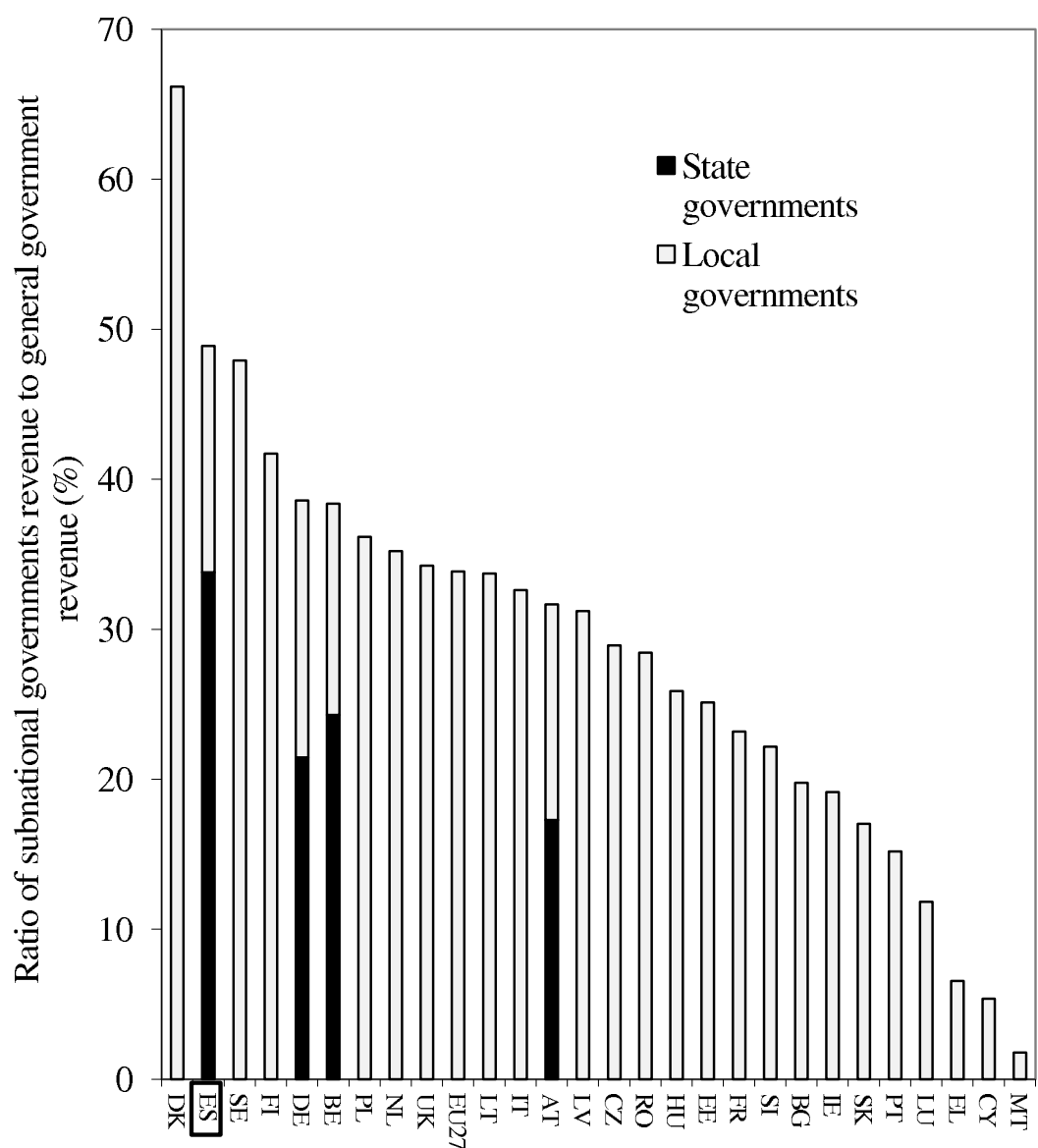
Figure 9: Subnational government expenditures. Percentage of general government expenditures in 2010. Source: European Commission.