Municipal indebtedness in Spain revisited: the impact of borrowing limits and urban development

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Abstract

This article investigates the effectiveness of municipal debt control in order to avoid excessive indebtedness, and the impact of urban development on local government financing practices. The various hypotheses are tested using municipal-level microdata for the Spanish region of Navarra. The empirical results confirm the effectiveness of debt restrictions and show that revenue from urban development policies has provided an alternative debt-financing instrument.

KEY WORDS: Municipal indebtedness, capital expenditures, restrictions revenue from urbanization, local finance.

JEL CLASSIFICATION: H7
1.- Introduction

In decentralized countries, debt is a funding instrument enabling local governments to shift short-term unsustainable tax burdens on to future generations for reasons of basic intergenerational equity. Political decentralization may therefore be driving the accumulation of public debt in some countries. Fiscal decentralization has been associated theoretically with both a stimulating and a dampening effect on government debt (the dampening hypothesis). For example, the evidence provided by Freitag and Vatter (2010) for the Swiss case show that decentralization strengthens fiscal discipline (see Oates, 1999). In turn, Baskaran (2010) explores this question for a panel of OECD countries, finding that decentralized expenditure significantly reduces public indebtedness, whereas decentralized taxation and vertical fiscal imbalances are insignificant.

The incentives to use debt increase as a result of the existence of the fiscal illusion.

Within the context of Public Choice, the theory of fiscal illusion –debt illusion- argues that local government debt and spending levels may divert from the optimum when politicians and bureaucrats are out to seek political gain (see for example Abrams and
Dougan, 1986; Misiolek and Elder, 1988; Oates, 1988). That is, when they try to extend their sphere of influence as far as possible in order to maximize votes. To this end, they increase the provision of goods and services without raising enough taxes to finance them, leaving this task to future governments instead. The most striking example of this is the so-called “flypaper effect”, based on the assumption that an increase in intergovernmental grants rarely leads to tax reductions, but rather stimulates much higher expenditure and ultimately increases debt (Rodden, 2002). In consequence, voters systematically overestimate the benefits of deficit-financed government expenditures today while underestimating the future tax liabilities due to public debt. The political weakness of subcentral governments, resulting from the fragmentation of their political parties and the need to form coalitions, may also lead to excessive debt levels. The so-called weak government hypothesis, put forward in the seminal work by Roubini and Sachs (1989), has been tested empirically for lower-tier governments in numerous studies (Ashworth et al., 2005; Jochimsen and Nuscheler, 2010). The resulting evidence suggests that coalition governments issue significantly more debt than single-party governments. This contrasts with Geys
(2007), who finds no significant difference in debt growth between one-party
governments and ‘large’ coalitions.

The literature on fiscal federalism also presents various arguments in favour of the
enforcement of subnational government borrowing restrictions. These include
intergenerational equity, the preservation of long-term financial equilibrium and the
coordination of fiscal policy by central governments. As a result, decentralization may
be associated with disarray in local government finances, growing indebtedness, and
costlier borrowing at the central and subnational levels (Poterba and Reuben, 1999).

Furthermore, in the European Monetary Union the Stability and Growth Pact (SGP)
requires of all member states a commitment to keep their budget deficit within certain
limits in order to guarantee a long-term budget balance, compatible with the level of
service provision prescribed in the European Union social model. This means that, in
addition to addressing intergenerational equity issues and ensuring their financial
solvency, Public Administrations must also comply with central government’s targets
for maintaining macroeconomic stability. In a decentralized country such as Spain,
any effort by the central government to balance the budget will be sterile unless
accompanied by budgetary discipline on the part of subcentral governments. It was to promote this discipline that Spain passed the Law for Budgetary Stability (*Ley General de Estabilidad Presupuestaria* (LGEP), setting deficit and debt targets for all tiers of government, central, regional and municipal, following criteria proposed, among others, by Bunch (1991), Alt and Lowry (1994), Poterba (1995), Poterba (1997), and Rossi and Dafflon (2002), for evaluating balanced budget rules and debt control. The main developments in the research on the impact of institutional restrictions on municipal borrowing is to be found in Farnham (1985), Kiewiet and Szakaly (1996), Ter-Minassian and Craig (1997), Kopits (2001), and Cabasés et al. (2007), to name but a few.\(^1\)

The period running from 1995 to 2007 was one of high economic growth in Spain accompanied by a housing construction boom during which the real estate market had a direct impact on local public finances. According to Pou (2007), the real-estate share in municipal revenue has increased year on year, and the real-estate share in

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total wealth in the Spain as a whole rose from 22.8% of total non-financial local government assets in 1992 to 31.9% in 2004. Meanwhile, spending on urbanization rose from 31.0% to 35.9% of total municipal expenditure over the same period. Against this background and the Spanish local finance pattern, urban development resulting from the real estate boom has provided municipal governments with large sums of revenue. These resources, which have the effect of making urban development the guarantee of long-term budgetary balance, work inefficiently in bullish real-estate markets, because they act as an incentive to local governments to engage in urban over-planning. Part of the reason for this lies in the fiscal illusion phenomenon (Oates, 1988), given the inevitable link between municipal finance management and the electoral cycle. Some local authorities have used the extra income from urban development projects to solve current funding problems, with no thought for how it might affect future spending needs.

Municipal urban planning designs and their effect on local funding have received little attention in economic research, the tendency being to regard them as an architectural
issue. Nevertheless, municipal budget growth over the least few years and the recent shrinkage of the Spanish real-estate market have raised interest in investigating the use of urban development as a financing tool by Spanish local governments. Despite this fact, to date there are few studies on the issue. Thus, Roger (2008) offers a descriptive analysis of the effects of urban development plans on municipal treasuries, while Sánchez-Maldonado and Suárez-Pandiello (2008) offer an initial assessment of the effects of urban development plans on local funding patterns. In a similar vein, Hortas-Rico and Solé-Ollé (2010) investigates the cost of local public service provision in relation to urban space layout. Finally, with respect to the potential link between urban financing and local debt, Cabasés (2008) provides an empirical analysis of the impact of urban resources on municipal debt in the Spanish region of Navarra.

Within this framework, this article examines indebtedness in Spanish local governments, paying particular attention to the impact of institutional borrowing restrictions and urban development plans. Specifically, our analysis distinguishes itself

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2 Pohlan (1996) analyses the effects of suburbanisation processes on the finances of cities in West Germany, taking the metropolitan area of Bremen as an example.
from prior works in two major aspects. As far as we are aware, this is the first study that uses disaggregated data on the flow of revenue from urbanization to Spanish local governments. This has been possible thanks to the employment of a panel of municipalities located in the region of Navarra\(^3\). These data have allowed us to investigate the effect of urban development on municipal financing in general, and more specifically on indebtedness, to test whether municipal governments have an incentive to resort to overplanning as a revenue-boosting strategy (Sánchez-Maldonado, 2007; Sánchez-Maldonado and Suárez-Pandiello, 2008). Secondly, our analysis is based on municipal-level microdata, which offers considerable advantages over the use of aggregate data by population stratum, especially in view of the widely-varying behaviour of municipal governments even within the same population stratum (Cropf and Wendel, 1998; Benito and Bastida, 2004 and Letelier, 2010).

The paper is organized as follows. Section 2 provides the context and rationale for the theoretical framework to explain the use and control of subcentral government debt. Section 3 describes the effects of urban development on municipal financing. Section ___________

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\(^3\) Navarra is an European Union NUTS-2 region of northern Spain with a surface area of 10,000 km\(^2\) and a population of 600,000. It has 272 municipalities, 116 of which have populations of over 500 and together account for 94.5% of the total population.
4 presents an analysis of current debt restrictions during the study period. Section five offers an econometric analysis on the impact of different types of debt restriction and local financing strategies, particularly the use of revenues from urban development plans. The final section introduces the main conclusions of the article.

2. Theoretical rationale for the use and regulation of local government debt

2.1 Local government debt

One of the key foundations of the arguments used by local governments to justify debt issues is contained in the pioneering work by Musgrave (1959), who defines the role of debt in public sector functions such as allocation, redistribution and stabilization of resources. Thus, as Dafflon (1996) also maintains, subcentral borrowing cannot be used to provide a buffer against the ups and downs of the economic cycle. These authors also argue that allocation efficiency requires sustained economic equilibrium, because the cost of providing services must be borne by the people whose needs they help to satisfy. This equilibrium does not preclude recourse to debt, however, since the costs of long-term goods and services must be financed throughout their
entire useful lifetime. Lane (1993) and Poterba (1997) express themselves in similar terms, using arguments based on the concept of maintaining equilibrium throughout the economic cycle in the compensatory context.

In short, therefore, debt plays a role in the choice local governments have to make when deciding how to finance investment, that is, whether to use current revenues (pay-as-you-go approach) or debt (the pay-as-you-use approach). The main arguments to support the pay-as-you-go approach see it as a way to safeguard the interests of future generations who have had no part in current spending decisions, as a means to ensure intragenerational equity, or as a result of interjurisdictional mobility to avoid an excessive debt load. Advocates of the pay-as-you-use approach, meanwhile, stress the advantages of being able to pay the costs while enjoying the benefits, the savings resulting from the use of debt to beat inflation, and income gains from, among other things, the actual investments (Monasterio and Suárez, 2002). The main research along these lines includes Asefa et al. (1981), Poterba (1995) and, in particular, Bonner (1972), who concludes that: “low investment growth rates generally make it cheaper to finance through taxation, while
increases in capital expenditure make it cheaper to finance through debt”. Note however that the question whether investments should ideally be financed on debt or current revenues basis has long been a subject of scientific debate. The controversy is summarized in Dafflon and Beer-Tóth (2009).

The arguments in support of local governments using debt in the allocative context can be summarized as follows:

- **Pay-as-you-use.** Debt makes it possible to spread the cost over the entire useful lifetime of the good and enables the undertaking of high-cost projects.

- **Intergenerational equity.** Debt makes it possible to spread the cost of the good proportionally over several generations such that each pays for the benefits received.

- **Reduction of tax friction.** Debt can be used to gear irregular capital expenditures to tax revenue trends.

- **Self-funding projects.** Debt can be used, as in the previous point, to gear capital expenditures to the current endogenous revenues that they will generate.

It is our belief that intergenerational equity is of particular importance in the case of municipal governments, because they have become specialized in the execution of
capital expenditures to create infrastructure, housing and premises for economic activities. However, given the narrow margin of fiscal autonomy and taxation capacity enjoyed by municipal governments in relation to the volume of their investment, the tax friction reduction argument also holds great weight. Thus, the application of classical fiscal federalism for the efficient allocation of revenue across different tiers of government leaves municipal authorities financially dependent on central government and reliant on grants or debt to enable them to carry through their investment projects.

2.2 Restrictions

In a context of fiscal decentralization, central government needs to control the use of debt by local governments, since there is a set of potential factors that might lead to inefficiency. These include the possibility of subcentral debt policies interfering with the macroeconomic aims of central government, which might justify vertical coordination, as suggested by King (1984) and Inman (1990). Another factor justifying the need for restrictions is explained by the fiscal illusion theory, that is, the pursuit of political benefit through the exploitation of fiscal illusion among current voters, by
concealing the true cost of goods provided (Oates, 1988; Holcombe and Mills, 1995; and Buchanan, 1995).

Central government restrictions are also intended to prevent insolvency or financial risk resulting from excessive indebtedness at subcentral level. They are also a means to discourage strategic decisions to incur debt in order to press for higher grants from central government. It appears unlikely that self-imposed debt restrictions could be achieved, because, as fiscal competency models have predicted, there would be incentives to non-compliance at all tiers of jurisdiction. These arguments are fully explained (Carlsen, 1994; Poterba, 1995; and Wildasin, 1997).

The commonest forms of debt restriction are specific central government coordination standards, such as maximum repayment periods and caps on debt service, and outstanding debt; co-financing schemes subject to financial viability guarantees; a demand for fiscal responsibility in local governments, and application of the financial market’s own control criterion. A review of the main fiscal control regulations affecting subcentral governments is summarized in Sutherland, et al. (2005).

4 Others such as Dafflon and Beer-Tóth (2009) show that managing local public debt is not so much an issue of fiscal capacity or compliance with formal fiscal rules but rather a question of responsibility and self-control
2.3 Theoretical model

The model for the theoretical analysis of the basic channels through which to control and condition subcentral borrowing policies can be expressed as follows. Starting from the budget restriction affecting any government\(^5\):

$$C^E + K^E + F^E = C^R + K^R + F^R$$ \[1\]

where \(C^E\) is current expenditures, \(K^E\) is capital expenditures, \(F^E\) is financial expenditures, \(C^R\) is current revenues, \(K^R\) is capital revenues \(F^R\) is financial revenues.

Considering that \(C^E\) can be broken down into interest payments \((I^E)\) and primary current expenditure \((PC^E)\); that \(F^R\) can be broken down into annual debt revenue \((D)\) and other financial revenues \((OF^R)\); that \(F^E\) are composed of debt amortization expenditures \((DA)\) and other financing expenditure \((OF^E)\); by omitting \(OF^E\) and \(OF^R\), which are of very scant importance; solving the above equation gives:

$$D = I^E + DA + PC^E - C^R + K^E - K^R$$ \[2\]

Grouping together the terms of [2] gives:

\(^5\) For a detailed analysis of the model construction, see Vallés, et al. (2003).
In words, debt is a function of the debt load \((I^E + DA\)), primary current savings \((C^R - PC^E)\), and the co-financing effort that subcentral governments are forced to make \((K^E - K^R)\). Thus, there are three types of strategy to control local government debt policies: restrictions on debt loads, strategies affecting primary current savings, and policies influencing the co-financing effort.

To analyze the effect of municipal urban development decisions on the co-financing effort strategy, we decompose \(K^R\) into two parts: revenue from grants \((KG^R)\) and capital gains from urban development \((KU^R)\). While the first of these involves capital transfers from central government, the second involves revenue from urban development. The flow of revenues in the latter case depends on the level of urbanization. It will therefore be more notable in towns and cities where there is a municipal growth process and urban land prices are high.\(^6\)

The co-financing of capital expenditure will therefore depend on grants received \((KG^R)\) and revenue from municipal urbanization decisions \((KU^R)\), which may provide

\[D = (I^E + DA) - (C^R - PC^E) + (K^E - K^R)\]  \[\text{[3]}\]

\(^6\) On this issue, see Roger (2008) and Hortas-Rico and Solé-Ollé (2010).
an incentive for municipal governments to take urban development decisions in order to obtain extra revenue.

Thus, [3] can be written as follows:

$$D = (I^E + DA) - (C^R - PC^E) + (K^E - KG^R - KU^R)$$  \[4\]

By dividing equation [4] by the municipal population, we can summarize the three strategies to be tested in this paper:

$$d = dl - cps + ce$$  \[5\]

Where $d$ denotes debt per capita, $(dl)$ debt load, $(cps)$ current primary savings, and $(ce)$ co-financing effort, including both grants and urban development revenue.

3.- Impact of urban development on local financing in Spain.

One of the main responsibilities of municipal governments in Spain is to design and execute urban housing plans. This includes the planning and execution of housing projects, urban discipline, and the administration of building land. Spanish urban development legislation grants municipal governments the right to control the use of land, manage *Patrimonio Municipal del Suelo* (PMS) Municipal Land Reserves, which
is the stock of public building land destined for the promotion of publicly subsidized housing, and regulate the market for building land. This activity takes up a large share of the municipal budget. In the case of the municipal governments of Navarra, as shown in Table 1, housing and urban development, which includes the expense of maintaining and investing in residential sites, accounts for 28% of total expenditure, and 50% of capital expenditure. These percentages are in line with those of other Spanish regions.

Through the exercise of this function, municipal governments obtain a flow of revenue specifically destined towards this objective. This type of revenue differs in several ways from that obtained from taxation, grants and debt. The first is that the flow is irregular and the quantity depends on the amount of urbanization taking place as the result of urban growth. The second is that it can materialize in the form of land ceded directly by private owners or cash payments. The third is that it is ear-marked and must be used for the promotion of public housing and the maintenance of PMS, Municipal Land Reserves.
This revenue includes:

- The ceding of land for the construction of public works and facilities. As a general rule, 10% of the land used for these purposes must be provided by private landowners, after deducting any charges due.

- Cash-in-lieu of land: A landowner may provide cash-in-lieu of an open space contribution, the value of the land being determined according to urbanized land prices.

- Fees on developers (Cuotas de urbanización): Charges levied against new development in order to generate revenue for funding the capital improvements necessitated by that development.

- Fees on residents (Contribuciones especiales): General infrastructure costs, that is, any that can be considered separate from direct urban development costs, may be charged to the section of the public who gain most benefit from them.

In addition to the above, part of the municipal tax revenue (non-recurrent taxes) comes from urban development activity. This includes building tax (Impuesto sobre Construcciones, Instalaciones y Obras, ICIO), land transactions tax, (Impuesto sobre
Thus, strict compliance with urban development legislation would provide local governments with revenue to finance urban development and purchase building land to meet the demand for residential or business property development sites. This revenue may take the form of cash or expropiable land. However, since the wording of the legislation allows quite loose interpretation of what constitutes earmarked revenue, it can, in exceptional circumstances, be used to finance public infrastructure investment and general services, not directly linked to urban development. In addition, the management of municipal land reserves PMS allows the purchase of land through agreements with private landowners whereby the latter cede land to the administration in exchange for future benefits from urban development that will add value to their property.

This complex urban development management system means that municipal governments obtain money when they decide to develop land for urban use. This income may be direct or indirect through the sale of land ceded by private
landowners. It should be used to finance new urban development projects but, since it may also be used for more general investment purposes, it provides an alternative to debt or grants.

In a context of real estate market growth, the urbanization of land becomes highly lucrative for municipal authorities, because private landowners are prepared to hand over large cash sums in order to retain urban land ownership rights. Meanwhile, since tax revenue from urban development has also risen sharply as a result of an increase in real estate transactions, current income has grown spectacularly, causing current expenditure to increase at a rate that is unsustainable with the standard growth in local tax rates.

Thus, the municipal urban development financing model, which is supposed to ensure long-term budgetary equilibrium through new developments, works inefficiently when there is a real-estate market boom, because it encourages municipal authorities to plan more urban sites than are needed. That is, it makes them deviate from them to the requirements needed to control the price of urbanizable land, because it makes them active actors in the land market. By obtaining revenue through the purchase and
sale of land, they are able to dodge the political cost of taxing the public. This creates what is known as the fiscal illusion phenomenon.

In order to observe the effects of urban development on municipal government financing in quantitative terms, we examine the pattern of main budgetary expenditure allocations for the municipal governments of Navarra over the period 1995-2007. The analysis is performed on the consolidated budget statements of the municipal governments, their administration and other departments, and lower tier authorities (councils). The data, supplied by the Local Administration Department of the Government of Navarra and the Navarra Accounts Tribunal, cover municipalities with over 2000 inhabitants during the study period.

One of the main features of Graph 1 is the sudden surge of revenue from urban development, which gradually increases, replacing other sources such as ordinary taxation and grants. A look at the evolution of the various municipal funding categories in Graph 2 reveals constant growth in ordinary taxation and current grants, contrasting with a much steeper rate of growth in urban development revenue, which was the main source of income during 2006 and 2007. Grants follow a similar trend
but with a slower rate of increase, while the debt trend takes the opposite direction to both the other income sources.

(INsert Graph 1)

(INsert Graph 2)

Graph 3 shows the match between expenditure and funding dynamics. There is steady growth in both current expenditure and current income. Capital expenditure also adjusts to the trend in capital income, increasing rapidly during the period 2005-2007. Meanwhile, the debt service remains constant due to reduced use of debt revenue and falling interest rates.

(INsert Graph 3)

The growth in current expenditure, which doubles between 1999 and 2007, is partly explained by the increase in public capital stock resulting from investment over that period. New cultural and sports facilities, residential homes for the elderly, new town halls, and new urban developments, require money to pay a larger workforce, provide
extra public services, and cover additional maintenance, security, lighting and cleaning costs, etc.

Operating expenditure lags somewhat behind investment. In other words, money invested one year triggers an increase in operating expenditure one or two years later. Thus, 2007’s operating costs are linked to 2005’s or 2006’s capital stock, not to the enormous expansion that took place in 2007, which can be identified as the height of the real estate boom. At that point, the real estate market freezes, and local authorities start to eat (spend) into the enormous revenue surplus generated by rampant real estate growth, as shown in graph 4.

(INSERT GRAPH 4 )

In Graph 6, we have split current expenditures into four parts: ordinary taxes, current grants, revenue from own assets and the ICIO Tax linked to urban development. Despite the modest impact of the ICIO in quantitative terms, its role as a source of current income has turned it into a basic component of local government funding,
because it guarantees net savings. Municipal governments have geared their current expenditure levels to the ICIO, which, when deducted, leaves negative net savings, as shown in Graph 7.

We distinguish between three types of capital income: grants, urban development revenue and borrowing. Annual series data do not always adequately fit the investment cycle, which spans a longer period. Generally speaking, local governments turn to borrowing as a last resort, when they have already exhausted their own resources and grants. Thus, as is evident from Graph 8, the borrowing trend changes from 2007 onwards, following the exhaustion of resources from the major urban development projects undertaken during that period.

By net savings, we mean the difference between current income and operating and financial expenditures, which, translated into accountancy terms, is the difference between income items 1 to 5 and expenditure items 1, 2, 3, 4 and 9.
4.- Implementation of and compliance with borrowing restrictions

Spanish municipal borrowing rules stipulate that loans of more than one-year maturity be used to finance investment expenditure. In addition, in the event of the debt service exceeding the limits set for certain budget ratios, the municipal government must apply for authorization from the highest level of sub-central government. These ratios and their upper and lower bounds underwent some modifications over the study period\(^8\). Initially, the upper limit on the annual debt service for any municipal authority was 25% of current income\(^9\). Later, the budget indicator became net savings, which had to be positive in order to waive the need for authorization. Table 2 shows the periods during which the main central- and regional-level restrictions were in force, together with the changes introduced during the study period.

\[\text{By debt service load we mean the sum of annual payments of interest and amortisation of debt (budget items 3 and 9), together with those relating to the project named in the debt-authorization request.}\]

\[\text{State regulations have undergone continual change affecting the control mechanisms set up by central government. See Vallés, et al. (2003) for a detailed review of these issues. The Government of Navarra passed a local treasury law (} \text{Ley Foral Reguladora de Haciendas Locales de Navarra, LFRHLN)} \text{ in 1995, which was amended in this respect in 2004.}\]
The Spanish local financing model includes the three debt control strategies mentioned in section 2. Firstly, the debt authorization system depends on the debt load. Next, the allocation of debt to investment expenditure and the limit imposed on net savings influence the level of current savings. Lastly, financing through grants and municipal tax load margins set by the central government all have an impact on the co-financing effort.

The main institutional restrictions in place during the study period can be summarized as follows. Firstly, debt revenue must be used exclusively for investment expenditure. Secondly, as a preventive measure to guard against financial imbalances caused by over-borrowing, local authorities must apply for authorization from the central government before new debt may be incurred when the ratio of debt service to current income for the last period is higher than 25%. Thirdly, the previous indicator is replaced with net savings, which must be positive in order to waive the need for authorization. The aim behind the joint application of both restrictions (allocation and

\[10\] This change increased the severity of the debt restrictions, bringing them further into line with financial balance objectives. The removal of the restriction limiting the municipal debt service load to no
a cap on debt service) is that municipal governments should generate sufficient current savings to cover the bulk of their capital expenditures.

Another restriction that must be mentioned is the cap on the total debt load, which should be no higher than 110% of current income. According to Monasterio and Suárez (2002), this last indicator has the same effect as the percentage of debt service, but it is a more stringent measure, given the credit climate at the time of its adoption.

The control mechanisms described above were supplemented with restrictions brought in to guarantee compliance with central government’s macroeconomic budgetary stability objectives. In a decentralized country such as Spain, objectives aimed at controlling the public and public debt affect all public administrations\textsuperscript{11}. In practice, the general budgetary stability act (Ley General de Estabilidad Presupuestaria (LGEP)) only requires municipal governments to comply with more than 25% of current revenues and its replacement with net savings requirements has enabled significantly better control of municipal financial balance, as detailed in Monasterio and Suárez (2002).

\textsuperscript{11} Since subcentral governments have no powers to issue money, restricting debt levels is the same as restricting deficit levels. In fact, the LGEP restricts the financing capacity or financing needs of each administration to the to the limits established by the European National and Regional Accounts System.
budgetary stability in terms of financing capacity when asking central government to authorize further borrowing.

5.- An empirical model of municipal indebtedness

This section offers an explanatory model of municipal indebtedness. Firstly, we describe the various hypotheses to be tested and the variables used in the analysis. This is followed with the specification of the econometric model and the presentation of the main findings.

5.1.- The model: hypotheses and variables

Our dependent variable is the increase in per capita debt in each of the municipalities during the various periods considered ($\Delta DEBT$). This variable is obtained as the quotient between the rise in the outstanding debt stock and the number of taxable inhabitants under each municipal government. As mentioned in the Introduction, our study aims to determine to what extent borrowing patterns match the theoretical proposals and restrictions in force during the study period. We therefore examine
whether debt has been used to cover investment expenditure. Next, we assess the effectiveness of the restrictions in force during the study period: the ratio of debt service to lagged current income and positive net savings. Finally, we also test the effect on municipal debt of obtaining funding through urban development activities.

The various explanatory variables included in the model and their expected signs are given below.

(INSERT TABLE 3)

- **Intergenerational equity** ($K^e$): We aim to investigate whether local authorities incur debt in order to defer the financing of investment expenditures to a later period and thus spread the load over the different generations benefiting from the investment. This would be consistent with theoretical arguments relating to intergenerational equity and the rules laid out in the borrowing regulations. We construct this variable as the sum of real investment plus capital transfer expenditure over the number of taxable inhabitants. The expected sign for the coefficient of this variable is positive provided the debt is used for investment expenditure.
• **Debt level** (*LRHL*): In order to capture the effect of the resulting debt service, we include in the model the value in the previous period of the ratio of debt service to current revenue. The expected sign of the coefficient of this variable is negative; that is, the higher the interest and depreciation payments in relation to current revenues over a period, the lower the indebtedness in the following period.

• **Co-financing capacity** (*SAVEN*): We wish to determine to what extent higher net savings can reduce the need to incur debt as a means to finance investment expenditure. We test this hypothesis on net savings per capita, as defined above. The expected sign of the coefficient of this variable is ambiguous: on the one hand, greater co-financing capacity means less dependence on credit as a source of funding, but on the other hand, higher net savings permit a greater debt margin, by enabling a higher debt service capacity.

• **Co-financing with urban development revenue** (*UR*): Our objective is to examine whether urban development helps to finance investments and thereby
reduce indebtedness. We construct this variable as the per capita value of the sum of capital revenues from urban development, \( KU^R \) and ICIO tax revenue, all of which are associated with urban development. The expected sign of the coefficient of this variable is negative.

The model also includes a variety of control variables to capture institutional, fiscal or economic factors that might affect debt variation. This set of variables and the expected sign of the relationship with indebtedness are as follows.

- **Fiscal responsibility**: We aim to study to what extent higher own tax revenue affects the debt level in order to test the effectiveness of fiscal responsibility as a control instrument for municipal borrowing. We will test this hypothesis on own tax revenue (items 1 and 3) per capita, excluding ICIO, which is included in urban development revenue. The expected sign is negative, because the lower (greater) the own tax burden, the less (more) the municipal government exercises its taxation capacity, which forces it to resort to other discretionary income sources, that is, an increase in indebtedness as an alternative source of funding.
• Co-financing of capital expenditures: We wish to capture whether revenue from grants is a substitute for indebtedness. To that end, we calculate the amount of per capita grant revenue. In particular, in accounting terms, this variable is obtained by discounting from income item 7 of the municipality’s liquidated budget, the articles relating to urban development revenue. The expected sign for the coefficient of this variable is negative.

• Prior financial status: This variable is included in the model to investigate the effect of the previous period’s debt on subsequent borrowing decisions, irrespective of financial ratio considerations, which have already been captured in other variables. The expected sign of this variable is negative: the higher the per capita debt stock, the greater the constraint on further borrowing.

Accordingly, we consider in our empirical analysis the following econometric model:

$$\Delta DEB_{it} = \alpha + \beta K_{it}^R + \delta LRHL_{it} + \phi SAVEN_{it} + \phi U_{it}^R + \theta X_{it} + \lambda_i + \mu_t + \epsilon_{it} \tag{6}$$

where the subindexes $i$ and $t$ denote the municipality and the time period, and $X$ is the set of control variables described above. In turn, $\lambda$ denotes unobservable fixed effects.
and $\mu$ time-specific effects common to all municipalities. Finally, $\epsilon$ represents the corresponding disturbance term.

In order to reduce the impact on the results of year-on-year fluctuations in the patterns of municipal indebtedness, all the variables are constructed using aggregate data corresponding to each legislature between 1995 and 2007. Tables 4 and 5 provide some additional information and descriptive statistics for the different variables employed in our analysis.

Our sample includes all municipalities in Navarra with more than 500 inhabitants. Smaller municipalities were excluded from the analysis because they tend to register extreme values in some of the variables considered.

An important advantage of the chosen specification is that model [6] allows us to control for country-specific factors relating, for example, to institutional or political features, thus eliminating the omitted-variable bias that occurs if there are unobservable time-invariant factors correlated with the explanatory variables. All the estimations of model [6] carried out in this section are based on
heteroskedasticity and autocorrelation consistent standard errors (Newey and West, 1987, 1994).

(INSERT TABLES 4 and 5)

5.2.- Results

Table 6 presents the results obtained when model G is estimated by OLS. As can be observed, the model seems to work reasonably well in explaining the variations registered by the dependent variable, with a relatively good value in terms of goodness-of-fit.

(INSERT TABLE 6)

Firstly, investment proves to be one of the key determining factors of indebtedness, since it transfers some of the cost of capital projects on to future generations, in exchange for the benefits they will obtain from the current investment. The debt service in the previous period proves to be significant and has a negative sign.
The model shows that the restriction of net savings is effective during this period. The variable is significant and has a negative sign. Thus, the empirical evidence suggests that those municipal authorities that practice an austerity policy with respect to current expenditure obtain more current revenues (own or grants), or efficiently schedule their debt depreciation, show higher financing capacity and have less frequent need to obtain credit to finance their investment projects.

The variable used to capture revenue from urban development is significant and has a negative sign. The sign corroborates that this source of income is a substitute for indebtedness, and, strikingly, it has a higher coefficient than grants. In this way, the model illustrates the role of this source of funding as an alternative to indebtedness, revealing the part played by this source of revenue in local investment activity, and explaining municipal governments’ incentive to seek new urban development projects in order to obtain extra funding.

Of all the control variables, grants prove to be significant, and have the expected negative sign, suggesting that more heavily subsidized municipalities have less need to incur debt.
Taxation revenue proves to be significant, but, in contrast to our hypothesis, it has a positive sign. The available evidence therefore suggests that greater fiscal responsibility and/or capacity on the part of municipal governments leads to an increase in indebtedness rather than to a substitution of income sources (taxes-debt)\(^\text{12}\). One possible explanation for this finding is that higher per capita taxation is more frequently associated with higher taxable wealth than higher tax rates. Thus, relatively higher taxable wealth increases municipal governments’ future debt-service capacity\(^\text{13}\). Along with this variable, previous debt also determines subsequent indebtedness, since it has the expected negative sign. Thus, a higher debt stock discourages the use of this source of funding.

In conclusion, we are able to confirm most of our hypotheses as follows. Firstly, municipal governments use debt revenue to finance their investments. Secondly, net savings affect indebtedness, since higher net savings act as co-financing mechanism, reducing the need to incur debt. Thirdly, the ratio between debt service and current

\(^{12}\) See Bonner (1972).

\(^{13}\) Bahl and Martínez-Vazquez (2007) suggest decomposing the ratio of tax revenue and taxation GDP to real-estate-owned property, in order to assess the impact of administrative decisions, such as tax rates, bases and exemptions.
revenue during the previous period (indebtedness level) also reduces per capita debt, despite the severity of the restriction (25%). Fourthly, revenue from urban development proves to be significant, show the expected sign, and have a higher coefficient than grants, which illustrates its importance in relation to other capital funding sources. Fifthly, grants prove to be a substitute for indebtedness. Lastly, previous debt stock acts as a constraint on indebtedness.

6.- Conclusions

We have analysed municipal indebtedness to test the effectiveness of the constraints imposed to control it, and assess the extent to which it is affected by the economic resources that make up the local financing structure. To that end we have estimated a two-way fixed-effects model using municipal-level microdata for the Spanish region of Navarre.

We are able to conclude that regulation of the municipal financing structure in Spain includes three budgetary discipline measures. Local governments have to maintain a certain debt service ratio, guarantee sustained current savings, and co-financing with
other economic resources. From this, we deduce that the regulation framework for the control of municipal debt in Spain, and particularly in Navarra, matches theoretical recommendations for budget control and discipline.

With respect to local financing trends, the analysis of municipal populations of more than 2000 in Navarra shows that revenue from urban development has played a key role, especially from year 2003 onwards, replacing indebtedness as a source of funding for capital operations. We have also found that the tax most closely linked to urban development activity, the ICIO, has followed an increasing trend and has contributed to the growth of current expenditure, thus playing a major part in achieving positive net savings.

These findings bring into focus the uncertainty that threatens the sustainability of local finances in Spain once the real estate crisis has passed. On the one hand, there are plans to increase debt in order to finance that part of the realized investment that has not been covered by other resources. On the other, we have found evidence of an effective reduction in the ICIO which will have a negative effect on net savings from
2008 onwards. This will result in an overall budget deficit that the rigid local tax regime will be unable to finance.

This municipal indebtedness model confirms investment as one of the determining factors. Constraints on the ratio of debt service to current income and net savings have also proved effective.

The estimates from the model confirm that income from urban development substitutes indebtedness even more effectively than grants. This illustrates the strength of the urban development boom in recent years. The most important conclusion to be drawn from this is the duality of the municipal investment funding pattern. Low growth and slow urban development dynamics force some local authorities to depend on grants and indebtedness, while a process of urban development has enabled others to benefit from the flow of resources from real estate activity. The data for 2007, the last year of the study period, already suggested that the sudden “bust” of the real-estate boom in Spain might seriously affect the budget balance in the latter group, as the provisional budgets for 2008 appear to confirm.
Confirmation is also found for a positive association between fiscal pressure or fiscal capacity and indebtedness. This suggests that, far from substituting indebtedness, tax revenues actually increase it by providing extra debt servicing funds. These can be created either by the need for stronger tax measures or greater available taxable wealth. In the latter case, positive correlation between income and indebtedness would be a sign of the normality of a large share of the local public goods and services, and lack of flexibility in the municipal taxation system to meet growing demand through income.
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ANNEX: GRAPHS AND TABLES

GRAPH 1

FUNDING SOURCES OF MUNICIPAL POPULATIONS OVER 2000

GRAPH 2
GRAPH 3

EXPENDITURE PATTERN: MUNICIPAL POPULATIONS OVER 2000

YEAR
EUROS
0 50.000.000 100.000.000 150.000.000 200.000.000 250.000.000 300.000.000 350.000.000 400.000.000 450.000.000

GRAPH 4

TOTAL ACCUMULATED BUDGET SURPLUS (1995-2007)

YEAR
DIFFERENCE BETWEEN REVENUE AND TOTAL EXPENDITURE (€)
0 50.000.000 100.000.000 150.000.000 200.000.000 250.000.000 300.000.000 350.000.000
GRAPH 5

CURRENT REVENUE PATTERN

YEAR

REVENUE (€)


0 50,000,000 100,000,000 150,000,000 200,000,000 250,000,000

ORDINARY TAXES
ICIO
CURRENT GRANTS
REVENUES FROM OWN ASSETS AND COMMUNAL PROPERTITY

GRAPH 6

ESTIMATED NET SAVINGS WITH AND WITHOUT ICIO

YEAR

CURRENT BALANCE (€)


-30,000,000 -20,000,000 -10,000,000 0 10,000,000 20,000,000 30,000,000 40,000,000 50,000,000 60,000,000

WITH ICIO
WITHOUT ICIO
GRAPH 7

CAPITAL FUNDING SOURCES: MUNICIPAL POPULATIONS OVER 2000

YEAR

GRANTS
URBAN DEVELOPMENT REVENUES
INDEBTNESS
Table 1: Municipal operating expenditure in Navarra (2008)

<table>
<thead>
<tr>
<th>Code</th>
<th>Spending category</th>
<th>Operating expenditure</th>
<th>Capital expenditure</th>
<th>Financing expenditure</th>
<th>Total expenditure</th>
<th>% of total expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
<td>Housing and urban development</td>
<td>70,566,984.92</td>
<td>2</td>
<td>10,006.83</td>
<td>251,588,794.67</td>
<td>28.66%</td>
</tr>
<tr>
<td>45</td>
<td>Culture</td>
<td>87,153,886.60</td>
<td>66,725,077.18</td>
<td>6,458.16</td>
<td>153,885,421.94</td>
<td>17.53%</td>
</tr>
<tr>
<td>31</td>
<td>Security and civil defence</td>
<td>91,345,367.47</td>
<td>7,327,526.41</td>
<td>24,165.08</td>
<td>98,697,058.96</td>
<td>11.24%</td>
</tr>
<tr>
<td>42</td>
<td>Education</td>
<td>50,654,070.58</td>
<td>29,363,112.03</td>
<td>936.72</td>
<td>80,018,119.33</td>
<td>9.11%</td>
</tr>
<tr>
<td>12</td>
<td>General administration</td>
<td>57,390,782.52</td>
<td>16,683,820.79</td>
<td>7,354.86</td>
<td>74,081,958.17</td>
<td>8.44%</td>
</tr>
<tr>
<td>22</td>
<td>Community welfare</td>
<td>41,525,276.07</td>
<td>2,151,633.70</td>
<td>0.00</td>
<td>43,676,909.77</td>
<td>4.97%</td>
</tr>
<tr>
<td>44</td>
<td>Public debt</td>
<td>23,419,887.49</td>
<td>17,682,298.57</td>
<td>0.00</td>
<td>41,102,186.06</td>
<td>4.68%</td>
</tr>
<tr>
<td>72</td>
<td>Industry</td>
<td>744,499.09</td>
<td>20,634,353.18</td>
<td>0.00</td>
<td>21,378,852.27</td>
<td>2.44%</td>
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<tr>
<td>53</td>
<td>Agricultural infrastructure</td>
<td>6,463,260.69</td>
<td>12,308,861.08</td>
<td>0.00</td>
<td>18,772,121.77</td>
<td>2.14%</td>
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<tr>
<td>61</td>
<td>Economic regulation</td>
<td>11,914,606.80</td>
<td>837,669.13</td>
<td>111,940.85</td>
<td>12,864,216.78</td>
<td>1.47%</td>
</tr>
<tr>
<td>32</td>
<td>Social development</td>
<td>10,901,582.40</td>
<td>999,089.58</td>
<td>0.00</td>
<td>11,900,671.98</td>
<td>1.36%</td>
</tr>
<tr>
<td>46</td>
<td>Other community and social services</td>
<td>8,090,905.14</td>
<td>1,811,097.58</td>
<td>0.00</td>
<td>9,902,002.72</td>
<td>1.13%</td>
</tr>
<tr>
<td>11</td>
<td>Government agencies</td>
<td>9,454,551.26</td>
<td>35,105.61</td>
<td>0.00</td>
<td>9,489,656.87</td>
<td>1.08%</td>
</tr>
<tr>
<td>41</td>
<td>Health</td>
<td>5,478,581.56</td>
<td>1,377,372.31</td>
<td>0.00</td>
<td>6,855,953.87</td>
<td>0.78%</td>
</tr>
<tr>
<td>51</td>
<td>Transport and basic infrastructure</td>
<td>2,775,648.52</td>
<td>2,919,349.34</td>
<td>0.00</td>
<td>5,694,997.86</td>
<td>0.65%</td>
</tr>
<tr>
<td>75</td>
<td>Tourism</td>
<td>2,459,752.92</td>
<td>2,288,298.83</td>
<td>0.00</td>
<td>4,748,051.75</td>
<td>0.54%</td>
</tr>
<tr>
<td>9</td>
<td>Grants to public agencies</td>
<td>926,099.79</td>
<td>1,108,305.14</td>
<td>0.00</td>
<td>2,034,404.93</td>
<td>0.23%</td>
</tr>
<tr>
<td>62</td>
<td>Commercial regulation</td>
<td>1,791,303.50</td>
<td>230,758.76</td>
<td>0.00</td>
<td>2,022,062.26</td>
<td>0.23%</td>
</tr>
<tr>
<td>73</td>
<td>Energy</td>
<td>153,718.53</td>
<td>1,545,003.73</td>
<td>0.00</td>
<td>1,698,722.26</td>
<td>0.19%</td>
</tr>
<tr>
<td>71</td>
<td>Crop farming, livestock and fishing</td>
<td>249,908.49</td>
<td>327,177.81</td>
<td>0.00</td>
<td>577,086.30</td>
<td>0.07%</td>
</tr>
<tr>
<td>55</td>
<td>Basic data and statistics</td>
<td>148,143.30</td>
<td>4,199.39</td>
<td>0.00</td>
<td>152,342.69</td>
<td>0.02%</td>
</tr>
<tr>
<td>52</td>
<td>Communications</td>
<td>59,429.26</td>
<td>21,328.34</td>
<td>0.00</td>
<td>80,757.60</td>
<td>0.01%</td>
</tr>
<tr>
<td>54</td>
<td>Scientific, technological and applied research</td>
<td>17,000.00</td>
<td>0.00</td>
<td>0.00</td>
<td>17,000.00</td>
<td>0.00%</td>
</tr>
<tr>
<td>74</td>
<td>Mining</td>
<td>845.40</td>
<td>0.00</td>
<td>0.00</td>
<td>845.40</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

TOTAL 483,929,636.88 1 26,622,206.33 877,945,084.62

Source: Regional statistics from the Ministry of Economy and Treasury
### Table 2: Legal constraints during the study period

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NATIONAL LEVEL (SPAIN)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net savings / Current revenues</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-2.00%</td>
<td>-1.50%</td>
<td>-0.75%</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>Debt servicing &lt; % Current rev.</td>
<td></td>
<td>25%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outstanding debt &lt; % Current rev.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>110%</td>
</tr>
<tr>
<td><strong>REGIONAL LEVEL (NAVARRA)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net savings / Current revenues</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt;0.00%</td>
</tr>
<tr>
<td>Debt servicing &lt; % Current rev.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25%</td>
</tr>
<tr>
<td>Outstanding debt &lt; % Current rev.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Source: Authors’ own calculations
Table 3: Expected signs of variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hypothesis</th>
<th>Description</th>
<th>Expected sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta DEBT_{it}$</td>
<td>Use of debt</td>
<td>Increase in per capita debt stock over the period</td>
<td>+</td>
</tr>
<tr>
<td>$K^E_{it}$</td>
<td>Intergenerational equity</td>
<td>Per capita investment expenditure</td>
<td>+</td>
</tr>
<tr>
<td>$LRHL_{it}$</td>
<td>Impact of control mechanisms. (Maximum indebtedness constraint).</td>
<td>Municipal debt level</td>
<td>-</td>
</tr>
<tr>
<td>$SAVEN_{it}$</td>
<td>Co-financing capacity.</td>
<td>Per capita net savings through debt depreciation</td>
<td>Undetermined</td>
</tr>
<tr>
<td>$U^R_{it}$</td>
<td>Co-financing through urban development revenue</td>
<td>Per capita urban development revenue</td>
<td>-</td>
</tr>
<tr>
<td>$TAX_{it}$</td>
<td>Fiscal responsibility</td>
<td>Ratio of own taxes to number of inhabitants</td>
<td>-</td>
</tr>
<tr>
<td>$KG^R_{it}$</td>
<td>Co-funding required from capital expenditure</td>
<td>Capital income per inhabitant</td>
<td>-</td>
</tr>
<tr>
<td>$DEB^{-1}_{-it}$</td>
<td>Prior financial status</td>
<td>Per capita debt stock at start of period</td>
<td>-</td>
</tr>
<tr>
<td>Variable</td>
<td>Symbol</td>
<td>Explanation</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Municipal indebtedness</td>
<td>$\Delta DEBT_{it}$</td>
<td>Difference between outstanding debt at the end and beginning of each period (^{(1)})</td>
<td></td>
</tr>
<tr>
<td>Intergenerational equity</td>
<td>$K_{it}^E$</td>
<td>Spending categories 6 and 7: Aggregated value period (^{(2)})</td>
<td></td>
</tr>
<tr>
<td>Debt level</td>
<td>$LRHL_{it}$</td>
<td>(Spending items 3 and 9)/Revenue items 1,2,3,4,5): Aggregated value period (^{(3)})</td>
<td></td>
</tr>
<tr>
<td>Co-funding capacity</td>
<td>$SAVEN_{it}$</td>
<td>(Revenue items 1,2,3,4,5) – (Spending items 1,2,4): Aggregated value period (^{(2)})</td>
<td></td>
</tr>
<tr>
<td>Co-financing through urban development revenue</td>
<td>$U_{it}^R$</td>
<td>Revenue item 2 + revenue item 79 : Aggregated value period (^{(2)})</td>
<td></td>
</tr>
<tr>
<td>Fiscal responsibility</td>
<td>$TAX_{it}$</td>
<td>Revenue items 1 plus 2: Aggregated value period (^{(2)})</td>
<td></td>
</tr>
<tr>
<td>Co-financing of capital expenditure</td>
<td>$KG_{it}^R$</td>
<td>Revenue item 7– item 79: Aggregated value period (^{(2)})</td>
<td></td>
</tr>
<tr>
<td>Prior financial status</td>
<td>$DEB_{it} - 1$</td>
<td>Outstanding debt per capita year : Aggregated value year (^{(4)})</td>
<td></td>
</tr>
</tbody>
</table>

\(^{(1)}\) Periods: 1995-99; 1999-03; 2003-07  
\(^{(2)}\) Periods: 1996-99; 2000-03; 2004-07  
\(^{(3)}\) Periods: 1995-98; 1999-02; 2003-06  
\(^{(4)}\) Years: 1995; 1999; 2003
Table 5: Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unit</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta DEBT_{it}$</td>
<td>€/inhab.</td>
<td>348</td>
<td>-1059.57</td>
<td>1808.08</td>
<td>37.68</td>
<td>266.70</td>
</tr>
<tr>
<td>$K_{it}^E$</td>
<td>€/inhab.</td>
<td>348</td>
<td>182.27</td>
<td>9577.36</td>
<td>1620.56</td>
<td>1273.59</td>
</tr>
<tr>
<td>LRHL$_{it}$</td>
<td>Ratio</td>
<td>348</td>
<td>0.00</td>
<td>3.69</td>
<td>0.11</td>
<td>0.21</td>
</tr>
<tr>
<td>$SAVEN_{it}$</td>
<td>€/inhab.</td>
<td>348</td>
<td>-9890.19</td>
<td>4271.06</td>
<td>376.65</td>
<td>764.36</td>
</tr>
<tr>
<td>$U_{it}^R$</td>
<td>€/inhab.</td>
<td>348</td>
<td>23.05</td>
<td>8160.68</td>
<td>507.31</td>
<td>845.58</td>
</tr>
<tr>
<td>$TAX_{it}$</td>
<td>€/inhab.</td>
<td>348</td>
<td>419.38</td>
<td>4376.78</td>
<td>981.07</td>
<td>515.62</td>
</tr>
<tr>
<td>$KG_{it}^R$</td>
<td>€/inhab.</td>
<td>348</td>
<td>0.00</td>
<td>4803.74</td>
<td>731.78</td>
<td>652.00</td>
</tr>
<tr>
<td>$DEB_{-1it}$</td>
<td>€/inhab.</td>
<td>348</td>
<td>0.00</td>
<td>1911.41</td>
<td>304.69</td>
<td>272.24</td>
</tr>
</tbody>
</table>
Table 6: Econometric analysis

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Coefficient</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-72.777</td>
<td>(77.581)</td>
</tr>
<tr>
<td>Intergenerational equity</td>
<td>0.130***</td>
<td>(0.035)</td>
</tr>
<tr>
<td>Debt level</td>
<td>-496.940**</td>
<td>(205.610)</td>
</tr>
<tr>
<td>Co-funding capacity</td>
<td>-0.189***</td>
<td>(0.066)</td>
</tr>
<tr>
<td>Co-financing through urban development revenue</td>
<td>-0.170***</td>
<td>(0.039)</td>
</tr>
<tr>
<td>Fiscal responsibility</td>
<td>0.399***</td>
<td>(0.132)</td>
</tr>
<tr>
<td>Co-financing of capital expenditure</td>
<td>-0.073**</td>
<td>(0.030)</td>
</tr>
<tr>
<td>Prior financial status</td>
<td>-1.051***</td>
<td>(0.105)</td>
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<tr>
<td>F-test</td>
<td>4.947***</td>
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<td>Adjusted R-squared</td>
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<tr>
<td>Fixed effects</td>
<td>Yes</td>
<td></td>
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<tr>
<td>Time effects</td>
<td>Yes</td>
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<td>Observations</td>
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</tbody>
</table>

Notes: The dependent variable is the increase in per capita debt stock during each period. Heteroskedasticity and autocorrelation standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.