

**International Studies Program
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The Challenge of Designing Capital Equalization Transfers: An Application to Spanish Regions¹

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Abstract: This paper analyzes the main design issues for utilizing capital transfers with an equalization objective within a system of sub-national finance. Although there is a vast literature and ample policy practice with the design of equalization grants involving needs for recurrent expenditures and/or fiscal capacity associated with current revenues, there is a dearth in the fiscal federalism literature at both the theoretical design and actual practice levels on how to use capital transfers with an interregional equalization objective. The two main aims of this paper are first, at the conceptual level, to identify the singular characteristics of capital expenditures and capital financing sources that would allow quantifying capital expenditure needs and financing capacity across sub-national jurisdictions; and second, by incorporating those measures into a capital equalization transfer formula to apply the design framework at the regional level in Spain.

Keywords: capital transfers, equalization, fiscal decentralization design

JEL Codes: H50, H7

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1. INTRODUCTION

Intergovernmental transfers represent a major source of revenue for sub-national (regional and local) governments in most decentralized countries. Although there is a considerable literature on equalization transfers and conditional grants involving recurrent expenditures and revenues (starting from Buchanan 1950 and Musgrave 1959), much less has been written about capital grants, and in particular, those designed with an equalization objective in mind. In this paper, we build on the previous literature (Levtchenkova and Petchey, 2007; Petchey and MacDonald, 2007; Josie *et al.*, 2008) by focusing on the challenges of designing capital equalization grants and more specifically by asking the question of how relevant and feasible the concepts of expenditure needs and fiscal capacity used in the design of recurrent equalization grants may be to the design of capital equalization grants.

Our basic departure point is the following: just as regional governments have recurrent expenditure needs while providing public services, they also have capital expenditure needs that have to be addressed in order to properly supply those services. In this sense, the design of a capital intergovernmental equalization transfer mechanism should be a key element of any intergovernmental finance system, just as equalization grants for recurrent purposes are. However, there is a considerable vacuum in the fiscal federalism literature on how capital equalization grants may be designed. In the actual policy arena and practice, the situation is not much better. Although capital transfers are at times implemented with an equalization purpose in mind, we are far from having a complete normative theory on the topic.

To reconsider the role of an equalization objective in the financing of capital expenditures at the sub-national level of government, the paper focuses on the specific

characteristics of the capital budget -as opposed to the recurrent budget. The aim is to introduce a methodology for assessing regional (or local) capital expenditure needs and regional (or local) financial capacity and to use these measures as the basic pillars in the design of a system of capital transfers with an equalization objective.

The rest of the paper is organized as follows. Section two introduces a conceptual framework supporting the design of capital equalization transfers. Section three briefly reviews the main characteristics of the Spanish system for financing capital expenditures at the regional level. Section four introduces a new approach for assessing regional capital expenditure needs and financial capacity, highlighting how the concept of financial capacity in the context of capital equalization transfers differs from the conventional concept of fiscal capacity used in the design of equalization transfers for recurrent purposes. Section four applies the proposed methodology to Spain's regions. The last section of the paper concludes.

2. INTERGOVERNMENTAL CAPITAL TRANSFERS: THEORY AND INTERNATIONAL PRACTICE

Theoretical foundations of capital transfers:

First to be discussed are the reasons why capital expenditures should be treated separately from recurrent expenditures in the design of intergovernmental transfers. Although there is very little literature about the theoretical foundations and the normative design of capital transfers, it seems fairly obvious that the nature and the aims of capital expenditure are quite different –although complementary- from those of the recurrent part of the budget. This is both a conceptual and practical issue. First, it is important to remark the singularities of each part of the budget in order to be able to

design more transparent methods of financing. And second, from the real world experience, there are important institutional and political restrictions that suggest separating both parts of the budget. Some recent papers have touched upon this issue. For example, Ahmad and Searle (2006) state that separating recurrent from capital transfers can be more appropriate in a context of scarce resources in which the pressure to assess immediate current needs may leave little room for paying attention to investment needs. Also as Levchenkova and Petchey (2007) and Petchey and MacDonald (2007) argue, one main reason for creating specific capital transfers is to guarantee minimum standards of services across a country, considering that capital is the main input in the production of certain public services.

Using the benefit principle as a guide for the attainment of efficiency and equity within a decentralized public sector, the cost of public services should be financed with taxes paid by those citizens who benefit from them.² Therefore, should a part of public expenditure be devoted to finance infrastructures that generate a recurrent flow of services along a period of time (a road, a sewerage network, or a hospital), the pay-as-you-go principle (as a way to make the benefit principle operational from an intertemporal perspective) requires that all of their users (current and future) support the burden of the cost of providing the required infrastructure. Otherwise, a suboptimal level of capital goods and service provision would result.

Once the pay-as-you-go principle is established, the argument is pretty straightforward: capital expenditure should be financed with both present and future taxes, in a proportion linked to the level of current services derived from the capital infrastructure

² The ability-to-pay principle in addition would call for some transfers to individuals or jurisdictions that have lower capacity to finance their needs. This issue is further developed below.

each year over the useful life of the capital infrastructure.³ However, capital infrastructure projects are lumpy and their financing typically requires the advancement of sums of money beyond the available liquidity of many sub-national budgets. The solution is for the local government to borrow the necessary amount to finance the cost of the capital infrastructure project and use current taxes to pay for the servicing of that debt (interest and the repayment of the principal), in such a way that current taxes pay each year for the current cost of using the services derived from the capital infrastructure. Thus, from the perspective of the pay-as-you-go principle, even in the case of durable capital infrastructure, taxpayers continue to pay taxes according to the benefits they receive.⁴

However, the existence of credit financing reduces, but does not eliminate, the need for capital transfers. This need especially arises when local jurisdictions have no (or limited) access to credit markets due to their limited financing capacity. And it might be more acute when it comes to projects that do not generate their own revenue streams, as in the case of social infrastructure projects.

The important implication of the discussion above is that when it comes to financing capital expenditures at the sub-national level, the design of intergovernmental capital transfers needs to take into account the possibility of regional governments to resort not just to current taxes but also to credit (reflecting their future taxing ability).

³ This is in correspondence with the conventional view. For example, King (1984) argues that recurrent expenditure should always be financed with taxes, while investment projects should always be financed with debt credit lasting as long as the benefits from the capital project flow.

⁴ If the amount of regional (or local) investment was identical every year and the span of life of the assets was always the same, then the need to distinguish between current and capital expenditures could disappear. However, in general, the flow of regional (local) investment is irregular and the duration of the facilities variable.

This is, from our point of view, one of the main reasons why intergovernmental recurrent transfers, including those with equalization purposes, should be designed and applied separately from those with investment purposes.

From an equity point of view, if sub-national governments had to satisfy their needs for public infrastructure by resorting exclusively to credit, this could lead to inter-territorial inequities in the distribution of public capital infrastructure and ultimately in the availability of basic public services. The potential for credit access of sub-national jurisdictions is correlated, among other things, with their economic base.⁵ Therefore, richer regions, with more dynamic economies, would have better possibilities of financing public investment through credit than those with lower levels of economic activity and tax bases.

A generally accepted goal –although not unanimously- of conventional equalization transfers is to allow all jurisdictions to provide a similar level of public services, provided that they exercise a similar level of tax effort. However, it is important to point out that equalization transfers rarely take into account the specific characteristics and nature of capital expenditure needs. For practical reasons,⁶ it is more common for conventional equalization grants to assess recurrent expenditure needs only, devoting capital grants to regional development. In the fewer cases where global expenditure needs (recurrent and capital) are addressed, this is typically done without distinguishing those connected to investments in capital infrastructure from those related with the recurrent expenditure needs associated with the provision of services themselves.

The significant technical difficulties in quantifying expenditure needs and financial capacity of different sub-national jurisdictions explains that at the present time there

⁵ Some jurisdictions can also have difficulties in accessing credit because of their small administrative size and their short experience in the capital market.

⁶ Among other factors, it is technically hard to measure the quantity and quality of the capital stock.

does not appear to exist in the international practice even a single instance of capital equalization transfers that measures capital expenditure needs and regional potential financing capacity in a satisfactory way (Martinez-Vazquez, 2000, Herrero *et al.*, 2010).

The main goal of this paper is to explore ways to design a formula for capital equalization transfers which, being transparent and simple, can accurately incorporate information across sub-national governments on differences in needs for capital infrastructure (arising from differences in costs, historical backlogs, etc.) and capital financing capacity.

A simple theoretical framework:

Within capital transfers designed with an explicit equity objective, it is useful to distinguish between those capital transfers pursuing regional economic growth and development targets from those designed with an objective for more equal access to public services, and which are complementary to the conventional equalization grants for recurrent purposes. While capital transfers pursuing regional economic development objectives allow for the positive discrimination of economically lagged territories, capital transfers pursuing an objective of more equal access to public services should be designed to treat all territories equally, aiming to give each jurisdiction the opportunity of providing a standard level of services at a standard level of financial effort.⁷ Our focus in this paper is on the second type of transfers or what we call capital equalization transfers.

⁷ Josie *et al.* (2008) distinguish between grants for economic infrastructure and grants for social capital. In the first case, they argue that the allocation of resources should be done according to efficiency targets, while in the latter, equalization transfers should be distributed to obtain minimum standards of public services.

The conventional equalization transfer formula for recurrent purposes distributes the funds in direct proportion to expenditure needs and in inverse proportion to sub-national potential revenue:

$$TR_i = TR \left[\frac{EN_i}{\sum_{i=1}^n EN_i} - \frac{FC_i}{\sum_{i=1}^n FC_i} \right] \quad [1]$$

where TR_i is region's i total equalization entitlement, TR is the total pool of resources to be distributed by the grant,⁸ EN_i is region's i measure of expenditure needs, and FC_i is region's i measure of fiscal capacity (Ahmad 1997; Boadway 2004, 2006).

The challenge here is how to adapt this formula to certain specific characteristics of capital budgets. Because investments in infrastructure can be financed with current tax collections but also other sources, especially borrowing, the term FC_i in [1] should include all the potential financing sources, and not just those potential revenues coming from current taxes or fiscal capacity ($FiscCap_i$).⁹ Another way to express it is that FC_i includes the present value of the future flow of revenue (discounted by the borrowing costs as we will see)¹⁰. For simplicity, we will assume that the other potential financing sources reduce to borrowing. Thus, this implies that potential borrowing or debt ($PotDebt_i$) should be a part of the financial capacity index in the modified equalization formula.¹¹

$$FC_i = FiscCap_i + PotDebt_i \quad [2]$$

⁸ If the central government decides to fully close all horizontal gaps, then the formula would become a simpler one:

$$TR_i = EN_i - FC_i, \text{ and } TR \text{ would be endogenously and not exogenously determined.}$$

⁹ For completeness, $FiscCap$ should perhaps also include potential Regional Gross Savings or, in other words, all those recurrent resources that have not been spent to finance recurrent expenditure.

¹⁰ It could also be possible to include interest costs differentials in the expenditure needs index, ignoring it in the revenue side of the budget, but we find that it reduces transparency and complicates things further.

¹¹ Of course, the use of potential as opposed to actual debt is to prevent capital equalization transfers from inducing any particular patterns of borrowing practices.

Another issue that needs to be considered in the design of capital equalization transfers is the territorial distribution of the existing public capital stock that can be interpreted as the (present value of) the future flow of public services derived from that stock. For example, Ahmad and Searle (2006) point out that it is precisely the aim of offsetting differences in the regional stock of capital that mainly justifies the separation between current and capital equalization transfers; and Levchenkova and Petchey (2007) have considered these design issues further.

If the current allocation of capital stock is the result of the regional governments' autonomous decisions, then the so far modified formula [1] can produce equitable outcomes and further adjustments would not be needed. However, if former public investment patterns for capital stock used to provide access to public services –i.e. the ones implemented by the central government in a pre-devolution period- had followed less than equitable patterns, then the application of the so far modified formula in [1] could perpetuate the existing differences in the territorial distribution of capital stock. In order to address those relative historical inequities it may be necessary to introduce another term in the modified formula [1] dealing with these exogenous differences in capital stock (Levchenkova and Petchey 2007):

$$TR_i = TR \left[\frac{EN_i}{\sum_{i=1}^n EN_i} - \frac{FC_i}{\sum_{i=1}^n FC_i} \right] (1 - \alpha) + \alpha TR \left[\frac{CSD_i}{\sum_{i=1}^n CSD_i} \right] \quad [3]$$

where CSD_i expresses the capital stock deficit of region i compared to a normative standard for the entire country and α is the percentage of the pool of available resources that will be devoted each year to close regional historical disparities in the distribution of capital stock. To guarantee the affordability of the transfer, the idea of formula [3] is

to distribute a share (α) of the total pool of equalization resources to offset part of the total deficit of capital stock each year, because erasing all regional historical differences in the capital stock would be a difficult goal to achieve in one single year. It seems more realistic to implement that compensation along a more or less longer period of time (t)¹². Note that, over time, as the relative deficits in capital stock are narrowed, eventually the second term in [3] would drop out and so α would be set to zero and the operational part of the transfer formula would become again that of the modified formula [1]¹³. The inclusion of the $(1 - \alpha)TR$ term makes it clear that the central authorities can be drawing from the same overall pool of funds with capital equalization purposes.¹⁴

3. A BRIEF INTRODUCTION TO SPAIN'S CAPITAL TRANSFERS SYSTEM

Because our goal in this paper is to illustrate how the capital equalization grant system designed above can be implemented in the real world, in particular, in the case of Spanish regional governments, in this section we briefly introduce what the current system of capital grants is in that country.

¹² Therefore, the number of years (t) needed to close the regional historical differences in the stock of capital will depend on the share (α) and the total transfer (TR) that is devoted to that aim: $t = \frac{\sum_{i=1}^n CSD_i}{\alpha TR} \forall TR_1 = TR_2 = \dots = TR_t$ [4]

¹³ Assuming α and TR are constant throughout the years, the same logic in [3] applies for all periods up to t , when all regional capital stocks converge to the initial national standard. Reformulating, the second component of [3] becomes the total regional deficit divided by the number of years devoted for the compensation of those deficits:

$$\alpha TR \left[\frac{CSD_{it}}{\sum_{i=1}^n CSD_i} \right] = \frac{CSD_i}{t}$$

Therefore, a constant quantity of the regional deficit is compensated every year, being bigger with smaller t s and larger TR s. Nevertheless, the idea here is to apply a formula that tries to offset the regional differences in the stock of capital existing at the moment of its first implementation. Therefore, no further assessments and/or compensations should be needed, thus reducing the possibilities of potential strategic behaviors among recipients.

¹⁴ A potential shortcoming of this framework is that it can induce inefficient investments, such as universities or specialized hospitals that should provide services for big populations. Further thought will be needed to seek ways to avoid this type of incentives.

Spain is not a federal country from a legal and constitutional point of view, although the level of political and economic decentralization is as intense as in many federal countries. Since the creation of the Autonomous Communities (ACs thereafter) in the late seventies, large shares of public expenditures and taxes have been devolved to those regional governments. There are two separate regimes of financing ACs: the “special” or “chartered” system, that affects only two territories (the Basque Country and Navarre), and the so-called “common” system, that applies to the other 15 ACs. The biggest difference between them is that in the case of the chartered system, the regional government collects and administers practically all national taxes, which are in part used to finance the provision of regional public services, with the remaining amount of resources being transferred to the central government in the form of a negative transfer. In the case of the common regime, the ACs raise their own tax revenues, and in addition they accrue other resources from revenue sharing in certain national taxes and from several unconditional transfers from the central government (Monasterio 2010, Ruiz-Huerta and Herrero 2008, and López Laborda *et al.* 2007).

Focusing on the “common regime” system, ACs were transferred in the past powers over some taxes –the so-called devolved taxes–, over which they have significant regulatory and collection powers but ultimately with limited revenue potential. These included property taxes, wealth transfer taxes (real estate sales, inheritances and donations), and gambling taxes. Significantly more dynamic sources of tax revenues are the so-called shared taxes between the central government and the Autonomous Communities of the common regime. This group includes the personal income tax

shared at 50 percent from January 2009, the value added tax shared at 50 percent, and excise taxes on tobacco, alcohol and gasoline shared at 57 percent.¹⁵

The ACs also benefit from several vertical and unconditional transfers that they can use to finance either recurrent or capital expenditure. Under the current system that became effective in January 2009, the former Sufficiency Fund –some form of revenue sharing pool that had been allocated to the ACs since the mid eighties- has been replaced by two new big Funds, with the objectives of closing the vertical gap and regional horizontal imbalances. The Essential Public Services Fund (EPSF) is targeted to close horizontal gaps, and it basically redistributes resources from those territories with (adjusted) fiscal capacity per capita over the average to those regions with a fiscal capacity below the average. The Global Sufficiency Fund (GSF) closes the remaining regional vertical gaps, measured as the difference between expenditure needs¹⁶ and the sum of aggregate regional fiscal capacity and the received EPSF funds (De la Fuente 2009; Ruiz-Huerta and García 2010).

Each reform of Spain's transfer system has ignored the fact that potentially the needs for capital infrastructure and investment costs can differ from region to region in ways that are not captured in the conventional measurements of needs and costs for the provision of current services. Moreover, the different reforms of the transfer system have always implicitly assumed that the distribution of the stock of public capital across regions prior to the original decentralization reforms needed no adjustments or compensations. However, there is no empirical evidence supporting that fundamental assumption. Due to the discriminatory development policies implemented during the pre-democratic

¹⁵ The bases for the sharing differ by tax. In the case of personal income taxes, the sharing is on derivation basis and in the cases of the VAT and excises different aggregate consumption indexes are used for the allocation of revenues.

¹⁶ Expenditure needs are measured as the regional share in population (with a weight of 30%), the size of the jurisdiction (1.8%), scattered population (0.6%), insularity (0.6%), equivalent (adjusted per age) population covered by the National Health System (38%), population over 65 (8.5%) and population below 16 (20.5%).

period in Spain, the safer inference would be that the distribution of public capital stock was not equitable at the time of devolution in the 1980s.

At present, beyond the unconditional transfers just listed above, regional capital expenditures are financed with revenues coming from several other sources: the Inter-territorial Compensation Fund (ICF hereafter), funds coming from the European Union (EU), other matching capital transfers that finance part of bilaterally (center-region) agreed investment projects, and regional borrowing (subject to the strong restrictions that apply under the current legislation on budget stability based on the EU Maastricht Treaty). The first two instruments, ICF and EU funds, only apply to ACs with a per capita income below 75% of European average.

Because the allocation of funds from the EU is largely out of the Spanish central government's authority, we will concentrate our analysis on the ICF, which can be considered a full fledged conditional transfer for capital purposes. In fact the ICF finds legitimacy in Spain's Constitution, which explicitly recognizes the role of this grant as an instrument of inter-territorial solidarity devoted to offset regional disparities in the level of regional development.¹⁷

The current design of the ICF transfer is complex and contains the following elements. The total pool of resources to be distributed must be at least 30 percent of the total capital (for civil purposes) infrastructure investment (excluding replacement investments) implemented by the central government. This amount is adjusted by the relative population of eligible ACs and their share (also as a group) in the national average income. In terms of eligibility, only ACs with a per capita income lower than

¹⁷ Article 158.2 of the 1978 Constitution endorses the ICF Law, which was approved in 1984 and reformed subsequently in 1990 and 2001.

75% of the EU average qualify for this grant.¹⁸ Since 2001, those territories that benefit from the ICF can use one third – the so-called Complementary Fund - of the total amount to finance recurrent expenditure resulting from the maintenance of previous investments implemented in the last two years.¹⁹

The total amount of the grant is distributed among eligible ACs according to the following criteria: total population (87.5 percent), net migration (only if negative, 1.6 percent), unemployment (1 percent), territory size (3 percent), and number of population settlements (6.9 percent).²⁰

With the qualification of the maintenance clause just mentioned, the ICF has to be used to directly finance investment projects, or indirectly through the distribution of capital transfers to other economic agents. Whatever option is considered, these investments have to be bilaterally agreed on between the central authorities and each of the regional governments, with the general criterion being that they promote future increases in income and wealth. Once the projects are implemented, the ACs have the obligation to report on their performance to the national Parliament.

The current ICF system has been criticized on several counts. In the first place, the pool of funds is generally considered too small to have an impact on regional economic growth, especially when compared to the much larger EU funds that have been made available until now to basically the same ACs. In addition, although the initial goal of the Fund was to finance investments in productive infrastructure to help close the

¹⁸ ACs that fulfill this requirement are Extremadura, Andalusia, Castile-La Mancha, Galicia, Murcia, Canary Islands, Castile and Leon, Valencia, Asturias and Cantabria.

¹⁹ This amendment was introduced to recognize the fact that every investment project generates future recurrent costs that also will need financing.

²⁰ Once this computation is done, a recalculation of the allocation is performed in order to further compensate the poorest and insular territories. For the first group, 3.624 percent of total ICF pool is allocated in inverse proportion to regional gross value added (weighted by regional population). In the second group, the Canary Islands' allocation is increased by 63.1 percent to acknowledge this territory's relative disadvantage due to its insular ultra-peripheral location.

economic gap between the richest and the poorest regions, recent studies of the actual use of these funds reveal that they have commonly been used to finance instead social infrastructure such as hospitals, schools, and so on (Utrilla, 2009). These latter uses, however, fit well within the notion that there are needs within the system for capital equalization along the lines argued in this paper.

Furthermore, the distributional criteria actually used falls short of delivering the mandated constitutional principle of solidarity across regions. By using the criterion of the relative poverty, the ICF allocates proportionally more resources to those regions with the lowest levels of economic activity. However, effectively, redistribution does not take place within eligible and non-eligible territories combined, but only within the former group.

4. RECONSIDERING CAPITAL EXPENDITURE NEEDS AND FINANCIAL CAPACITY: AN APPLICATION TO THE SPANISH REGIONAL LEVEL

We are now ready to move on with the application of the capital equalization grant design to Spain's regions. As occurs in many other countries, the Spanish system of intergovernmental transfers currently reflects confusion between the equalization and the development objectives of capital grants. This reduces the overall level of transparency and the effectiveness of the transfer system. Complicating things further, the seemingly insufficient pool of funds means that an important part of regional capital infrastructure expenditures continues to be financed from recurrent revenue sources.

In this section we simulate several potential reforms to the present system of equalization transfers in Spain which: (1) emphasize the separate different treatment for

recurrent expenditure needs and fiscal capacity and that for capital infrastructure needs and financial capacity; and (2) distinguish between capital equalization transfers and development capital grants. Since these two sets of grants have clearly different objectives, they should use different instruments with different distributional criteria.

In the first part of this section, we discuss step by step the methodological issues regarding the implementation of capital equalization transfers. In the second part of the section we apply those methodologies to the Spanish regional governments.

A) METHODOLOGICAL ISSUES IN ASSESSING CAPITAL EXPENDITURE NEEDS AND FINANCIAL CAPACITY.

Determination of the transfer pool and the equity standard

The first issue we need to address is the determination of the pool of resources to be distributed. In practice, there are several approaches available to guide this determination. The decision can be totally *ad hoc* or it can be informed by some kind of assessment of the existing gap or the costs of fulfilling certain sub-national responsibilities. It is always possible to exogenously set the standard in the level that the central government (unilaterally or in the context of a multilateral agreement with the regions) believes that fits best within the current budgetary and political restrictions. Another approach is to follow a historical perspective and use the available regional budgetary information to set the national standards for the first year, assuming that from there on, the central government can modify those standards, and regional governments can look at their own resources if they decide to increase public expenditures. But ultimately, how much money is available to provide for regional public services is a political decision made within the existing constraints of the public resource envelope.

The question of the pool of resources to be distributed through the grant is strongly linked to the equity standard that is to be achieved with them. *Ceteris paribus*, the larger the pool of funds, the more egalitarian the system of intergovernmental transfers can become. Also, the existence of an explicit equity standard is essential for the evaluation of the system's performance.

There are different options for setting the equity standard. But regardless of which one is chosen, it is important to select one that not only is financially sustainable, but also that reflects the desired level of interregional solidarity of the country as a whole. The most egalitarian system would strive to erase all interregional differences in capital expenditure needs and financial capacity. In the case of the national average standard, some jurisdictions would receive net resources from the transfer, while richer ones would have to yield part of their own revenue collections in the form of negative transfers. If the standard is set at the highest level of provision, then all territories – except the richest- would receive positive transfers; and so on.

In the international practice, the equity standard is commonly set at less than full equalization, thus reducing –although not eliminating- inter-territorial disparities, and positive and negative transfers do not always coexist. For historical or politically sensitive reasons, the central government may decide that only positive grants should be implemented, therefore improving the financial situation of the relatively poorer regions, without (directly) worsening the position of the most dynamic regions.

Assessing regional expenditure needs

Measuring the regional cost of providing services is one of the most difficult and controversial issues in the design of intergovernmental transfers (Advisory Commission

on Intergovernmental Relations 1990, Dafflon 2007, Canavire-Bacarreza *et al.* 2010). In an ideal world, this assessment would incorporate all those regional characteristics and circumstances that increase or reduce the cost of providing services within a certain jurisdiction and which are out of the regional government's control (Reschovsky 2007, Boex and Martinez-Vazquez 2007). Unfortunately, most of these circumstances are very hard, if not impossible, to assess in practice because of the lack of statistical information required. For some observers, the "Representative Expenditure Budget System" may be close to that ideal. However, the statistical information is usually scarce –even if at all available. Rather than relying on opaque approaches such as those based on political bargaining, several second-best alternatives are available²¹ (Boex and Martinez-Vazquez 2007, Herrero and Martinez-Vazquez 2007), the most transparent and accurate of which is the Standardized Expenditure Budget (SEB thereafter) from our point of view. It is compatible with scarce statistical inputs, and its implementation is very simple. The idea is to set top-down standardized levels of per client expenditure for each public service, using as a first approximation previous regional performances, or even exogenously-determined more elaborated expenditure norms. This is the approach we adopt below.

The fundamental methodology behind the SEB approach can be summarized as follows. First, services ($j=1,2,\dots,n$) that are supposed to be equalized are identified together with the client or population base associated with each service. Second, the number of

²¹ The simplest option is to assume that population constitutes the best approximation to expenditure needs (Canada). Being simple, this method ignores the fact that some public services are not used (with the same intensity) by the entire population. In a similar way, the Spanish system estimates expenditure needs based on the regional share of certain socio-economic variables, being highly exposed to political bargaining. As an alternative to deal with scarce statistical inputs, the previous Spanish system linked expenditure needs with last year's level of real expenditure, therefore perpetuating the original status quo. A different alternative is to measure bottom-up costs (salaries, utilities, etc) to assess the level of expenditure that would allow the regional government to provide a standard basket of services. This last option, applied in the former Soviet Union, Denmark or Japan, revealed to be expensive and cumbersome.

potential users in each region ($PUsers^j$) is assessed.²² When feasible, each sub-group of users should be weighted ($WPUUsers^j$) with some measure of its intensity of demand for the service (for example, middle-age population tends to have a lower demand for health services than the very young and older populations). An adjustment may also be necessary for differences in the costs of provisions (due to transportation costs, salary levels, etc.) across regions using a normalized cost index.²³ Next, the total standard expenditure in each category of services has to be determined (TSE^j), either exogenously (in a multilateral agreement, or unilaterally decided by the central government) or endogenously (using for example overall lagged expenditure figures).

Using a standard that is based on actual previous expenditure figures is a convenient way to arrive at some initial standards and also helps to make the system financially feasible. From a dynamic point of view, the evolution of the standards should take into account changes in spending priorities, the evolution of client bases and relatives costs of provision, and, of course, the positive (negative) growth of the resources used to finance the transfer.

Sub-national expenditure needs in service j can now be easily obtained by multiplying the number of regional potential users by the standard expenditure in service j per potential user:

$$EN_i^j = \frac{\sum_j TSE_i}{\sum_j WPUUsers_i} \times WPUUsers_i^j \quad [5]$$

Where subindex i refers to regions and superindex j refers to service categories.

²² If actual, as opposed to potential, users are included, then regions with a larger share of unattended demand, due for example to their lack of potential revenue, would have lower expenditure needs indexes.

²³ The inclusion of inter-territorial differences in the cost of inputs in expenditure needs indexes is nevertheless controversial. For example, Boadway (2006, 2007) has suggested to leave them aside for efficiency reasons.

The total expenditure needs of region i would then be obtained by adding up its expenditure needs for each service category:

$$EN_i = \sum_i EN_i^j \quad [6]$$

Expressions [5] and [6] can be used to capture expenditure needs for current services and separately for capital infrastructure. In the discussion above, the intent is to capture expenditure needs for capital infrastructure. In the absence of empirical evidence about the incidence of certain regional characteristics –such as area, population dispersion, topography, etc- on the costs of providing regional infrastructures, the main difference between the recurrent and capital needs indexes will be the weight of each category of services, considering that they can absorb different shares of the recurrent and capital budget.²⁴

Assessing regional financial capacity

Measuring financial capacity is usually also a difficult task due to the lack of statistical information. Focusing on the design of capital transfers, the first thing that we should point out is that we are here using the term *financial capacity* instead of the usual *fiscal capacity* that is incorporated in the typical equalization transfer formula for current services. Investments can be financed with capital revenues, including those accruing from public savings and borrowing. Therefore, the allocation formula for capital equalization transfers needs to incorporate a broader concept than the usual fiscal capacity measure which usually only accounts for current potential tax revenues.

It seems that the financial capacity index of a territory should provide information about the ability to obtain resources from: (1) *potential* tax collections; (2) *potential* regional

²⁴ Note that the relative weight of the expenditure needs index for categories of services such as “public infrastructures” or “social services” will be significantly different in the recurrent and the capital budget.

gross savings (or positive potential recurrent budget balance measured by the difference between expenditure needs and fiscal capacity in recurrent terms); and (3) from potential borrowing. Using actual tax collections, actual gross savings, or actual borrowing to assess financial capacity would obviously introduce perverse negative incentives in tax effort, budget management, and borrowing practices. Therefore, the challenge is how to derive a financial capacity index from generally available statistical information.

Focusing first on taxes, the aim is to assess the potential collection of each territory, meaning the tax yield that a region would accrue with a standard level of fiscal effort. Setting the standard fiscal effort can be done exogenously –at the level that the central government decides–, or endogenously –i.e. at the average level–. A rather ideal approach to obtaining regional fiscal capacity is the Representative Tax System (RTS) (Advisory Commission on Intergovernmental Relations 1986, Dafflon 2007, Wilson 2007)²⁵, which measures the regional potential collection (RPC_i^k) of each category of resources ($k=1,2,\dots,m$) provided that the tax rate, deductions and tax administration efficiency are at the standard national level. If the standard fiscal effort (t_s) is set at the average level, then:

$$t_s = \frac{\sum_k RRC_i^k}{\sum_k RTB_i^k} \quad [7]$$

where RRC_i^k refers to regional real collection of jurisdiction i in tax k , and RTB_i^k is the regional tax base of jurisdiction i in tax k . Therefore, regional potential collection of region i in tax k is easily obtained:

²⁵ Boadway (2006) points at two potential incentive disadvantages with the RTS: the rate tax-back problem, where regional governments can modify the national average tax rates by changing their own rates; and the base tax-back problem, when regional governments can reduce their tax bases in order to increase their transfer entitlements.

$$RPC_i^k = t_s \times RTB_i^k \quad [8]$$

where RTB_i represents the total regional tax base in tax k . Finally, the regional fiscal capacity would be obtained by adding up the potential collection of every tax source:

$$FiscCap_i = \sum_k RPC_i^k \quad [9]$$

However, the statistical information on regional tax bases is not always available, and therefore alternative methods are needed (Boex and Martinez-Vazquez 2007, Herrero and Martinez-Vazquez 2007). One option is using proxies for the tax bases, such as GDP, aggregate consumption or other macro indicators. Of course, the accuracy of this approach is lower than in the RTS. If none of these approaches is feasible, real lagged collection could be used in ways that minimize the induced negative incentives to collect taxes.

Regarding the assessment of regional potential gross savings, it is important to use a variable that is not derived from actual regional budgetary policies. Therefore, a normative measure has to be used, based on the potential recurrent fiscal capacity (obtained with one of the methods mentioned above) and regional recurrent expenditure needs (obtained also with one of the methods described above).

The additional challenge is the measurement of potential borrowing. The idea is to arrive at an indicator that provides information about the extent to which a jurisdiction may have the ability to resort to debt financing. As a source of financing, borrowing is usually subject to several constraints. First of all, sub-national governments typically have legal restrictions on how much they can borrow. But, apart from that, regions can have lower access to credit for economic and financial reasons. The lower the level of regional economic activity, the lower the probability of obtaining credit is (and the

higher the costs). In addition, the lower the regional stock of debt, the higher the probability of being able to borrow, and do so at lower costs.

In the context of capital equalization transfers, using an index of financial capacity that would attribute a lower capacity to those territories that have bad ratings due to their past budget policies would obviously introduce perverse incentives in the equalization system. However, those territories that have low ratings because of their low level of economic activity could easily be attributed a smaller financial capacity. These issues pose a dilemma of how to measure the borrowing capacity element of financial capacity.

Given the inexistence of public statistical information on regional governments' access to credit, one option is to derive a potential debt index for each region in two steps. First, we estimate normative regional credit ratings (ER_i) by regressing actual rating indexes published by rating companies²⁶ on regional shares in some relevant economic and social variables (ESV_i):

$$ER_i = f(ESV_i) \quad [10]$$

Second, to transform the estimated rating (which is an index) into regional potential debt (RPD_i), we can use either a politically accepted level of regional debt, the legal maximum level of regional debt, or alternatively the real regional pool of debt ($\sum_i RD_i$)

). In the last case, the regional potential debt would be:

$$RPD_i = \sum_i RD_i \times \frac{WRR_i}{\sum_i WRR_i} \quad [11]$$

²⁶ We need to acknowledge the fact that the accuracy of these ratings has been under revision recently. Therefore, what we do should be interpreted as a first approximation to tackle a problem that is still on the table after acknowledging that no further public data are available.

where WRR_i is the estimated regional rating weighted by some variable related to the region's size (population, regional GDP, etc).

Having obtained expenditure needs from [6] and financial capacity in [2] as the sum of [9] and [11] with the methodology proposed above, the capital equalization transfer can now be allocated following the adjusted formula in [1].

Offsetting disparities in the levels of regional capital stock

As discussed above, an adjustment of formula [1] may be needed to take into account the fact that the pre-devolution distribution of capital stock was uneven. Not addressing this issue squarely would mean that the potential level of services that can be provided by some regions would remain conditioned by an inadequate initial capital stock.

Accounting for an initial capital stock disparity, as reflected in [3], requires first an assessment of the different regional capital stocks, and second, setting a regional standard (endogenously or exogenously). Statistical information on the actual stock of public infrastructure is extremely hard to get, and therefore approximated solutions need to be used.

Levtchekova and Petchey (2007) argue that in general it should be possible to set a priori an exogenous (eg. international standards) equitable distribution of infrastructure and then use conditional capital transfers to achieve that desired allocation of the capital stock. On the contrary, Josie *et al.* (2008) use endogenous standards, based on the real capital stock of South African subcentral governments.

Setting the capital stock standard involves several other considerations. While the average level of regional performance works reasonably well as a standard in the measurement of expenditure needs and financial capacity, selecting the average level of

capital stock as the standard would not work properly in the context of examining shortfalls at the time of devolution. The aim of including that stock variable in the formula in [3] is to offset differences across regions in the ability to provide services due to past differing capital investment patterns out of the control of the regional governments themselves. Using the average level of stock as a standard would implicitly assume that the best endowed regions should lose a part of their existing capital in order to make it possible to equalize it. To tackle this problem, Josie *et al.* (2008) use the average level as the national standard, ignoring those regions with an over-endowment of capital stock, because reducing an already existing capital stock would be wasteful and inefficient. Another option would be to set the standard at the highest level of existing capital stock. In this case, all territories –except the best endowed one- would receive equalization transfers on this account²⁷.

B) AN APPLICATION AT THE SPANISH REGIONAL LEVEL

Applying the proposed methodological approaches to the Spanish regions will enable us to highlight their overall implementation feasibility, but also any potential shortcomings.²⁸

The amount of the transfer: the standard budget

The first step is to determine those expenditure and revenue categories that should be included in the equalization system as a whole (Standard Budget), in order to separate recurrent and capital budgets and to arrive at the level of resources to be distributed through the recurrent and capital equalization transfers. In the case of Spain, there is a deeply rooted belief that the central government is still ultimately responsible for the

²⁷ However, the standard setting can be done in many different ways and will ultimately be a political decision.

²⁸ A first approach applying a capital equalization transfer that deals with the existing regional differences in the capital stock was implemented in Financial and Fiscal Commission (2007) for the South African case.

financing of all devolved services, although not for the regionally created new programs. In this context, central government recurrent equalization transfers are calculated on the basis of estimated expenditure needs only for those devolved services. From our point of view, this method introduces a strong bias of the system towards the historical criterion of distributing resources. To avoid this bias in the design of the Standard Budget (SB), we used the available information of the actual regional budgets for the year 2006 (the most recent year for which complete data are available when writing this paper).²⁹

Regarding the scope, we need to make a choice of whether to include the special charter regions of Navarre and the Basque Country, or simply to exclude them from the calculations reducing the analysis to the ACs under the common regime. We believe that including the Basque Country and Navarre in the measurement of national standards would contribute to improving the equity level of equalization transfers. It would be difficult to justify the implementation of an equalization system on the basis of equity standards and, at the same time, to exclude some territories from the system, especially when these territories are among the best off in the country³⁰.

The selection of expenditure categories to be equalized needs to exclude from the SB those functions that, due to political reasons, have not been devolved to all territories such as justice, security (regional police) and prisons.³¹ In addition, some other expenditure categories are excluded because they are not strictly referred to as regional services; these entail transfers to other public administrations in which the ACs work as

²⁹ <http://serviciosweb.meh.es/apps/CCAALiquidaciones/>

³⁰ We should note that the inclusion of these two regions within the equalization system is compatible with the special characteristics of the charter system, including the devolution of most taxing powers to their respective regional governments. The only difference with the current system is that under our proposal these two special regions would be required to increase the amount of resources that they have to transfer to the central government

³¹ The same amount of resources needs to be deducted from the revenue side of the budget (thus reducing the quantity of central transfers) in order to balance the SB.

mere intermediaries between central and local governments, such as the provision of some social security services on behalf of the central administration.

Concerning the revenue side of the budget, all central and local taxes are excluded (the Basque Country and Navarre collect some of them), as are all intergovernmental transfers received by ACs.

The main sources of statistical information for constructing the SB were the regional budgets, although these data had to be adjusted in some cases with complementary information, to which we refer below.

Assessing regional expenditure needs

The assessment of expenditure needs is performed for the following service categories: health, education, social services and other general services plus infrastructures.³² The main reason for selecting these four categories is that each of them has a homogeneous group of potential users, plus there is enough information about the relative use of services of each of those groups. Table 1 shows the amount of total expenditure that was included in the total consolidated budget for all CAs with recurrent and capital purposes. For the next step, the selection of the client base or number of potential users for each service, we employ different population groups in the ACs that can be associated with the consumption of the service. The particular selections are presented in Appendix 1. Also Table 2.1 of Appendix 2 shows the regional share on capital expenditure needs for each of the selected service categories.

³² This last category includes housing, culture, agriculture, fishery, industry, trade, tourism, transportation, infrastructures, R+D+I and general services.

TABLE 1: RECURRENT AND CAPITAL STANDARD EXPENDITURE, 2006
(in Thousands €)

	Recurrent Expenditure	Capital Expenditure	TOTAL
Health	47.608.629	2.178.478	49.787.107
Education	30.479.434	2.355.721	32.835.155
Social Services	7.043.396	776.098	7.819.494
Gral.Services+Infrastructures	16.317.117	18.508.988	34.826.106
Total Expenditure to equalize	101.448.577	23.819.287	125.267.864

Source: elaborated by the authors

Assessing regional financial capacity

In order to calculate the potential capital revenue of each region, the first task is to assess the recurrent budget surplus—the difference between current expenditure needs and fiscal capacity or potential tax revenues. For the current expenditure needs we use the estimates in Herrero and Martinez-Vazquez (2007). For potential revenues we follow a modified representative system approach using several proxies for tax bases using regression analysis; the different steps are presented in Appendix 3. The potential recurrent surplus is obtained by the difference between recurrent expenditure needs and recurrent fiscal capacity (column 1 of Table 2).

Other sub-national financing sources that need to be included in order to distribute the capital equalization transfer are capital revenues from selling assets and potential borrowing (capital fiscal capacity, column 2 in Table 2). For the ACs, capital resources accrue from the sale and exploitation of public real assets. In this case, actual proceeds are used to measure regional financial capacity, because doing so would clearly introduce a negative incentive to sell public real assets.

For regional potential debt (column 3 in Table 2), following Leal and López (2008), we estimate each jurisdiction's rating as a function of a set of socio-economic variables. With that purpose, we used a linear regression model (Ordinary Least Squares) because

it provides a better fit than other alternative approaches given that our dependent variable is of qualitative and discrete nature.³³ The idea is to derive predicted ratings which will provide information about the probability that a region would be able to obtain financing resources from credit, given its particular socio-economic characteristics, but isolating it from their current level of debt.³⁴ The steps are described in Appendix 4.

Using the estimated regional ratings weighted with the regional share in GDP, we then distribute the total pool of real sub-national debt that was included in the standard budget among all ACs.

After estimating the regional current surplus, capital fiscal capacity, and potential debt, we now are able to show in column 4 of Table 2 the regional financial capacity of every AC. Note that these figures already incorporate the adjustments needed to account for the different financial regimes of Navarre and the Basque Country.

³³ The singularity of our data panel comes from the special nature of the dependent variable, which is a discrete variable with multiple ordered responses (ranging from 0 to 5). When dealing with these variables, an option would be using more complex models such as an ordered probit model with fixed effects or a random effects probit model. However, estimating a probit with fixed effects would be inconsistent and using the random effects model would require us to assume the existence of a correlation between the unobservable terms and the error term. These approaches would also require a longer panel than the one we have. However, as Angrist and Pischke (2009) suggest, in this case the consistency of the predicted values, not the method of estimation, is the most relevant criterion. This leads us to use an OLS linear regression with fixed effects, considering that OLS is a linear approach to $E[Y/X]$ estimating the average marginal effect relatively well even if $E[Y/X]$ is not a linear function.

³⁴ Attributing a lower rating to a region that has autonomously decided to increase expenditure (or to lower taxes), financing it with debt, would obviously introduce a positive incentive to over-expand regional budgets. Therefore, we are just interested in that part of the regional low (or high) rating that is related to the evolution of variables that are out of direct regional government's control.

TABLE 2: ESTIMATES OF REGIONAL FINANCIAL CAPACITY, 2006
(Thousands €)

	(1) Recurrent potential surplus	(2) Capital fiscal capacity	(3) Potential debt	(4) Financial capacity
Andalusia	-	132.939	446.442	579.381
Aragon	-	23.908	132.714	156.622
Asturias	-	29.785	105.148	134.932
Balearic Is.	613.324	5.016	149.656	767.997
Canary Is.	-	36.254	209.277	245.531
Cantabria	-	10.682	43.037	53.719
Castile and Leon	-	84.054	267.377	351.431
Castile-La Mancha	-	66.460	178.921	245.381
Catalonia	1.922.120	37.236	700.280	2.659.636
C.Valencia	-	22.368	378.008	400.376
Extremadura	-	33.683	76.696	110.380
Galicia	-	92.822	194.043	286.865
Madrid	3.494.314	195.208	718.558	4.408.080
Murcia	-	31.055	87.836	118.891
Navarre	2.098.417	57.502	117.013	2.272.932
Basque C.	8.213.798	58.506	384.356	8.656.660
La Rioja	-	1.516	39.589	41.105
Total	16.341.972	918.994	4.228.952	21.489.918

Source: elaborated by the authors

(*) Zero values mean that the region has larger recurrent expenditure needs than recurrent fiscal capacity, and therefore should receive recurrent equalization transfers.

Closing historical gaps in regional capital stock

The most important difficulty we face here is the assessment of the actual capital stock.

In the case of Spain, no public data base exists on the level of public real investments in each territory. However, some other information is available. In particular, we use the BBVA data base (Mas *et al.* 2005 and Mas *et al.* 2006), which contains considerable information about the net total (private and public) stock of capital (wealth) in each region, based on the Perpetual Inventory Methodology. But given the presentation of those data, we need to estimate which part of the total stock is related to the provision of public services and which is not.³⁵

³⁵ The data base distinguishes four types of capital assets: 1) housing; 2) other constructions; 3) transportation equipment; and 4) machinery, equipment and other products. Focusing on item number two (other constructions), we used in our estimation a ten percent of sub-category two (other public constructions), assuming this is the share of the accumulated investment of that item that is referred to non-residential buildings devoted to health, education, administration, sports and cultural services. According to Mas *et al.* (2006 and 2007), ninety per cent of the investment included in this item is carried out by private agents. Therefore, we assume that the remaining ten

Table 3 shows the estimated total public capital stock for each AC in column number one. Column two presents the regional capital stock per adjusted population, using the expenditure needs index previously obtained. Using the highest regional value of capital stock turned out to be unaffordable. Therefore, we decided to assess the regional deficit using the national average as our standard value (column number 3). The fourth column in Table 3 presents the total deficit of each region, while column number five shows the share of each territory in the national gap compared with the normative standard selected. Due to the standard we use, only six ACs (Andalusia, the Canary Islands, Valencia, Extremadura, Galicia and Murcia) have a deficit in their capital stock. Therefore, those regions will be the only ones to accrue from the part of the equalization transfer that deals with the uneven distribution of the regional capital stock.

TABLE 3: ESTIMATED TERRITORIAL DISTRIBUTION OF PUBLIC CAPITAL STOCK, 2006. Thousands €

	(1) Total capital stock	(2) Capital stock per adjusted population	(3) Regional deficit capital stock (per capita)	(4) Total deficit	(5) % Total deficit
Andalusia	9.596.109	1,20	0,50	4.030.887	65,43
Aragon	2.764.696	2,15			
Asturias	2.203.979	2,05			
Balearic Is.	1.839.269	1,86			
Canary Is.	2.775.871	1,40	0,29	580.268	9,42
Cantabria	1.045.472	1,84			
Castile and Leon	4.590.039	1,80			
Castile-La Mancha	3.446.080	1,76			
Catalonia	13.690.959	1,93			
C.Valencia	8.016.330	1,67	0,03	122.592	1,99
Extremadura	1.494.671	1,35	0,35	382.751	6,21
Galicia	4.101.370	1,47	0,22	625.915	10,16
Madrid	10.958.568	1,84			
Murcia	1.916.649	1,39	0,30	418.631	6,79
Navarre	1.325.117	2,21			
Basque C.	5.251.973	2,48			
La Rioja	614.276	2,01			
Total	75.631.427	1,70		6.161.045	100

Source: elaborated by the authors

percent is carried out by regional administrations. For further information about the distribution of the stock of capital, see BBVA-IVIE (2009).

The allocation of the transfer amounts

After obtaining measures for regional expenditure needs (Table 2.1 of Appendix 2), regional financial capacity (Table 2), and regional deficit in the capital stock (Table 3), we can now move on to the actual distribution of the capital equalization transfer. The results are shown in Table 4. Columns one and two show regional expenditure needs and financial capacity respectively, while in the third column we present the allocation of the equalization capital transfers according to the adjusted formula [1], that is to say, ignoring the existence of differences in the regional distribution of capital stock. However, if offsetting the uneven distribution of regional capital stock is also an objective of the transfer, then the formula in [3] applies. In this case, the capital grant would be divided into two components: the first, shown in column four, is the strict capital equalization transfer (allocated in proportion to the gap between financial capacity and expenditure needs), and the second, devoted to closing the historical gap in existing capital stock, is shown in the fifth column. There we assume that $\alpha = 0.3$, meaning that each year 30 percent of the pool of available funds would be devoted to offset historical disparities in the regional capital stock. Of course, a value of $\alpha = 0.3$ is selected just for illustration purposes, but it reflects the likely financial difficulties implied by attempting to close the historical disparities in capital stock in a shorter period. The last column in Table 4 shows the total capital equalization transfer (with compensation) to each region.³⁶ For example, with $\alpha = 0.3$, and using the national average as the standard value, it would take 8,8 years to offset the regional deficits included in Table 3.

³⁶ Note that the resulting negative transfer for the Basque Country and Navarra has already been adjusted considering that they actually collect 100 percent of Personal Income Tax, Corporate Tax, VAT and Excise Taxes.

The figures in Table 4 would not be the final capital transfer (positive or negative) for each region because other capital grants –apart from the ICF- are actually allocated at the regional level of government. To adjust for that, those other grants (if they are within the services covered in the capital equalization grant) could be subtracted from the estimated equalization transfer. We should also note that because the Basque Country and Navarre regions have many special or singular spending powers –not devolved to other regions-, there would be a need for further adjustments to their respective final (negative) transfers. However, it is far from clear what adjustments will need to be made and they would clearly require very detailed analysis.

**TABLE 4: ALLOCATION OF CAPITAL EQUALIZATION TRANSFERS, 2006
(Thousands €)**

	(1) Expenditure Needs	(2) Financial Capacity	(3) Pure Capital Equalization Transfer	(4) Equalization Transfer $\times(1-\alpha)$	(5) Compensation for Differences in Capital Stock	(6) Total capital Transfer with compensation
Andalusia	4.291.673	579.381	3.712.292	2.598.604	457.200	3.055.804
Aragon	685.818	156.622	529.196	370.437	-	370.437
Asturias	575.755	134.932	440.822	308.576	-	308.576
Balearic Is.	529.634	767.997	- 238.363	- 166.854	-	- 166.854
Canary Is.	1.056.979	245.531	811.448	568.014	65.816	633.830
Cantabria	303.102	53.719	249.383	174.568	-	174.568
Castile and Leon	1.363.019	351.431	1.011.588	708.111	-	708.111
Castile-La Mancha	1.048.164	245.381	802.783	561.948	-	561.948
Catalonia	3.789.534	2.659.636	1.129.898	790.928	-	790.928
C.Valencia	2.563.264	400.376	2.162.888	1.514.022	13.905	1.527.926
Extremadura	591.273	110.380	480.894	336.626	43.413	380.039
Galicia	1.488.806	286.865	1.201.941	841.359	70.994	912.353
Madrid	3.181.725	4.408.080	- 1.226.355	- 858.449	-	- 858.449
Murcia	735.471	118.891	616.580	431.606	47.483	479.089
Navarre	320.459	2.272.932	- 1.952.472	- 1.366.731	-	- 1.366.731
Basque C.	1.130.907	8.656.660	- 7.525.753	- 5.268.027	-	- 5.268.027
La Rioja	163.705	41.105	122.600	85.820	-	85.820
Total	23.819.287	21.489.918	2.329.369	1.630.558	698.811	2.329.369

Source: elaborated by the authors

5. CONCLUSIONS

This paper analyzes the role of equalization transfers in financing regional capital expenditure. Although there is a vast literature on the justification, design and effects of

equalization grants for recurrent purposes, little work has been done on the design of capital grants with an equalization purpose.

In this paper we have argued that due to its singularities, capital spending should receive differential treatment from recurrent spending in the design of intergovernmental equalization transfers. Public investment in infrastructure generates an inter-temporal flow of services which calls for a different kind of financing than recurrent expenditures on public services. Under the benefit principle, the resources used to finance capital expenditures should include future taxes (credit) as opposed to just tax resources available the initial year of the investment.

To account for these peculiarities of capital spending, we propose a new methodology for the design of capital equalization transfers. Following the internal logic of equalization grants for recurrent purposes, our proposal requires allocating proportionally more resources to those territories where expenditure needs are larger and/or where the level of potential financing resources is smaller. This requires expanding the conventional concept of fiscal capacity to that of regional financial capacity. The latter concept not only takes into account the regional potential capacity for collecting taxes but also the territory's ability to access credit.

Since the direct use of regional level of debt in the capital equalization formula would introduce perverse incentives in decision making regarding the use of credit, we introduce an index for regional potential debt, which takes into account the degree of difficulty each region faces in obtaining credit; the index is based on the region's social and economic conditions, which can hardly be modified by the regional authorities.

An additional issue that differentiates recurrent from capital equalization transfers is the possible existence of different initial stocks of capital across regions. If those

differences are not the consequence of discretionary decisions of regional governments but rather the result of previous central government policies, equalization transfers may also be used to offset them. Without taking into account those differences, all other things equal, jurisdictions with a better initial endowment of capital stock would have the ability to provide better services than those with lesser initial capital stocks. However, closing the historical gaps in the distribution of the stock of capital can be an expensive goal to achieve when that distribution is very uneven. Therefore, it may be necessary to implement this type of reform over an extended period of time.

This paper applies the proposed design methodology for capital equalization grants to Spain's regional government level. Currently, the Spanish system of regional finance makes no distinction between capital transfers with development versus equalization objectives. There is, however, a particular transfer in the system, the ICF, which has been used to finance investment projects with an implicit capital equalization objective. For this reason we use the ICF as the basis of our analysis. The computation of capital equalization transfers is based on the Standardized Budget (SB). The total amount of resources to be allocated through the capital equalization transfer could be approximated by the difference between total capital expenditure needs and total capital financing capacity, but ultimately the inter-territorial equity target to be achieved is a political decision. The final allocation of capital equalization transfers is done in direct proportion to estimated expenditure needs and each jurisdiction's relative deficit in the initial stock of capital and in inverse proportion to estimated financial capacity. We also introduce and apply relatively simple and transparent methodologies to estimate capital expenditure needs, financial capacity, and historical differences in the stock of capital across Spanish regions.

The results are in line with prior expectations. The richest territories would have to yield part of their resources in order to allow for capital equalization, while the poorest ones receive positive transfers that would allow them to finance more investments. However, the adjustment of regional differences in the initial stock of capital would reduce the payments of the former group and the positive transfers to the latter group due to the fact that the historical deficit in the stock of capital appears to be larger in the most economically dynamic and populated territories.

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Appendix 1: Estimating expenditure needs: What are the different client bases for each service?

To obtain the number of potential users existing in each service category used to assess regional expenditure needs related with capital expenditure, we used the following indicators:

- Health services were divided into two categories: in-patient (hospital) care and primary (ambulatory) care.³⁷ In the first case, two groups of potential users were included, weighted by their respective relative demand for hospital services: population below 65 and population 65 and older. In the second, we also assessed two groups of potential users: population below 55 and population 55 and older.³⁸
- Education services were classified into three categories: pre-primary education and primary education, comprised by population under 4 plus enrolled students in primary schools; secondary education given by the number of enrolled students for the compulsory grades and population between the ages of 16 and 17; and university education as the population between the ages of 18 and 24.³⁹
- Potential users of social services were assessed with the number of people over 65, as this is a category of services that is mainly focused on elderly care.

³⁷ The reason for selecting these categories is that the pattern of the demand of real users is different in each of them. Data on the use of health services come from the *Encuesta de Morbilidad Hospitalaria 2006* and *Encuesta Nacional de Salud 2006* (http://www.ine.es/inebmenu/mnu_salud.htm). The weight of each category of service in the final index of expenditure needs is its weight in total real expenditures (*Informe Gasto Sanitario 2007*, <http://www.msc.es/estadEstudios/estadisticas/sisInfSanSNS/finGastoSanit.htm>).

³⁸ Population data come from Instituto Nacional de Estadística, *Padrón 2006* (http://www.ine.es/inebmenu/mnu_cifraspob.htm). Of course, this adjusted potential number of users could be obtained in a more accurate way, with differentiated subindexes for each group of age and sex of the population. Our main concern here was to obtain a simple index without ignoring the biggest differences in patterns of using health services.

³⁹ All population and enrolled students data come from Instituto Nacional de Estadística (http://www.ine.es/inebmenu/mnu_cifraspob.htm and http://www.ine.es/inebmenu/mnu_educa.htm) and each group of potential users was weighted with the relative cost of each category of education published in Ministerio de Educación, *Estadística del Gasto Público en Educación 2006* (<http://www.educacion.es/mecd/jsp/plantilla.jsp?id=311&area=estadisticas>)

- The category of “other general services and infrastructures”, in spite of being heterogeneous, has one common characteristic: it is a range of services that is used by the whole population. Therefore, expenditure needs were measured relative to the entire population of each territory.⁴⁰

There are many other regional characteristics and circumstances that may affect the cost of providing services. However, for simplicity reasons, none was included in the expenditure needs assessment exercise at this time. These adjustments could be done later as empirical evidence about those factors becomes available.

⁴⁰ The final relative expenditure needs index was obtained adjusting each of these four categories with their respective weight in the standard budget.

Appendix 2: Estimating expenditure needs

The estimated capital expenditure needs in each of the four selected categories can be seen in table 2.1. The last column shows the final regional capital expenditure needs that will be used to distribute the capital equalization transfer.

TABLE 2.1 REGIONAL CAPITAL EXPENDITURE NEEDS, 2006 (thousands €)

	Health	Education	Social Services	Gral + Infrastr.	Total EN
Andalusia	373.674	483.772	121.817	3.312.410	4.291.673
Aragon	67.060	61.030	27.175	530.552	685.818
Asturias	58.146	45.780	24.579	447.250	575.755
Balearic Is.	46.097	53.388	14.393	415.755	529.634
Canary Is.	88.971	113.506	25.605	828.898	1.056.979
Cantabria	28.841	27.296	11.029	235.936	303.102
Castile and Leon	137.675	118.234	59.264	1.047.846	1.363.019
Castile-La Mancha	98.150	109.786	37.733	802.495	1.048.164
Catalonia	346.864	357.375	122.154	2.963.141	3.789.534
C.Valencia	232.657	253.053	81.177	1.996.377	2.563.264
Extremadura	55.658	62.731	21.698	451.186	591.273
Galicia	148.107	129.530	61.777	1.149.392	1.488.806
Madrid	280.430	315.597	90.414	2.495.284	3.181.725
Murcia	62.955	83.764	19.645	569.108	735.471
Navarre	29.830	29.753	10.910	249.967	320.459
Basque C.	107.898	95.991	40.868	886.149	1.130.907
La Rioja	15.466	15.135	5.861	127.243	163.705
Total	2.178.479	2.355.721	776.099	18.508.988	23.819.287

Source: elaborated by the authors

Appendix 3: Estimating potential tax revenues:

Recurrent potential revenues are obtained as follows. For those taxes over which ACs do not have any regulatory and administrative powers (VAT and excise taxes), actual collections are used.⁴¹ The main reason is that regional governments cannot modify regional fiscal effort in these cases. For those taxes over which ACs have regulation and/or administrative powers, and therefore regional fiscal effort can be altered, we estimate potential revenue in the following steps:

- For the primarily devolved taxes (transmission and property of wealth, notary's documents and gambling taxes), regionally introduced taxes, and public fees and charges, lacking statistical information on the regional tax bases, we use regression analysis with a fixed effects model and panel data for 1995 to 2006,⁴² where the independent variable is regional GDP and the dependent variable was real collections.⁴³ The main statistical estimators are shown in Table 3.1.
- For the Personal Income Tax we use a similar approach with panel data for 2002 to 2006, and where the independent variable is regional GDP and the dependent variable is real PIT collections.⁴⁴ The statistical results are shown in Table 3.1.

⁴¹ The statistical information came from Ministerio de Economía y Hacienda, *Financiación de las Comunidades Autónomas por los Impuestos Cedidos, Fondo de Suficiencia y Garantía de Financiación de los Servicios de Asistencia Sanitaria correspondiente al ejercicio 2006* (<http://www.meh.es/es-ES/Estadistica%20e%20Informes/Estadisticas%20territoriales/Paginas/Estadisticas%20Territoriales.aspx>), except for the Basque Country and Navarra, for which we used data from Instituto de Estudios Fiscales, *BADESPE* (<http://estadief.meh.es/>), adjusting their collection to the "common" system (35% of VAT and 40% of excise taxes).

⁴² Except for the "Other taxes" category, in which due to the lack of a homogeneous temporal series, the estimation is based on a cross-section simple regression model.

⁴³ Real collection data came from Instituto de Estudios Fiscales, *BADESPE* (<http://www.estadief.meh.es/>) in the first case, while from regional budgets in the last one. GDP data were obtained from Instituto Nacional de Estadística (http://www.ine.es/inebmenu/mnu_cuentas.htm).

⁴⁴ All data coming from Ministerio de Economía y Hacienda, *Financiación de las Comunidades Autónomas por los Impuestos Cedidos, Fondo de Suficiencia y Garantía de Financiación de los Servicios de Asistencia Sanitaria correspondiente al ejercicio 2006* (<http://www.meh.es/esES/Estadistica%20e%20Informes/Estadisticas%20territoriales/Paginas/Estadisticas%20Territoriales.aspx>).

TABLE 3.1: REGRESSION BASED FISCAL CAPACITY ESTIMATES BASED ON DISCRETIONARY TAX SOURCES, 2006

	Personal Income Tax		Notary's Doc. Tax		Wealth Property Tax		Inheritance Tax		Wealth Transm. Tax		Gambling Tax		Other Taxes	
R2	.998		.955		.968		.969		.984		.986		.787	
Std.Err.	.04388		.26081		.19245		.19021		.15008		.11516		.396662	
F	2.459.156		227.266		342.975		370.199		684.396		751.211		55.376	
N	85		198		196		204		204		176		17	
	Coefficients		Coefficients		Coefficients		Coefficients		Coefficients		Coefficients		Coefficients	
Constant	-12.964	(-15.347)(*)	-30.079	(-21.560)	-9.457	(-10.447)	-17.826	(-18.897)	-26.116	(-35.088)	1.061	(1.675)	-1.435	(-0.771)
logGDP	1.485	(32.643)	2.346	(30.805)	1.200	(21.123)	1.616	(30.070)	2.185	(51.521)	.573	(15.867)	.792	(7.442)
DumAnd	excl.		excl.		-1.335	(-8.527)	.002	(.024)	-0.529	(-7.616)	.749	(13.699)		
DumArag	.909	(12.428)	1.716	(11.167)	-0.402	(-4.250)	1.613	(18.780)	.911	(13.445)	.315	(5.925)		
DumAst	1.156	(13.074)	2.124	(11.233)	-0.395	(-4.632)	1.753	(18.386)	1.391	(18.500)	-0.145	(-2.426)		
DumBal	.885	(10.788)	2.226	(13.288)	-0.330	(-3.759)	1.710	(18.530)	1.774	(24.373)	.218	(3.678)		
DumCan	.516	(8.340)	1.415	(10.012)	-1.001	(-9.738)	.304	(3.737)	.532	(8.299)	.592	(11.915)		
DumCant	1.321	(11.765)	3.305	(15.695)	excl.		2.237	(19.211)	2.313	(25.180)	n.a.			
DumCL	.473	(9.379)	.800	(6.368)	-0.820	(-7.057)	1.097	(14.090)	.112	(1.830)	.315	(6.682)		
DumCM	.629	(9.061)	1.594	(10.697)	-1.312	(-13.461)	.786	(9.354)	.772	(11.645)	-0.254	(-4.907)		
DumCat	.121	(3.862)	-0.386	(-3.523)	-0.529	(-3.050)	.384	(3.923)	-0.903	(-11.702)	.724	(11.725)		
DumVal	.274	(8.635)	.538	(4.917)	-0.687	(-4.886)	.453	(5.582)	-0.051	(-0.8)	.910	(18.348)		
DumExt	.891	(8.921)	2.323	(12.154)	-1.295	(-16.111)	1.243	(11.844)	1.475	(17.820)	-0.209	(-3.132)		
DumGal	.538	(10.208)	.939	(7.317)	-0.809	(-7.123)	1.111	(14.208)	.095	(1.537)	.069	(1.457)		
DumMad	.274	(9.101)	-0.345	(-3.012)	.074	(.423)	.408	(4.286)	-0.705	(-9.376)	n.a.			
DumMur	.777	(9.512)	2.268	(13.467)	-0.952	(-10.895)	.932	(10.053)	1.456	(19.910)	.087	(1.502)		
DumNav	1.000	(10.111)	2.257	(11.889)	.458	(5.368)	1.024	(9.825)	1.453	(17.673)	-0.198	(-3.567)		
DumPV	.453	(9.918)	.277	(2.281)	-0.202	(-1.677)	excl.		excl..		excl..			
DumRio	1.508	(11.135)	3.783	(15.491)	0,27	(.327)	2.352	(17.092)	2.658	(24.478)	-0.593	(-6.620)		

Source: elaborated by the authors

(*) Numbers in brackets represent *t* values

Appendix 4: *Estimating potential debt.*

The dependent variable is the actual regional rating published by Moody's or Standard and Poors (1997-2006), and the vector of independent variables includes regional GDP, central and sub-central debt levels, total population, share of younger population, share of older population and weight of intergovernmental transfers in the regional budget. According to the past literature on this issue (Leal and López 2007), we should expect regional GDP to increase the jurisdiction's final rating, assuming that the probability of payment default is lower. Of course, we should also expect that a higher regional level in the stock of debt would lower that jurisdiction's rating. Furthermore, following the literature we also expect a bigger share of population and a larger share in young population to increase regional ratings. The latter fact is due to the fact that a younger population is supposed to enlarge the future active population (and therefore, future economic production); contrarily, a larger regional share in the elderly population implies larger non-productive payments through pensions and a smaller labor force. Finally, the sign of the variable related with the weight of intergovernmental transfers in the regional budget is ambiguous. On the one hand, a higher financial dependency ratio reveals a weaker budgetary position of the regional government, hindering its capacity to increase own revenues to pay loans back. On the other hand, a high share of intergovernmental transfers can also imply a higher probability of central government bailout.

We also create a dummy variable that takes value 1 when the AC is the Basque Country or Navarre, and 0 for the rest of the ACs, to allow for the fact that these two territories benefit from a much more decentralized system of finance. Each region is also captured by a dummy variable to control the regional fix effects. In the estimation results, shown

in Table 4.1, the only variable that was statistically significant was GDP. Interestingly, regional or central total debt and the special financial condition of the Basque Country and Navarre were not significant. The reason for former debt's not being significant can be that the ratings companies assume the possibility of a bail out, so no relationship between the stock of debt and the regional ratings should be expected. Therefore, our resulting estimated ratings depend only on regional economic conditions that cannot directly be modified by the ACs' governments, which is precisely what we need to account for within the capital equalization system.

TABLE 4.1: ESTIMATING REGIONAL RATINGS (2006)

R2	.9743
Root MSE	.45573
F (17,113)	393.92
P > F	0.0000
N	130
Coefficients	
GDP per capita	.1479311 (6.41) (*)
Pop<24	1.56e-06 (1.16)
DumAnd	-4.052 (-1.15)
DumArag	-1.068344 (-1.36)
DumAst	(dropped)
DumBal	.0462108 (.06)
DumCan	-.2289046 (-.22)
DumCant	-1.110699 (-1.86)
DumCL	-.6055964 (-.54)
DumCM	.1955473 (.20)
DumCat	-4.108696 (-1.50)
DumVal	-2.308171 (-1.19)
DumExt	.4505377 (-.56)
DumGal	-1.106069 (-.92)
DumMad	-3.992994 (-1.63)
DumMur	-1.058872 (-1.34)
DumNav	.371172 (-.55)
DumPV	-.748773 (-.67)
DumRio	(dropped)

Source: elaborated by the authors; (*)t values shown in brackets