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Abstract

We analyze from an empirical point of view the evolution and determinants of Spanish regional public debt. Spain offers an interesting case study because of its high level of fiscal decentralization, implemented gradually during the past four decades, the parallel entry into force of a number of national fiscal rules in that period, and the heterogeneity of its regions, both in terms of economic fundamentals and some institutional features. Our main findings are the following: i) regional governments' fiscal policies reacted to public debt increases, on average, over the sample of study; ii) fiscal rules played a limited role in controlling debt surges, being only marginally effective in some instances, like high debt situations; iii) a higher degree of regional fiscal co-responsibility tends to be linked to more subdued debt dynamics; iv) market-disciple indicators have encouraged some discipline at the regional level, and v) regional non-standard (commercial) debt surges present explanatory power on the standard measure of public debt.

Keywords: regional public debt, fiscal rules, fiscal federalism, market discipline.

JEL classification: H6, E62, C53.

Resumen

En este documento se hace un análisis empírico de la evolución y de los determinantes de la deuda de las Comunidades Autónomas (CCAA). España constituye un caso interesante de estudio debido a su alto nivel de descentralización fiscal (desarrollado gradualmente durante las últimas cuatro décadas), que se ha producido simultáneamente a la entrada en vigor de diversas reglas fiscales nacionales, así como por la heterogeneidad de sus CCAA, tanto en términos de su estructura económica como por la existencia de algunas diferencias institucionales. Los resultados principales del análisis son los siguientes: i) las políticas fiscales de las CCAA reaccionaron a los incrementos de la deuda pública, en promedio en el período analizado; ii) las reglas fiscales desempeñaron un papel limitado a la hora de controlar los incrementos de la deuda, siendo solo efectivas marginalmente en determinadas situaciones, (por ejemplo, en momentos en los que el endeudamiento fue más elevado); iii) un nivel elevado de corresponsabilidad fiscal tiende a estar relacionado con una dinámica más moderada de la deuda; iv) los mercados financieros parecen haber contribuido a disciplinar la conducción de la política fiscal de las CCAA, y v) los incrementos de la deuda comercial autonómica explican parte de la dinámica de la deuda autonómica medida de acuerdo con las definiciones estándar (deuda según el Protocolo de Déficit Excesivo).

Palabras clave: deuda pública autonómica, reglas fiscales, federalismo fiscal, disciplina de mercado.

Códigos JEL: H6, E62, C53.

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1 Introduction

The analysis of sub-national public debt developments has gained relevance worldwide, due to the rising share of sub-national finance in the overall financing needs of the General Government sector in a number of countries, following a continued process of fiscal decentralization (Canuto and Liu (2010), EC(2012)). Against this framework, we study in this paper the evolution and the determinants of Spanish regional governments' net financing needs (measured by the change in public debt). We estimate empirical models in which we exploit the pool structure of our data (17 regions over the period 1995-2017).

The Spanish case is a relevant one from a global point of view, given that in the last few decades a process took place in which a significant degree of fiscal devolution occurred, to heterogeneous regions, in parallel with the adoption of several national and supranational fiscal rules, in different waves. In this framework, in addition, Spanish regional governments have been traditionally very active in capital markets, have accumulated significant levels of public debt, and are a recent example of a situation of sub-central fiscal stress, including central government intervention, connected to the euro area sovereign debt crisis. We develop in the following paragraphs these elements.

First, regional public finances were one of the major sources of national fiscal stress during the recent economic and financial crisis. The lasting effect of the recent crisis over regional public finances entailed a strong surge of regional debt over the last ten years, from some 6% of GDP in 2007 to 25% in 2017. The "Comunidades Autónomas" (CCAA henceforth) faced significant fiscal stress during the core years of the crisis. As a result, financial markets were partially closed, and the Central Government decided to bail-out a majority of regions.[1] The CCAA debt crisis may have damaged the sovereign risk of the country as a whole, as clearly stated by rating agencies in the midst of the euro area sovereign debt crisis.[2]

Second, the degree of fiscal decentralization in Spain is significant, and commensurate to that of leading federal countries. A fast and steady decentralization process has taken place ever since the country became a democracy in the 1970's, entailing a progressive cession of some key ex-

[1] The Central Government reacted to these lack of liquidity of some CCAA creating two specific funds. The first one, the Fund for Suppliers Payments, targeted the commercial debt of the regions that grew strongly up to 2011 both in amount and in delay of payment. This Fund was key for enabling firms that provided services and goods to the Public Administration to stay open and to continue investing and hiring new workers (Delgado-Téllez et al. (2017)). The second Fund, denominated the Financial Liquidity Fund, was established to cope with the liquidity problems of the CCAA. Both Funds entailed a change in the ownership of the CCAA debt, from the private sector to the Central Government. Thus, in 2017 around 58% of the debt of the CCAA was in hands of the Central Government.

[2] For example, as Fitch stated in its note *"Liquidity for Spain Regions Positive, More Detail Needed"* published on March 20th 2012, the relevant measure of debt for Spain was not the Central Government's one, but rather the total debt of the General Government that includes the regional and local debt.

penditure and revenue items to regional governments.[3] The 17 regional governments currently manage, among other competencies, education (including universities), health and social services. In 2017, sub-national governments (CCAA plus municipalities) 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).

Third, this decentralization process took place in a period in which a number of supra-national and national fiscal rules were implemented. National fiscal rules were implemented on top of EU-wide ones. Nowadays there are four main fiscal rules: deficit, debt and expenditure rules, similar to the European references, but subject to stricter monitoring procedures: In addition, another set of rules govern the accumulation of regional commercial debt, and spell a number of monitoring steps, including sanctions, in case payments are delayed with respect to legal periods. Despite these rules being in place, deficit non-compliance has been common at the regional level (Delgado-Téllez et al. (2016)).

Four, Spanish regions have traditionally been very active in international regional bond markets, ranking only behind the US, Germany, Japan, China and Canada (see Pérez and Prieto (2015); Canuto and Liu (2013); Delgado and Pérez (2018); Romeu (2013)). In 2017, total outstanding regional public debt amounted to some 288 bn euro (about 24.8% of Spanish GDP). For the whole period 1995-2017, average regional debt amounted to 11.1% of GDP, of which more than 40% was in the form of securities (other than shares). The weight of securities over total debt fell sharply during the economic crisis due to a partial closure of financial markets for the CCAA and the rising financing cost, reaching its lowest level of 16.2% in 2017.

Fifth, Spain's CCAA's fiscal credibility was also damaged over the past decade by the increase of liabilities not accounted for in the standard, European concept of public debt.[4] Those vehicles include the debt issued by companies controlled by regional governments and the accounts payable outstanding (including commercial debt). The literature suggest that these instruments may have 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 (see Fernández Llera and García Valiñas (2013)).

[3] This decentralization process emanates from the current Spanish Constitution (voted in 1978) which, in its second article, recognizes the rights to self-government of "regions and nationalities", within the Spanish nation.

[4] *Excessive Deficit Procedure* debt (EDP). Public debt is defined in the Protocol No. 12 on the excessive deficit procedure annexed to the Treaty on the Functioning of the European Union as "[...] total gross debt at nominal value outstanding at the end of the year and consolidated between and within the sectors of general government". Article 1(3) of Council Regulation (EC) No 479/2009 specifies the definition of Maastricht debt and deficit in statistical terms including the treatment of trade credits.

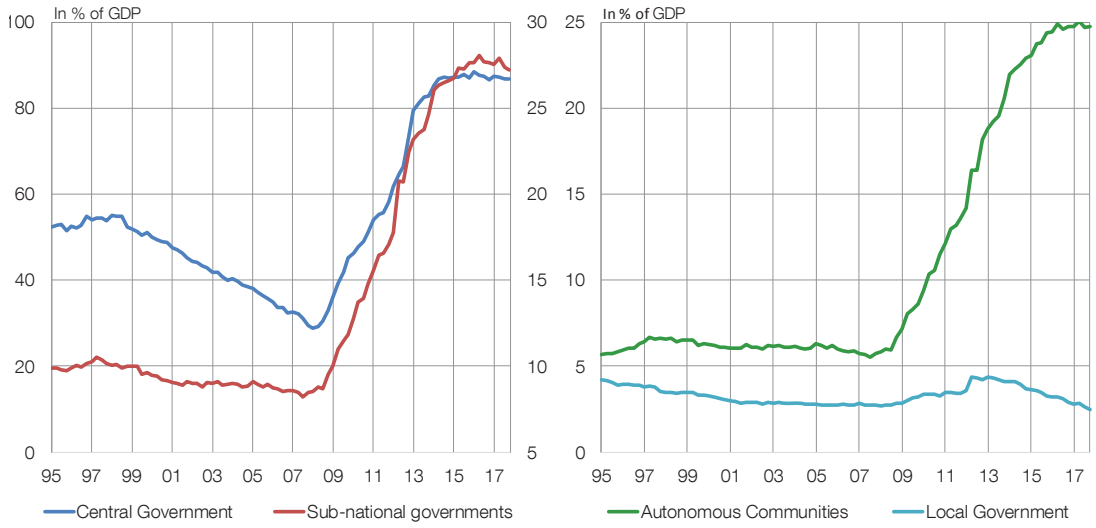
In this paper we move beyond the available literature that analyzes the role of fiscal federalism variables in the determination of regional public finances, the main difference being our focus on the determinants of the dynamics of public debt, rather than on primary balances as it is usually the case in the related literature. We deem changes in debt as our preferred object of study instead of budget balances given that the former is 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 CCAAs in the period 2010-2013. In the latter respect, see Campos et al. (2006) for an international perspective on this issue. Some papers that precede in certain respects our work are Vallés Giménez(2002), that also includes an excellent survey of pre-2002 papers on the issue, Argimón and Hernaández de Cos (2012), Simon-Cosano et al. (2013) or Mussons-Olivella (2017), among others.[5] In addition, we explore a more up-to-date period of time and include a number of non-standard fundamental variables, in particular those related to the structure and composition of public debt, the definition of fiscal rules' variables, and the interaction of regional public enterprises' debt and commercial debt with regular public debt.

Among the set of determinants we pay special attention to: (i) institutional factors, such as fiscal decentralization and fiscal rules, including self-correcting mechanisms like the reaction to past debt and past deviations from targets; (ii) political factors, related with the electoral cycle and the composition of government; (iii) market-disciple indicators, such as the change in the implicit interest rate and the structure of debt itself; (iv) non-EDP debt, focusing on public corporations controlled by CCAA and regional commercial debt. We find that self-correcting mechanisms and market-induced discipline, and to a lesser extent deeper fiscal decentralization, have been associated in the sample under study with heightened fiscal discipline.

Our paper is organized as follows. In Section 2 we provide some stylized facts on regional public debt in Spain. In Section 3 we focus on two relevant institutional issues: the process of fiscal decentralization since the early 1980s and the evolution of fiscal rules affecting regional governments in Spain. These issues are further expanded in appendices I and II. In turn, in Section 4 we perform the empirical analysis of the paper, covering first the standard approach of papers on fiscal federalism, and moving next 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 governments' standard debt and other public debt concepts. Finally, in Section 5 we provide some conclusions.

[5] The institutional determinants of local governments' indebtedness have 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 el al. (2013), and the references quoted therein.

Figure 1: The evolution of public debt in Spain, by sub-sector.



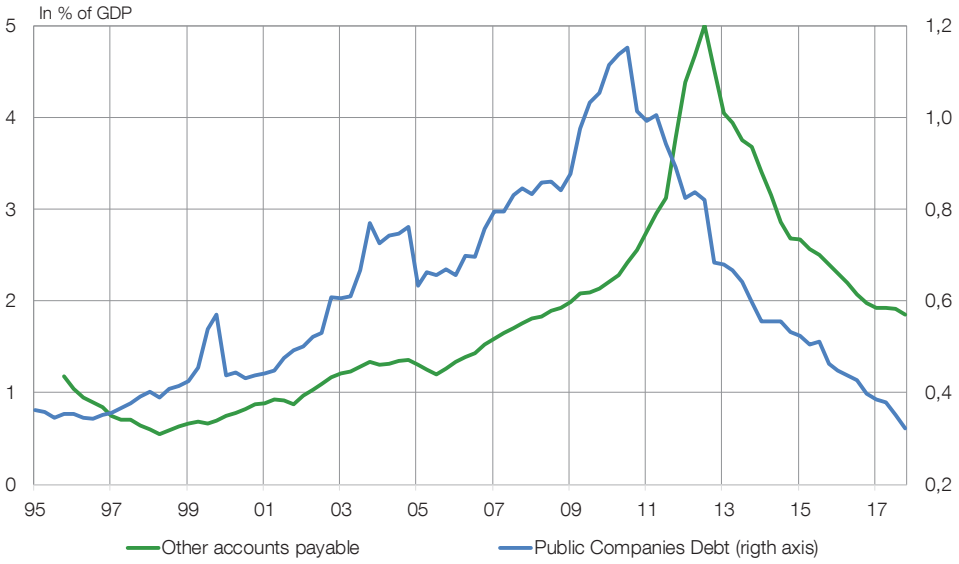
2 Stylized facts on regional public debt

2.1 Some trends

Spanish General Government debt increased in the period 2007-2017 by nearly 63 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 and CCAA non-consolidated debt moved from 29.5 and 5.7 percent of GDP, respectively, at the end of 2007, to 86.9% and 24.8% of GDP in 2017, multiplying by 3 and 4 their amounts respectively.

The increase in public debt came hand-in-hand with increases in other liabilities not covered by the extant definition of debt, but that are close complements, namely the aggregates of public corporations' debt and other accounts payable. The statistical category "*other accounts payable*" consists of financial claims which are created as a counterpart of a financial or a non-financial transaction in cases where there is a timing difference between this transaction and the corresponding payment. This category includes transactions in financial claims which stem from the early or late payment for transactions in goods or services, distributive transactions or secondary trade in financial assets. They consist of the counterpart transactions in case payment is due and not yet paid. Debts arising from income accruing over time and arrears are also classified under this category. This is clear from Figure 2. Regional public corporations' debt increased up to 2010 and decreased afterward, being the difference between the maximum and minimum over the whole period less than one percentage points of GDP. Meanwhile, the"*other accounts payable*" increased steeply up to the end of 2011 beginning of 2012, to decreased then sharply up to 2017. Nevertheless, its level is still higher than the pre-crisis one.

Figure 2: Other Autonomous Communities' (regional governments) liabilities not included in the standard definition of public debt.



Source: Banco de España
a. Moving average of the four consecutive quarters.

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 nominal GDP at t and let D_t be the nominal 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 GDP, def_t, and the deficit-debt adjustment, DDA_t combine to determine the evolution of the government debt-to-GDP-ratio,

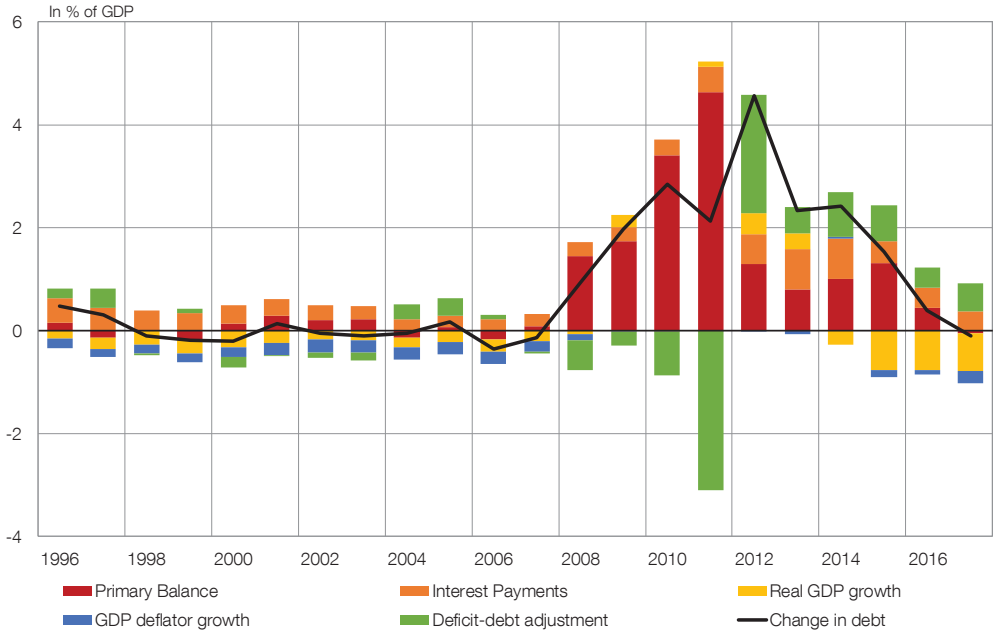
$$\frac{D_t}{Y_t} = \frac{1+i_t}{(1+\pi_t)\,(gdp_t)}\frac{D_{t-1}}{Y_{t-1}} + def_t + \frac{DDA_t}{Y_t} \tag{1}$$

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

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

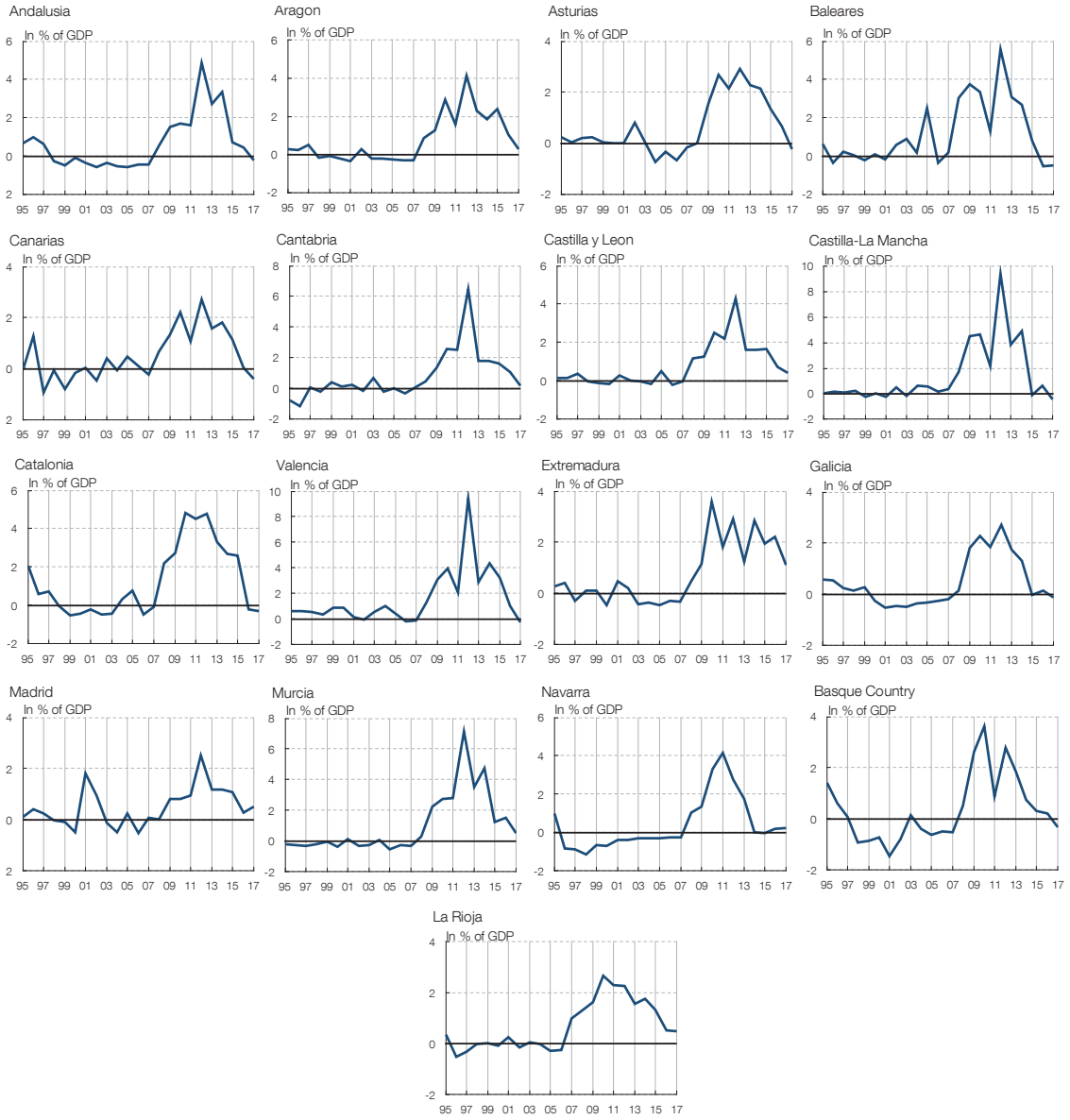
With this decomposition at hand it is possible to analyze the determinants of changes in the debt-to-GDP ratio. In Figure 3 we decompose these determinants for each year over the period 1996-2017 for the aggregate of CCAA (see 4 for the evolution of individual CCAA's debt). CCAAs reduced marginally their stock of debt in the period till 2007, with positive factors (real GDP growth and inflation) broadly compensating 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

Figure 3: The determinants of changes in Regional Governments' debt (changes as a percent of GDP) in the period 1995-2017.



equilibrium was broken and a significant contribution of public deficits pushed public debt upwards. Deficit-debt adjustments (stock-flow reconciliation) exerted a significant impact, in particular over the period 2010-2013.

Figure 4: Autonomous Communities' (regional governments) debt evolution in the period 1995-2017: changes as a percent of GDP.



3 Institutional Framework

3.1 The process of fiscal decentralization in Spain

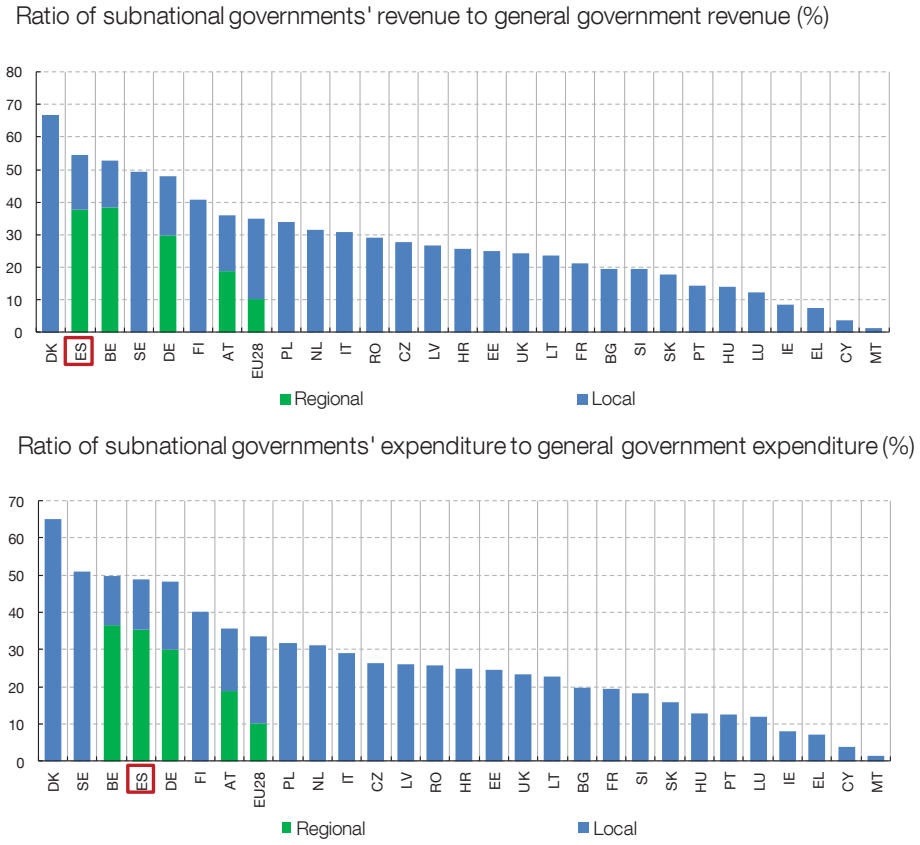
Spain is currently one of the most decentralized countries in the European Union. As mentioned before, in 2017, 50% of general government expenditure was carried out by subnational governments, with about 36% and 14% in the hands of regional governments and local governments, respectively (see Figure 5, second panel). This was the outcome 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, CCAAs were responsible for 92% of public expenditure on healthcare and 91% in education in 2016, and they managed 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. 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 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 5, first panel, on the extent of revenue decentralization). Again, the process was not completely homogeneous across regions. In particular, a distinction should be drawn between the ordinary-regime CCAAs (all except the Basque Country and Navarre), with partial fiscal autonomy, and the specific-status CCAAs (the Basque Country and Navarre), which have full fiscal autonomy with the exception of customs tariffs.

In essence, the Basque country provincial authorities (Álava, Guipúzcoa y Vizcaya) and Navarre's regional government 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, while at the same time the Central Government provides some services in these

Figure 5: International comparison of sub-national governments' revenues and expenditures (2017).



Source: EUROSTAT
a. Country nomenclature following ISO 3166/2.

regions (defense, diplomatic representation, etc.), the Basque Country and Navarre transfer some of their resources to the center, by means of the so-called "Cupo", in order to contribute to the financing of these services.

The financing arrangements for the ordinary-regime CCAAs have been developed over time on the basis of five-year agreements. In this regard, the so called Fiscal and Financial Policy Council (*Consejo de Política Fiscal y Financiera*, CPFF, hereafter) played a key role. The Council is composed of the nation-wide ministers of Economy and Finance and of the CCAA ministers of Finance, and acts as a consultative and discussion body with wide-ranging tasks relating to the co-ordination of the CCAAs financial activity. The agreements reached within the CPFF form the basis for developing the CCAAs financing arrangements. For more details see Appendix I.

3.2 The fiscal rules framework

From the outset of the introduction of the modern welfare state in Spain, subnational 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 were to 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.

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 Central 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 region 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. For more details on national fiscal rules of application to the conduction of CCAAs budgetary policies, see Appendix II.

4 Empirical analysis

In this section we move to the study of the determinants of the evolution of regional public debt, measured its change in terms of regional GDP. We do so by estimating empirical models in which we exploit the pool structure of our data: 17 regions over the period 1995-2017. The analysis we exploit the rich structure of institutional changes that happened over that long time span[6] to pose testable hypothesis on the impact of fiscal decentralization and fiscal rules. In addition, we include in the analysis political economy and market-disciple indicators.

[6] The time period for the empirical analysis is selected due to data availability constraints.

Table 1: Variables and expected impact on debt changes.

	Channels	Expected impact
Economic factors	Economic Cycle (t-1)	-
	Inflation deviation	-
	GDP per capita deviation	+/-
	House inflation deviation	-
Fiscal Rules	Fiscal Rules	-
	FR x Economic growth deviation	+
	FR x Budgetary Balance deviation	+/-
	FR x Debt/GDP (t-1) deviation	-
Institutional factors	Revenue autonomy	-
	Vertical Fiscal Imbalances	+
	Health expenditure	+/-
	Education expenditure	+/-
	Investment expenditure	+/-
Political factors	Electoral date distance	-
	Concordance	+/-
	% Left-wing MPs	+/-
	% Regionalist MPs	+/-
Market Discipline	Rating (t-1)	+
	Short/long term debt	+/-
	Securites/Loans debt	-
	Non-resident/resident debt	-
	Implicit interest	-
	Issuance interest	-
	Budget compliance (t-1)	-/+
Non-EDP debt	Fund for suppliers' payments	+
	Public companies debt	+
	Commercial debt	+

4.1 Data and hypotheses to be tested

In line with the extant literature, we include diverse channels that may affect the evolution of debt such as economic, political and institutional factors. Table 1 represents the main channels, and the variables used to test the main theoretical hypotheses. Apart from the common variables used in the literature, we also include a number of less conventional variables linked to the structure of public debt and market disciple measurement.

Economic variables used as controls As regards the economic factors, we follow closely the definitions and variables of Argimón and Hernández de Cos (2012). Economic theory has highlighted the economic cycle as a fundamental determinant of budget balances and, as a consequence, of changes in public debt. We use budget compliance over GDP to understand the effect of deficits on the debt accumulation.[7] In economic downturns budget deficits increase, either through the operation of automatic stabilizers or through the impact of counter-cyclical discretionary fiscal

[7] We measure the budget compliance as the difference between the actual budget in cash terms and the initial

policies designed to stabilize the economy, while the opposite occurs in expansions.[8] In addition to this channel, economic growth erodes the stock of public debt when measured as a percent of GDP. Indeed, even high debt ratios can be sustainable in a framework of healthy economic growth, while in a situation of low or negative growth even low debt ratios can turn out to be non-sustainable. We include in our analysis the lag of yearly real growth rate of each CCAA (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 the deviation from the regional average of GDP per capita as control variable as a measure of the degree of economic development,[9] but the relation with the debt evolution is not straight-forward. *Ceteris paribus*, a richer CCAA would have more margin of maneuver to cope with a debt surge, while at the same time because of the larger resources it may find it easier to obtain private financing at a lower cost, encouraging it to increase its debt more. In general, at a country level experiences very diverse experience, having some of the richest countries with enormous amounts of debt, such a Japan.

Another relevant economic factor behind debt accumulation may be the evolution of prices, as prescribed by the government budget constraint. Here the literature usually emphasizes the role of 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 non-financial 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 that is typically considered as key in the debt ratio determination although it may exercise opposing forces over the debt accumulation. On one hand, the indirect effect the inflation may have over the tax revenues (depending on the degree of wage indexation) and the direct through its deflating effect on the debt-to-GDP ratio may be compensated by the increase of expenditures that are indexed to price evolution. [10] The incidence

[8] Some authors point out, however, that the higher revenues in economic boom periods may generally entail pressure on the growth of public spending, in such a way that the relationship between the economic cycle and the budget balance may be altered or, at least, evidence asymmetrical behavior over the course of the cycle. See Morris and Schuknecht (2007), on related grounds.

[9] This deviation is measured as the GDPpc divided by the average GDPpc multiplied by 100.

[10] Apart from the impact on nominal GDP (the denominator of the debt ratio), higher inflation may increase the budget deficit through higher nominal interest rates and a higher real cost of purchases of goods and services or investment and, in general, of those items of public spending that can be indexed (e.g., pensions and wages). In the presence of non-indexed taxes, inflation may also generate higher revenues if, for instance, the tax rates are progressive. See Hernández de Cos et al. (2016).

of price changes (measured by the changes in 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.

Fiscal Rules Fiscal rules in Spain have increased in variety and strength over the past decades. Therefore, it is vital to clarify whether the rules have been effective or not. In order to do so, we consider the measure of the strength of fiscal rules developed by the European Commission, the so called Fiscal Rules Index, that is available for the whole period of study.[11] Public debt developments may be affected by the presence of different types of fiscal rules insofar as they supposedly pose a permanent constraint on fiscal policy. In addition to their role in enhancing fiscal discipline, such fiscal rules may further contribute to the reduction of uncertainty about future fiscal policy developments (see Plekhanov (2005), for a discussion of rules-based controls on regional governments' borrowing compared to other alternatives). One of the main hypothesis that we intend to contrast is whether fiscal rules have subdued the surge of regional debt, i.e. if the rules have had the expected dissuasive effect. Thus, if fiscal rules are effective, we would expect that an increase in strength of rules will entail a moderation of the upward evolution of the debt. We also include the interaction of this index with three variables: lagged economic growth, the lag of the deviation of budget balances with respect to the average for all CCAA, and the lag of the deviation of the debt-to-GDP ratio to the average.[12] The main idea is to test whether fiscal rules are more effective depending on the economic situation of the CCAA.

Thus, while there are no previous insights about the effectiveness of fiscal rules when economic growth is higher or smaller, it is plausible to think that if a CCAA has a stronger growth, the Central Government would be more stringer in the application of rules in this case, and thus rules would be more effective. Therefore, we would expect a negative impact for the interacted variable. A similar reasoning may be applied to the other interacted variables. If the budget balance ratio is worse for a CCAA in t-1, i.e. it has a higher deficit or a smaller surplus, fiscal rules would be effective if in the current year the debt does not grow as much. This would mean that the rules are effective for those CCAA with less sound finances. In the case of the debt interaction variable, when a CCAA has a higher debt the fiscal rules would be effective if the impact is negative, meaning that the higher the debt, the less would grow the debt on the following period. It may be noted that in

[11] See `https://ec.europa.eu/info/publications/fiscal-rules-database_en`. The new index is a normalized one, with an starting value of -0.45 to an ending value of 2.27. We have rescaled the variable so that there are no negative values that could hinder the estimation sign interpretation

[12] Budgetary Balances are obtained from the National Accounts (NA) data published by the Finance Ministry. Because data is only available at an annual basis from 2000 onwards, the beginning of the sample is completed using the public accounts' budgetary data (cash-based). This strategy will be used for all series. We use the lag of the Budget Balance over GDP to prevent any endogeneity possible in the analysis.

previous studies, such as Argimón and Hernández de Cos (2012) and Delgado-Téllez et al. (2016), fiscal rules do not seem to be very effective in deterring the deficit non-compliance. Therefore, we would not expect a high effectiveness of fiscal rules in controlling debt evolution.

Political and institutional factors The literature has proven the necessity of including political and institutional factors in the standard analysis (typically focused on the study of budget balances) 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 percentage 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 not form part explicitly or implicitly, of a national party) over the total number of seats of the regional parliament; the first variable aims at capturing potential pro-spending biases depending on the ideological orientation of the regional government, while the second could be instrumental for testing the existence of different attitudes towards public debt accumulation depending on the scope of the objective function of the regional government; in both cases there are no specific assumptions; (ii) a dummy for the political concordance of the center and the periphery (region), that measures the political alignment between the government of a given region and the central government; (iii) electoral cycle: instead of the standard election dummy that display a value of one in an election year and a zero otherwise, we use a transformation of the original variable to measure proximity to elections, computed as a continuous variable as the distance to elections (see Franzese Jr (2000), Franzese Jr (2002), Mink and de Haan (2005)).[13] This variable takes the value of one in the electoral year, and in the next period it would take 1/number of years left until next election, and so on[14]. There are two possible expectations about the impact of the electoral cycle. First, the year after elections, governments may start new investment projects, with the intention of finishing them before the next electoral date. Thus, debt would increase the most in the first years of the electoral cycle. But, on the other hand, expenditure tends to increase the near the electoral date is. Thus it would imply a surge of debt to finance the extra-expenditure.

Fiscal federalism-related control variables The territorial organization of a country has also been signaled 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.

[13] On electoral cycles and budgetary outcomes see, for example, Von Hagen (2010) or Mink and de Haan (2005).

[14] Thus, if there are 4 years between elections, the variable would take 0.25, 0.5, 0.75 and 1

In particular, the literature has devoted some effort to the existence of a so-called *soft budget constraint problem* whereby a regional 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-Navarro (2012); Delgado-Téllez et al. (2016)).

Following the literature we include in our analysis some alternative measures of fiscal co-responsibility, measured by: (i) Tax autonomy, the ratio of taxes over which the regions do have normative power, over their total non-financial revenues in NA terms;[15] (ii) The ratios of expenditure on education and health over regional GDP that represent the evolution of expenditure decentralization over the last 22 years.[16] Also the ratio of investment over total expenditure is used as a proxy of voluntary spending. (iii) Vertical Fiscal imbalances which is proxied following Eyraud and Lusinyan (2013) by the difference of total revenues and total expenditure, both net of transfers with the other Sub-sectors of Public Administration. The literature argues that there should be correspondence between the extent of a given region's spending responsibilities and its fiscal autonomy (fiscal co-responsibility), the latter being understood as the ability of the regions to generate income to finance that spending. Otherwise, vertical fiscal imbalances could emerge in the regions that would be usually filled by federal transfers. These transfers distort the relationship that should exist between the level of taxes and the benefits obtained by citizens, creating a common pool problem. As regards the impact of own revenue decentralization on fiscal balances, Governatori et al. (2012) discuss that theory does not provide clear predictions. On the one hand, a high value of a tax autonomy means that regional governments have more own resources to cover a given amount of expenditures, leading to better fiscal balances. On the other hand, one has to acknowledge that this type of variable conveys no information on the relative size of regional own revenues compared to their expenditures, which is probably a better way to capture regional governments incentives to behave in a financially responsible way. In addition, the impact of revenue decentralization may also differ depending on the share of transfers/taxes in CCAAs' revenues.

Market discipline, structure of debt Beyond 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 CCAA need external financing (national or international). Thus, either investors buy the debt of a CCAA

[15] The period 1995-1999 is obtained as a linear extrapolation with the execution data, as the NA accounts only cover the period 2000-2017. All NA data comes from the General Intervention Board of the State Administration website

[16] Yearly disaggregated data is available separately the COFOG publication available at the Finance Ministry, being 2016 the last year available.

or banks grant loans to the regions. One may conjecture that market pressure might be a key determinant on the change in public debt. The case of Spain is not one in which there is full reliance on capital markets to contain sub-national borrowing, as in the cases of Canada, Switzerland, and the United States. The latter are cases in which the Central Government does not set any limits on regional government's borrowing, so that these levels of government are free to decide the form of borrowing, and may decide by themselves to adopt a fiscal rule in an attempt to enhance their credit standing in the market.[17] Before 2012, in the Spanish framework regional governments were constrained by upper-level rules, as described above, while at the same time were subject to strict market scrutiny. But, the introduction of the FLA implied a change in the legal framework, imposing to those CCAA that decided to enter the financing program a reinforced conditionality due to the factual loss of the market discipline, as CCAA stopped depending on investors to finance their needs.

To approach the influence of market discipline, we explore the following control variables: (i) the implicit interest rate, as a measure of the market pressure [18]; (ii) the aggregate average issuance cost rate is used, but taking into account a caveat, and that is that some CCAA do not generally access to markets for getting financing for their debt. But it is a fair proxy for the market distress CCAA may have to confront when they need market financing; (iii) a number of variables linked to the composition of debt, as follows. First, the ratings in last period may impact the debt evolution, because the lower the ratings the harder should be to issue new debt. Second, the ratio of short-to-long run debt, being short term debt the one with a maturity less or equal to 12 months. Short-term debt could be associated with the reaction to sudden changes in market sentiment. Thus, it is not always a negative indicator, because a Government may expect a reduction of interest in the near future, and therefore it would prefer short term debt until costs decrease.[19] 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). Third, 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. And finally, the ratio of debt held by non-resident vs. that held by residents, might be

[17] In Switzerland, after an episode of soaring debt over the 90's, the Government introduced a debt brake rule, which is a highly strict rule, according to which the deficit of one year must be compensated in the next years, as explained by Bodmer(2006).

[18] Measured as the ratio of interest payments over the stock of debt

[19] Some papers have found short-term debt to be an indicator of vulnerability to international financial crises: Borensztein et al. (2004), Rodrik and Velasco (1999), Bussière and Mulder (1999).

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.

Additional control variables: pressure from units accounted for outside the boundaries of the General Government sector In particular, we consider the two non-EDP debt measures described in Section 2: the debt of public corporations owned by a given region, and the "other accounts payable". Indeed, the related literature would suggest that: (i) under tight budgetary rules a government may try to circumvent the constraints by cutting transfers to 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-standard debt may end up generating pressure on the responsible government to bail-out the external indebtedness vehicle.[20] (iii) The commercial debt may be used as a buffer in time of crisis, encouraging governments to delay payments to their suppliers, as it actually occurred in Spain up to 2011. We also include an informed dummy of the FFPP payments in percentage of GDP. This includes all the payments of the suppliers of the CCAA made by the Central Government funds.

4.2 The empirical model

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:

$$\Delta \frac{D_{it}}{Y_{it}} = \alpha_i + \sum_{j=1}^{N} \beta_j \ \Omega_{jit} + \epsilon_{it} \tag{3}$$

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 (3) aims at capturing all the unobservable CCAA effects that are time-unvarying, 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 model (3) in first differences. Moreover, given the possible simultaneity of some of the control variables and the dependent variable, the estimation is carried

[20] On a discussion about the role of public sector enterprises in Spain see Fernández Llera and García Valiñas (2013).

out by the Generalized Method of Moments (Arellano and Bond (1991)), using as instruments lagged regressors.

For robustness, we also estimate a fix effect model that is not estimated in inter-temporal differences. Thus we don't include the lag of the dependent variable in this estimation. It includes a fix effect for CCAA. Main results do no differ between both kinds of models. We have chosen the fix effect instead of the random effect model following the Hausman test criteria results, otherwise we would have estimated a random effect model.

4.3 Results

The results are shown in tables 2, 3, 4 and 5. The two first result tables include two different samples, the whole sample (1995-2017) and a sample without the recent crisis period (1995-2007) for the sake of robustness, as well as the Fix Effect models estimation.

In Table 2 we explore the role of the main economic variables and of the fiscal rules. In Table 3 we focus on studying the institutional and political factors. The effect of the different measures related with the market discipline is shown in Table 4, while in Table 5 we consider the impact of the debt (non-EDP) of public corporations and other accounts payable on the CCAA's debt.

Beginning with the baseline model shown in Table 2, there are six models included in this table. The first two columns show the GMM model whole sample, the second two the GMM model with a restricted sample from 1995 to 2007, and finally the last two columns show the fix effect model for the whole sample. The dependent variable is the change in the ratio of debt over GDP. The first conclusion we may draw from the results is that CCAA debt does not seem to follow an explosive path as both the lagged variable and the lag level of debt show a negative impact on the change of debt that in the case of the level of debt is highly significant. This means that whenever the level of debt or the change in debt increases in the previous year, the change in debt will be subdued in the current one. This is probably due to a combination of factors, first, if CCAA debt increases, the Central Government would control more thoroughly the finances of the CCAA, and second, it would be harder for the CCAA to finance this surge of debt at a reasonable cost, encouraging a stronger fiscal effort to reduce the deficit.

The second main result from the estimations is that among the economic evolution determinants, only economic growth seems to matter in the debt evolution.[21] Meanwhile, GDP per capita deviation has a negative but weak impact, signaling that those CCAA that have a higher GDP per capita tend to have less accumulation of debt. Nor the Price Index neither the house price inflation seem to have any significant impact on debt evolution.

[21] We use the lag of the GDP growth to avoid possible endogeneity problems.

Other two relevant variables included in this table are the budgetary compliance and the Fund for Suppliers' Payments vaiable. The former, has a puzzling outcome because it is not significant in the GMM models, and only it is significant in the fix effect model. If the sign of the coefficient is negative, as it is in the fixed effects and the long sample GMM, it means that fiscal non-compliance in the past does not restrict regional governments in the present. The latter has a significant and direct effect on debt evolution as expected, because the funds received since 2012 rose directly the amount of standard debt. Thus, we use the contemporaneous data in order to take into account this specific shock of the transformation of the commercial debt in EDP debt.

Still in Table 2, the last four variables are the ones related with the fiscal rules. First, fiscal rules strength index (FRI) in the previous period does not have a significant impact on the debt variation. This is a very striking result, as it is expected that fiscal rules would entail a break on the debt evolution. But, as shown in other previous studies such as Argimón and Hernández de Cos (2012) or Delgado-Téllez et al. (2016), current fiscal rules are not very effective in coping with fiscal non-compliance (deficit control). In Spain, most of the Central Government control until recently was concentrated on deficit targets compliance. There were no specific debt targets until 2012. Notwithstanding, there are some significant results when interacting the fiscal rules index with GDP growth, the budget balance and the debt-to-GDP ratio in deviations from the CCAA average. As it appears, fiscal rules would tend to be more effective when economic growth is lower and when debt levels are higher and when budgetary balance are worse, but in this case, this result is not significant in the main GMM model. Thus, the two last results are as expected, but it is slightly puzzling that fiscal rules are more effective when economic growth is more dimmed. This could be rationalized if one considers that in bad economic times public finances can be at stress, and tight rules might be necessary to cope with potential sustainability problems.

In Table 3 we focus on the analysis of two main channels, the political and the institutional factors. Political factors seem to have a weak effect. Curiously, the only political variable that has some effect is the weight of regional party parliamentarians but neither in the short GMM nor in the FE has any significance. More interesting is the results of the institutional factors' impact. The revenue autonomy plays a key role in debt evolution, as expected. When CCAA have a larger share of their revenues coming from taxes and other sources of revenue that are directly controlled by the regional government, debt seems to be more stable. This is because first, they can better anticipate the amounts of revenues they will have in an specific year, in contrast to a situation of heightened dependence on Central Government transfers, and second, regional governments would have more margin of maneuver because they could raise tax rates instead of relying on new debt. In the same sense, Vertical Fiscal Imbalances have a direct impact on debt increases, as expected. Finally, only the health expenditure variable displays a direct and significant impact on the dependent variables.

This may have to do with the rigidity of health expenditure, with enormous fixed costs and the social resistance to decrease this specific expenditure.

Table 4 includes the analysis of the role of market-discipline related variables. The following additional results in this table can be underlined: (i) the two proxies for the cost of financing, the implicit interest rate and the issuance rate behave similarly. An increase in implicit interest rate and the issuance interest rate discourages the increases in debt. Thus the increase in costs would have a deterrent effect on CCAA to augment the debt.[22] (ii) market discipline due to ratings evolution does not seem to work, as the results are not significant in neither of the samples and the sign even changes. (iii) Neither the ratio of short to long term debt nor the ratio of loans by non-residents vs. by residents has a significant effect. In the first case it matches with our hypothesis of ambiguity of the short-long ratio. In the second, it may have to do with a problem related with the data, because it only includes the loans held by foreigner banks and local ones. But there is no data available about securities, and the holding structure of securities may be different from that of loans. (iv) Finally, The ratio of securities over loans presents a negative significant sign. This ratio would imply that regional governments with better access to less "captive" investors (those buying securities) tend to be more disciplined from a fiscal point of view. Thus it would seem that some degree of market discipline is in place.

Finally, in Table 5 we show some estimated models to assess the linkages between regional governments' debt and their public corporations' (EEPP) debt and commercial debt[23]. There is no significant effect of the amount of public companies debt. Meanwhile, the commercial debt has a direct and significant impact on debt evolution, so that the dynamic evolution of commercial debt has some predictive power over regional, EDP debt. Even though we do not show it in the table, the results for this variable are alike for the short period 1995-2007.

5 Conclusions

In this paper, we study the evolution and the determinants of regional's debt evolution (measured by the change in public debt). The main results of the analysis are as follows. First, political factors played a limited role. Second, fiscal rules also played a limited role, being effective only in bad economic times periods and in situations of high debt. Third, "the fiscal decentralization design", i.e. the distribution of revenues and expenditure competencies, is extremely relevant in

[22] In the GMM model, the contemporaneous lag of implicit interest rate is included in the estimation so that endogeneity problem may be solved. On the contrary, we considered that the issuance interest rate does no have the problem of endogeneity as it is an average variable of all CCAAs and the data is common for all of them. Therefore the increase in debt in one CCAA should not have a very significant effect on the average issuance rate

[23] This variable, though, is only available for the aggregate of CCAA.

keeping debt subdued. Fourth, market-disciple plays a role in regional public finances evolution. And fifth, commercial debt seems to have been used as a substitute for regular debt.

Some policy conclusions are worth mentioning. First, the lack of effectiveness of fiscal rules might be read in relation to the economic literature that emphasizes that a set of features are crucial to achieve a certain incidence of any fiscal rule on the behavior of governments. In this regard, issues such as transparency, the possibility and credibility of penalties for noncompliance, and the existence of independent institutions responsible for monitoring compliance appear as determinants of the success of the fiscal rules. Second, as argued by Oates (2008), fiscal discipline may be enhanced when sub-national governments' spending competences are funded to a larger extent with own revenues. Indeed, in previous studies for the Spanish case, such as Delgado-Téllez et al. (2016), vertical fiscal imbalances play a key role in fiscal non-compliance. Third, market discipline may be key in influencing regional governments fiscal prudence. Fourth, be aware of possible law loopholes. The EDP debt definition does not include as part of the standard definition of debt some potential risks, such as the commercial debt or the public companies debt. Nevertheless, these debts may become standard debt under extraordinary circumstances. Thus, higher level authorities should take into account possible shortcuts governments may use to fulfill targets that do not entail a healthier financial situation. Therefore, commercial debt and public companies debt should be considered as risk for the debt sustainability.

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

Dependent variable: Δ EDP debt	GMM (1995-2017)		GMM (1995-2007)		FE (1995-2017)	
Lagged dependent variable	-0.12*	-0.13*	-0.13	-0.23*	-	-
	(0.06)	(0.07)	(0.16)	(0.13)	-	-
Economic cycle (t-1)	-0.16***	-0.21***	-0.05***	-0.09***	-0.29***	-0.34***
	(0.02)	(0.03)	(0.02)	(0.04)	(0.02)	(0.02)
Budgetary compliance (t-1)	-0.08	-0.03	0.04	0.10	-0.30***	-0.16**
	(0.05)	(0.06)	(0.14)	(0.13)	(0.06)	(0.07)
EDP debt (t-1)	-0.15***	-0.13***	-0.65***	-0.55***	-0.04***	-0.03***
	(0.01)	(0.02)	(0.17)	(0.12)	(0.01)	(0.01)
FFPP	0.12***	0.11***	-	-	0.12***	0.11***
	(0.01)	(0.01)	-	-	(0.01)	(0.01)
Inflation deviation	0.06	-0.04	-0.16	-0.21*	-0.16	-0.25
	(0.16)	(0.16)	(0.13)	(0.12)	(0.18)	(0.18)
GDP per capita deviation	-0.07*	-0.07*	-0.08***	-0.09***	-0.00	0.00
	(0.04)	(0.04)	(0.03)	(0.02)	(0.01)	(0.01)
House Price deviation	-0.02	-0.01	0.01	0.01	-0.00	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Fiscal Rules x Balance deviation (t-1)	-	-0.03	-	-0.10**	-	-0.10***
	-	(0.03)	-	(0.05)	-	(0.03)
Fiscal Rules x growth deviation (t-1)	-	0.09***	-	0.05	-	0.12***
	-	(0.02)	-	(0.04)	-	(0.02)
Fiscal Rules x debt deviation (t-1)	-	-0.03***	-	-0.05	-	-0.00
	-	(0.01)	-	(0.03)	-	(0.00)
Fiscal Rules Index (t-1)	-0.07	-	-0.04	-	0.06	-
	(0.10)	-	(0.07)	-	(0.07)	-
Number of observations	357	357	187	187	374	374
R-squared	-	-	-	-	0.72	0.75
Hansen	0.50	0.43	0.95	0.75	-	-
m1	0.02	0.09	0.63	0.48	-	-
m2	0.36	0.22	1.00	0.71	-	-

***, **, *: significance at the 1%, 5% and 10% levels. Instrument set in all models includes the second and third lag of the endogenous variable. Hansen is the p-value of the test of the over-identifying restrictions (see Hansen, 1982), which is asymptotically distributed chi-squared under the null hypothesis that these moment conditions are valid. A p-value equal or higher than 0.05 indicates that the instrument set is valid, which is confirmed under all models m1 and m2 are the p-values of serial correlation tests of order 1 and 2, respectively.

Table 3: The determinants of regional governments' debt changes (changes as a percent of GDP): Political and Fiscal decentralisation variables

Dependent variable: Δ EDP debt	GMM (1995-2017)		GMM (1995-2007)		FE (1995-2017)	
Lagged dependent variable	-0.12*	-0.13*	-0.15	-0.25	-	-
	(0.06)	(0.07)	(0.17)	(0.17)	-	-
Economic cycle	-0.16***	-0.14***	-0.05***	-0.05**	-0.27***	-0.22***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Budgetary compliance (t-1)	-0.08	-0.06	0.05	0.00	-0.40***	-0.21***
	(0.06)	(0.06)	(0.15)	(0.16)	(0.06)	(0.06)
EDP debt (t-1)	-0.15***	-0.14***	-0.59***	-0.50***	-0.02**	-0.04***
	(0.02)	(0.01)	(0.14)	(0.15)	(0.01)	(0.01)
FFPP	0.12***	0.12***	-	-	0.11***	0.13***
	(0.01)	(0.01)	-	-	(0.01)	(0.01)
Fiscal corresponsibility	-	-0.04**	-	-0.02*	-	0.00
	-	(0.01)	-	(0.01)	-	(0.01)
Vertical Fiscal Imbalances	-	0.09***	-	0.07**	-	0.05
	-	(0.03)	-	(0.03)	-	(0.03)
Education expenditure over GDP	-	-0.16	-	0.01	-	0.30*
	-	(0.21)	-	(0.13)	-	(0.16)
Health expenditure over GDP	-	0.48***	-	0.25	-	0.52***
	-	(0.11)	-	(0.24)	-	(0.10)
Investment expenditure over GDP	-	-0.14	-	0.10	-	0.10
	-	(0.19)	-	(0.20)	-	(0.11)
Concordance centre-periphery	0.17	-	-0.05	-	0.17*	-
	(0.19)	-	(0.10)	-	(0.10)	-
% Left-wing parties MPs	-0.01	-	-0.00	-	0.00	-
	(0.02)	-	(0.02)	-	(0.01)	-
Pro-autonomy	0.03**	-	-0.00	-	0.00	-
	(0.01)	-	(0.02)	-	(0.00)	-
Distance to elections	-0.11	-	0.04	-	0.04	-
	(0.07)	-	(0.08)	-	(0.16)	-
Number of observations	343	324	187	154	360	341
R-Squared	-	-	-	-	0.709	0.78
Hansen	0.565	0.496	0.96	0.98	-	-
m1	0.0561	0.0162	0.64	0.86	-	-
m2	0.340	0.127	0.90	0.32	-	-

***, **, *: significance at the 1%, 5% and 10% levels. Instrument set in all models includes the second and third lag of the endogenous variable. Hansen is the p-value of the test of the over-identifying restrictions (see Hansen, 1982), which is asymptotically distributed chi-squared under the null hypothesis that these moment conditions are valid. A p-value equal or higher than 0.05 indicates that the instrument set is valid, which is confirmed under all models m1 and m2 are the p-values of serial correlation tests of order 1 and 2, respectively.

Table 4: The determinants of regional governments' debt changes (changes as a percent of GDP): Market discipline.

Dependent variable: Δ EDP debt	GMM (1995-2017)				FE (1995-2017)	
Lagged dependent variable	0.06	0.05	-0.06	-0.06	-	-
	(0.06)	(0.06)	(0.06)	(0.06)	-	-
Economic cycle	-0.15***	-0.13***	-0.16***	-0.15***	-0.29***	-0.30***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Budgetary compliance (t-1)	0.02	-0.03	-0.03	-0.06	-0.24***	-0.26***
	(0.09)	(0.08)	(0.07)	(0.07)	(0.06)	(0.06)
EDP debt (t-1)	-0.25***	-0.20***	-0.18***	-0.18***	-0.04***	-0.04***
	(0.04)	(0.02)	(0.03)	(0.02)	(0.01)	(0.01)
FFPP	0.12***	0.12***	0.12***	0.12***	0.12***	0.13***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rating (t-1)	-0.12	-	0.00	-	-	-
	(0.08)	-	(0.06)	-	-	-
Ratio short/long term debt	0.00	0.01	0.00	0.01	-0.01*	-0.01**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Ratio Securities / Loans	-0.02**	-0.02**	-0.03***	-0.02***	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Ratio debt non-residents / residents	-0.00	-0.00	-0.00	-0.00	0.02***	0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
Implicit interest rate	-0.39***	-0.32***	-	-	-0.10***	-
	(0.10)	(0.06)	-	-	(0.02)	-
Issuance interest rate	-	-	-0.04	-0.05**	-	-0.07**
	-	-	(0.02)	(0.03)	-	(0.03)
Number of observations	293	357	293	357	374	374
R-squared	-	-	-	-	0.75	0.74
Hansen	0.28	0.17	0.43	0.43	-	-
m1	0.03	0.01	0.01	0.02	-	-
m2	0.20	0.29	0.94	0.62	-	-

***, **, *: significance at the 1%, 5% and 10% levels. Instrument set in all models includes the second and third lag of the endogenous variable. Hansen is the p-value of the test of the over-identifying restrictions (see Hansen, 1982), which is asymptotically distributed chi-squared under the null hypothesis that these moment conditions are valid. A p-value equal or higher than 0.05 indicates that the instrument set is valid, which is confirmed under all models m1 and m2 are the p-values of serial correlation tests of order 1 and 2, respectively.

Table 5: The determinants of regional governments' debt changes (changes as a percent of GDP): Non EDP components (public corporations owned by regional governments and other accounts payable).

Dependent variable: Δ EDP debt	GMM (1995-2017)			FE (1995-2017)		
Lagged dependent variable	-0.28***	-0.28***	0.03	-	-	-
	(0.06)	(0.07)	(0.08)	-	-	-
Economic cycle	-0.15***	-0.16***	-0.17***	-0.19***	-0.18***	-0.39***
	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)
EDP debt (t-1)	-0.08***	-0.07***	-0.15***	0.02***	0.02**	0.04***
	(0.03)	(0.02)	(0.03)	(0.01)	(0.01)	(0.01)
EEPP debt (t-1)	-0.08	-	-0.00	0.14	-	0.60***
	(0.56)	-	(0.68)	(0.12)	-	(0.13)
Δ EEPP debt	-	-0.24	-	-	-0.36*	-
	-	(0.25)	-	-	(0.20)	-
Commercial debt (t-1)	1.65***	1.63***	-	1.37***	1.46***	-
	(0.29)	(0.28)	-	(0.11)	(0.11)	-
Δ Commercial debt (t-1)	-	-	1.34***	-	-	1.18***
	-	-	(0.27)	-	-	(0.16)
Number of observations	357	340	340	374	357	357
R-squared	-	-	-	0.68	0.69	0.62
Hansen	0.10	0.12	0.03	-	-	-
m1	0.01	0.00	0.00	-	-	-
m2	0.59	0.59	0.36	-	-	-

***, **, *: significance at the 1%, 5% and 10% levels. Instrument set in all models includes the second and third lag of the endogenous variable. Hansen is the p-value of the test of the over-identifying restrictions (see Hansen, 1982), which is asymptotically distributed chi-squared under the null hypothesis that these moment conditions are valid. A p-value equal or higher than 0.05 indicates that the instrument set is valid, which is confirmed under all models m1 and m2 are the p-values of serial correlation tests of order 1 and 2, respectively.

I A historical view of the process of fiscal decentralization in Spain

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 – participation of CCAAs in Central Government revenues and the Inter-Territorial Compensation Fund (FCI) – supplemented with various taxes – taxes assigned by the Central Government, own taxes and surcharges on Central Government taxes. In addition, the CCAAs share in Central Government revenue was defined, in terms of the actual cost of the responsibilities assumed, and in February 1982 the method of calculating this actual cost was approved in the CPFF. Until 1984, the calculation was carried out by means of negotiations on committees in which the State and CCAAs were represented on an equal footing. Between 1984 and 1987, the percentage shares were fixed annually by law for the CCAAs as a whole.

In 1987 a new five year agreement on regional financing entered into force that radically changed the method for calculating the share in State revenue. It was now defined as a transfer of resources from the State to finance that part of the general responsibilities assumed, excluding health care and social services responsibilities, not financed through assigned taxes. The distribution system and the rules governing its future evolution were established. This system represented a significant advance in that it was more objective and automatic, and the above-mentioned negotiations between the State and the CCAAs and the ad hoc calculations disappeared. As regards tax revenue, the assignment of taxes was extended to registration duties (*Impuesto sobre Actos Jurídicos Documentados*) and the Canary Islands' Economic-Fiscal Regime (*Régimen Económico Fiscal*) was reformed with the creation of the Canary Islands General Indirect Tax (*Impuesto General Indirecto Canario*). Finally, the criteria for distributing the FCI were modified in 1990 (Law 29/1990 of 16 December 1990), and this fund was adapted to the new EU legislation on structural funds. Expenditure on health care and social responsibilities were financed independently with specific transfers from the Social security Treasury Department.[24]

[24]The criterion applied when setting the percentage of the State health budget (INSALUD) to be transferred is that of resident covered population in the region in question, thus obtaining equality of per capita financing among the CCAAs. Nonetheless, certain health services are usually maintained in State centers, and therefore the cost of such centers is deducted from the INSALUD budget before calculating the fraction to be transferred. The same is the case with the Health Research Fund, own revenue and the health programs of the Ministry of Health and Consumption.

On 20 January 1992 the regional financing arrangements for the five-year period 1992-1996 were agreed in the CPFF, with the creation of the specific tranche of the share in State revenue, corresponding to the share of 15% of "territorial" personal income tax payments (those arising within each region). In any case, the financing of the CCAAs under the new agreement continued to be based essentially on the share in State revenue. The share in State revenues was calculated as follows. First, the total amount of shared revenues for the initial year was obtained starting from a total volume of resources for the CCAAs as a whole, which was determined mainly by the resources transferred in 1990 under the previous system. This overall volume of financing was divided into two blocks, one for the article 143 CCAAs and the other for the article 151 CCAAs, with the aim of treating regions with the same level of assumable powers equally. The volume included in each of the two blocks was distributed among the CCAAs in accordance with certain weighted socio-economic variables (population, insularity, area, administrative units, relative wealth, fiscal effort and geographical dispersion), following a number of adjustments (among other adjustments, a redistribution of 2.7% of the outcome was made on the basis of the relative poverty of the CCAAs). The amount for each CCAA resulting from this distribution was reduced by an estimate of the revenue from assigned taxes and from the charges for services for which responsibility had been transferred. The resulting amount represented the initial financing obtained by each CCAA from the share in State revenue. Finally, to determine the share in State revenue in the subsequent years of the five-year period, the share in State revenue grew at the same rates as the so-called "structurally adjusted tax revenue" (ITAE), namely State revenue from non-assignable direct and indirect taxes, excluding resources from the EU, plus social security and unemployment insurance contributions, subject to a ceiling determined by the growth rate of GDP and a floor determined by the growth of Equivalent State Expenditure (the latter prevailing over the ceiling). These percentages were only revised in the event of transfers of new services or the assignment of new taxes. Moreover, given the significant financial problems with the arrangements in place to cover health expenditure by the CCAAs, which basically implied that the CCAAs had to supplement the financing from the Social security Treasury Department with contributions of resources from their own budgets, the CPFF agreed in September 1994 on a new financing model for health assistance for the period 1994-97. This took real spending on health for the year 1994 as its basis and determined the growth of this spending in accordance with the nominal GDP for each year. On 23 September 1996, the Fiscal and Financial Policy Council (CPFF) approved the content of the regional financing arrangements for the period 1997-2000. The core of the reform was as follows:(i) initially, 15% of personal income tax receipts were assigned, but once responsibilities on education had been fully transferred, at the end of the five-year period, 30% of this tax was assigned to the CCAAs; (ii)

regulatory powers were granted in respect of the taxes assigned[25] and of the tranche corresponding to the shared personal income tax (regulatory responsibilities for the tax rate schedule, including the tax-free allowance and deductions[26]). 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 CCAA 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 CCAA tranche[27]. Note that this system of guarantees entailed a significant change with respect to the system in force prior to the reform, since under the previous financing arrangements, the GDP growth rate was the ceiling not the floor for the growth in the general tranche of the share in State revenue. Furthermore, in 1997, a new agreement for the financing of health services for the period 1998-2001 was also reached. With this agreement, the resources earmarked for health financing grew over the period in accordance with the growth rate of nominal GDP, as in the previous agreement. However, health financing was drawn from two funds: a general fund, equivalent to that existing previously, and another, specific fund, aimed at ensuring minimum financing to the CCAAs whose population shrinks, at covering needs relating to medical training and research, and at compensating CCAAs for the assistance provided to non-residents. The share-out to the CCAAs that have assumed these responsibilities was made, in the case of the general fund, following the covered-population criterion, with updated data. And in the case of the specific fund, it was conducted ensuring that no CCAA whose population has shrunk should see the volume of its health financing fall by more than 0.25%, and financing extraordinary expenses relating to training and research and those arising from assistance provided to non-residents.

[25] Before the 1997 reform, the taxes assigned were the wealth tax, the inheritance and gift tax, the tax on property transfers and documented legal acts and the tax on gaming. The CCAAs were empowered to administer and levy these taxes, but did not have regulatory powers. The 1997 reform introduced restricted regulatory powers over this assigned taxes. In particular, regulatory responsibilities were established: over the tax-free allowance and the tax rate schedule of the wealth tax (which must be progressive and have the same number of brackets as that of the State, with the amount of the first bracket of the final tax base and the marginal rate also being the same); over the rate structure (necessarily progressive) and, in the case of mortis causa acquisition, over reductions from the tax base for the inheritance and gift tax. In the case of the tax on property transfers and documented legal acts, the CCAAs may regulate the rate charged on property transactions, and on the establishment and assignment of real rights relating thereto, as well as the rate payable on notarial documents. Lastly, in relation to gaming tax, their powers extend to tax exemptions, applicable rates, fixed charges, allowances and accrual, and to management, settlement, tax-collection and inspection matters.

[26] In particular, the CCAAs had the power to regulate the regional tax rate schedule, subject to the constraint that the amount payable as a result of applying the individual or joint regional tax rate schedule to the ordinary final tax base may be neither 20% higher nor 20% lower than the amount payable when the State tax rate schedule is applied to the same tax base. Further, the CCAAs may create their own deductions for individuals and households, non-corporate investment and the application of income, provided that they should not directly or indirectly entail a reduction in the actual tax levied on any category of income.

[27] The minimum increase in personal income tax and the share in State revenue guaranteed to each was that of the growth rate of nominal GDP. In addition, a third guarantee ensured the capacity to cover public services assumed (non university education): in the last year of the five-year period, in the event of education services having been transferred, the financing per inhabitant of each region could not be less than 90% of average per capita financing.

A new agreement came into force in 2002 that widened the CCAAs' tax resources. The assigned percentage of personal income tax was raised to 33% and, in addition, 35% of net VAT revenues, 40% of excise duties and 100% 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.[28] Lastly, Central Government guarantees as to the minimum growth of the financial resources received by each CCAA were eliminated.[29]

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; to 58% in the case of excise duties on manufactured production of alcohol, tobacco and hydrocarbons)[30] and CCAAs received additional powers to modify their rates in some of these taxes.[31] 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 CCAA receive 25% of its tax revenue, plus its participation in the so-called Guarantee Fund plus its share on the so-called Global Sufficiency Fund. In addition, two additional funds were created, of lower quantitative importance, the Competitiveness fund and the Cooperation fund to promote regional income convergence. The Guarantee Fund is formed by the contribution of 75% of the tax revenues assigned to CCAAs plus some additional funds 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. In turn, the Global Sufficiency Fund, for the base year, is calculated for each CCAA 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.

[28] 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.

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

[30] 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.

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

II The fiscal rules framework affecting regional governments

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 CCAA 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 adoption by Spain of the Maastricht Treaty did not have any specific bearing on sub-national governments' fiscal rules. The subsequent milestone in the definition of the framework of national fiscal rules took place in 2002. The budgetary stability law that came into force in 2002 set a single limit for all CCAAs, though not in terms of debt but only in terms of the budget balance. According to that law, CCAAs and local governments had to meet the principle of budgetary stability, defined as the obligation 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.[32] The law also provided that, in authorizing the arrangement of credit operations abroad and 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 economy's cyclical position. Specifically, it allowed the CCAAs to run a deficit of 0.75 percent of GDP if economic growth was below a certain threshold[33], to which a further 0.25 percent of GDP might be added to finance increases in productive investment, including that earmarked for research, development and innovation[34]. It likewise established that a significant portion (in

[32] 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.

[33] These growth thresholds that determine the possibility of attaining a budget in deficit, in balance or in surplus were set, for a period of three years, by the Council of Ministers, on the proposal of the Minister of Economy and Finance and further to a report by the Council of Fiscal and Financial Policy of the Regional Governments and the National Local Government Board. In particular, during this period of economic growth of less than 2% was projected, the general government deficit could not exceed 1% of GDP (breaking down into a ceiling of 0.2% of GDP for central government, 0.75% of GDP for the regional governments as a whole and 0.05% of GDP for large municipalities). If economic growth was between 2% and 3%, general government should show a budget in balance and, if growth exceeds 3%, a surplus should be run.

[34] In terms of the target-setting procedure, a report was first drawn up assessing the cyclical phase for the following three years. On this basis, the BSL obliged the government to set, first, the budgetary stability target for the three following years in the first half of each year, both for the general government sector as a whole and for each of the agents comprising it; and, second, the State spending limit. Both should be approved by Parliament. Once approved, the individual fiscal target for each regional government was set by means of bilateral negotiations between the Ministry of Economy and Finance and the representatives of each regional government on the Fiscal and Financial Policy Council.

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 had a clause saying 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). As to the monitoring procedure, the Ministry of Economy and Finance was required to submit a report to the government before 1 October each year on the degree of compliance with the targets, and on real cyclical developments during the year and deviations from the initial forecast. Should a risk of non-compliance be discerned, a warning may be made to the government agent responsible. If such non-compliance involved a higher-than-targeted deficit, the level of government in question was also required to draw up an economic and financial rebalancing plan over a maximum term of three years. 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, 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 Central government authorization[35].

Finally, a constitutional reform was approved in September 2011 that enshrined 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 [36] 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[37] and an expenditure rule[38]. The 60% debt to GDP limit is distributed as follows: 44% of GDP for the Central Government, 13% for all and each one of the CCAAs, and 3% of local governments. Moreover, in 2014 a new law added a maximum delay period for suppliers payments of 30 days as a stability target.

[35] However, if the regional government had submitted the economic and financial plan to the Fiscal and Financial Policy Council and the measures contained therein had been declared suitable by the Council, State authorization for short-term credit operations that were not deemed to be external financing was not required.

[36] The budgetary stability and financial sustainability law (LOEFSP), for a more general description and analysis of the 2012 budgetary stability law see Hernández de Cos and Pérez (2013b).

[37] Both of which should be achieved following a transition period up to 2020.

[38] This is an important novelty of the new rule. The expenditure rule has been defined in a similar manner as the one incorporated in the 2011 reform of the Stability and Growth Pact. In general terms the growth rate of public spending should not exceed medium-term GDP growth unless it is accompanied by discretionary increases in public revenue. The rule is applied not only to the Central Government but also to regions.

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Alcalá, 48 - 28014 Madrid
E-mail: publicaciones@bde.es
www.bde.es