



Measuring the Regional Incidence of Taxes and Public Expenditure: The Available Methodology and its Limitations*

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Summary

This article reviews the basic methodology used to estimate the regional incidence of taxes and public expenditure, which we call the *fiscal incidence* approach, and compares it with the *cash flow* approach, which measures tax revenues and expenditures in terms of the associated monetary cash flows. In this context, it considers critically the particular version of the cash flow approach used in Spain. The article also looks at the different ways in which economists have tried to decompose fiscal balances into a structural or distributive component and a cyclical component, and critically reviews present practices.

Keywords: Regional fiscal balances, tax and expenditure incidence, cyclical and structural effects.

Classification JEL: H2, H5, H22, H30, H61, H62.

1. Introduction

More than sixty years ago, Richard Musgrave¹ said that “The search for quantitative estimates of tax incidence leads the explorer through a wasteland of muddled concepts, inadequate theory, and lack of data.” Musgrave *et al.* (1951; p. 1) Things have not improved much since then. So the recent proliferation of this type of studies in Spain, with a particular emphasis on the regional incidence of central Government’s taxes and expenditure, is cause of some surprise. And so it is, the apparent precision and robustness with which these estimates are presented by official sources². For example, the Catalan Government estimate that, in 2010, the central Government’s³ fiscal balance in Catalonia (tax revenue minus public expenditure) was €16,543 million (8.5% of Catalan GDP) transmits an idea of exactness that is far from real⁴. It is an estimate subject to many assumptions, in which

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small variations of these assumptions have strong effects on the final results. It comes from a methodology which is not the right one to measure the difference between the taxes Catalan citizens pay to and the public services they receive from the central Government. And it is not even a measure of the observed fiscal balance, but rather that of a derived concept.

Although in Spain studies of regional fiscal balances have a fairly long tradition⁵, it is difficult not to see a certain relation between the renewed interest in this subject⁶ and the recent emergence of the Catalan secessionist movement, which takes the purported large and adverse fiscal balance of the region *vis-à-vis* the central Government as the main economic justification of the independence of Catalonia. In fact, the political use of incidence estimates is not new. Musgrave goes on to say that although empirical evidence is scarce, “the economist can be useful in making explicit the assumptions underlying a particular conclusion. His informed judgment, to say the least, should prove a better basis of policy than random guesses or political slogans.” (p. 1). It is in this spirit that the present paper reviews the methodology available to estimate the regional incidence of central Government’s fiscal actions and the limitations of this methodology. In order to illustrate the argument, the review makes use of recent official estimates of the Catalan fiscal balance, although estimates of the whole set of Spanish regional fiscal balances are also considered.

The rest of the paper is organized as follows: Section 2 reviews the basic methodology used to estimate the economic incidence of taxes and public expenditure, which for purposes of reference we call the *fiscal incidence* approach, and compares it with the *cash flow* approach, which measures tax revenues and expenditures in terms of monetary cash flows. It also considers critically the particular version of the cash flow approach presently used in Spain. Section 3 deals with two practical issues –institutional perimeter and coverage of fiscal balances– which play an important role in matters of estimation and can lead to severe distortions if not properly handled. Given that fiscal balances, as all macroeconomic concepts, are affected by the particular cyclical moment in which the measurement is made, Section 4 looks at the different ways in which economists have tried to decompose fiscal balances into a structural or distributive component and a cyclical component, and reviews critically present practices. Section 5 explains the causes behind the observed fiscal balance and concludes that the claim of the secessionist movement that the Catalan fiscal balance is excessively adverse is not justified. Section 6 advocates for the need to place more attention to basic observed data over time and for the insights that such data can offer when analyzed with care. Section 7 concludes the paper.

2. Fiscal incidence versus cash flow

The measurement of territorial fiscal balances involves a straightforward extension of the traditional studies of fiscal incidence. So it is sensible to begin by briefly reviewing the literature on fiscal incidence.

2.1. The literature on fiscal incidence

The first studies were aimed exclusively at the distribution of the tax burden across income classes⁷, but it was soon realized that to have a more complete picture of the economic incidence of the fiscal activity of governments, public expenditures had also to be taken into account⁸. In all cases, tax burdens were empirically approximated by the nominal amount of tax revenue (disregarding therefore the value of deadweight losses), and expenditure benefits by the nominal outlays by governments to provide public services (disregarding therefore the valuation that different individuals might have of these services). Incidence was therefore traced not to individual taxpayers or public services beneficiaries, but to groups of individuals, identified by their characteristics regarding their role as earners of income or as consumers of goods and services⁹. Despite attempts to improve on these approximations¹⁰, this remains the state of the art of the discipline.

The above gives the procedure to estimate the totals of revenue and expenditures. The next task is to assign these totals to individuals and, in particular, as far as the studies referred to, to individuals by income class. That is, to identify the incidence of governmental budget activity across the income distribution. Here comes an important second empirical approximation that relies on: a mixture of theory, to ascertain the shifting characteristics of specific taxes; the nature of different spending programs, to identify the final beneficiaries of public services; and statistical indicators, to allocate total revenues and expenditures across the income distribution according to the guidelines offered by theory and the characteristics of the different spending programs. Musgrave *et al.* (1951) give the first, complete and most authoritative account of the empirical criteria to allocate revenue, and Gillespie (1965) complements this set of criteria with another to allocate expenditure. Since the time these two contributions were made, with relatively few and non-fundamental variations, this is the methodology that has consistently been followed by other authors.

To give a flavor of the criteria used, and as far as tax revenue is concerned, Musgrave *et al.* (1951) assume that the individual income tax is born entirely by the individual. For the corporation tax, they use three shifting assumptions: according to the first, one-third of the tax is shifted forward to consumers and one-eighth is shifted backward to wage earners, the remaining falling on profits; according to the second, the entire tax is shifted forward to consumers; and according to the third, the entire tax remains on profits. In addition, they consider two assumptions regarding the treatment of retained earnings, which gives six distinct cases for the allocation of the corporate tax. In the case of excises they assume that they are entirely shifted forward to consumers. Property taxes are assumed to remain with the owner in the case of real estate owned by individuals, and distributed as dividends in the case of business property. But due to lack of data, three alternative scenarios are considered depending on the assumed distribution of owner occupied homes or rented property by individuals or business firms. Regarding Social Security taxes, three alternative assumptions are used for the employer contribution: Case A assumes that one-third is shifted backwards to wage earners and two-thirds forward to consumers; Case B assumes complete backward shifting to wage earners; and Case C, complete forward shifting to consumers. Regarding the employ-

ee contribution, in all three cases it is assumed that they fall on wage earners. Finally, given the high level of exemptions permitted, for Estate, Inheritance and Gift taxes they assume that all of the yield should be imputed to income recipients in the top bracket.

Gillespie (1965), without considering as many different alternative scenarios as Musgrave and collaborators, uses similar assumptions on revenue and, as far as expenditure is concerned he states that the aim is to identify the beneficiary of each type of expense. So transfer payments like pensions, unemployment and social assistance benefits are directly allocated to the corresponding recipients of the transfers; public services to the users of these services (although to the extent that some of these services, like health, have positive externalities, to the population at large); and investments in roads and motorways to “consumers of passenger travel” and “consumers of transported products”, and even to non-users to the extent that roads also provide access to the sites of property owners. An important issue was how to proceed as far as the allocation of non-divisible services such as defense, general government or foreign policy. Gillespie gives the right answer when he notes that these services nearly fulfill the characteristics of a “true ‘social want’ because equal amounts of them are consumed (or are available for consumption) by all” (p. 160). Another question, however, is how to allocate the cost of these services among income classes, and here Gillespie adopts four alternative assumptions: “Assumption A, [...] allocated equally to all families in correspondence with the idea [...] that ‘social wants’ are satisfied by goods and services that must be consumed [...] in equal amounts by all”. “Assumption B, [...] allocated by a distribution of total income [since the benefits from these] ‘general’ expenditures relate to the earnings of income”. “Assumption C, [...] allocated by a distribution of capital income, thereby reflecting the ‘protectionist’ version of the benefit doctrine”. And “Assumption D, [...] allocated by the distribution of disposable income” to the extent that “‘general’ expenditures complement the income-using aspect of economic activity” (pp. 160 and 161).

As the above description shows, these researchers, aware of the uncertainties surrounding this issue and the lack of adequate empirical indicators to allocate revenue and expenditure, did not hesitate to consider not only the results based on what appeared to them “the ‘most likely’ set of assumptions”, but also those obtained with a number of alternative hypothesis in order “to accommodate the reader whose idea of ‘most likely’ differed” from that entertained by the authors (Musgrave et al., 1951; p. 39). This stands in sharp contrast with the single set of assumptions approach used by GC (2012 and 2013), as we shall see below ¹¹.

This is the theory and empirical practice of economic incidence studies, and it must remain so if the scope of the investigation is directed to other distributional categories based on age, family status or geographical location of the individuals who pay the taxes and receive the benefits. Mushkin (1956) was one of the first attempts to allocate taxes geographically, and she adhered strictly to the methodology set out in Musgrave *et al.* (1951). In a subsequent study aimed at the distribution of federal expenditures among the States, Mushkin (1957) approaches the problem using the same analytical framework as that used for tax incidence. The distinction made between tax collections and tax incidence is essentially the same as the distinction “between the place where a government check is received

initially and the ultimate recipient of or ultimate beneficiary of the payment” (p. 435). Despite this, she calculates two distributions, one based on a dollar-flow approach, which she justifies as being “more familiar” (p. 436)¹², and another one based on a benefit approach, which “traces federal expenditures to the recipients of the services and payments for which the federal programs are designed” (p. 436), and which is consistent with the economic incidence approach she previously used in her tax study. The consideration of the cash flow approach by Mushkin meant a significant departure from academic practices, since up to that moment that method had only been used to collect statistics by Public Administrations. As we shall see below, this had consequences on subsequent research, particularly in Spain. Another noteworthy study of regional net incidence is that of Catsambas (1978), who finds objection to Mushkin’s use of the dollar-flow approach and follows very closely the Musgrave/Gillespie fiscal incidence methodology.

More recent studies can be found in Bosch, Espasa and Solé-Ollé (2010). Leaving aside the Spanish contributions that are considered below, a piece of work that goes directly into the central point of our discussion here is Vaillancourt (2010), who states that “The cash flow approach is inappropriate [...] since it does not take into account the possibility of the shifting of taxes from the point of collection to the point of effective payment or the inter-regional benefits of expenditure in one region. [...] Thus the fiscal incidence approach should be the one used” (p. 44). Among the country studies of fiscal balances presented in that volume, those for Italy and Belgium adopt the fiscal incidence approach, and the one for Canada uses what his author calls the “economic gain approach” which is a composite of the fiscal incidence approach for revenues, of the cash flow approach for the wage component of expenditures on goods and services, and of a new approach aimed at identifying the place where the production of these goods and services takes place for the non-wage component¹³.

2.2. The basic methodologies compared

The €16,543 million figure given above for the excess of revenues over expenditures that the central Government obtained in Catalonia in 2010 (GC, 2013), comes out of the so called *monetary* method to estimate territorial fiscal balances. Another approach, also considered in GC (2013), is the *benefit* method, which for the same year and using the same basic data yields an estimate of €11,258 million. Both estimates convey the idea that on average Catalan citizens pay in taxes much more than the value of transfers and services they receive from the central Government, but the excess estimated with the monetary flow method is almost 47% larger than that based on the benefit flow method. Given such disparity of results, it is important to know what the differences between these two methods are and for that purpose, in order to bring as clearly as possible these differences, it is useful to consider the two basic approaches on which these methods are based: the *fiscal incidence* approach (the foundation of the benefit method) and the *cash flow* approach (the foundation of the monetary method).

On the expenditure side, the problem is that to deliver a public service, the government must normally use certain inputs. Where these inputs are geographically located or where the

corresponding contracts are paid, is something that may be quite different from where the beneficiaries of this service live. On the revenue side, the problem is that the legal subjects of a tax do not necessarily coincide with the individuals who actually pay the tax –that is, with the individuals who see their private incomes reduced as a consequence of the tax (Bird, 2003).

The fiscal incidence approach assigns expenditures to a given territory according to the value of the services received by its residents, and tax revenue according to the residence of the individuals who finally bear the burden of the corresponding tax, irrespective of who is the legal subject of the tax and where he lives. The cash flow approach, on the other hand, assigns expenditures according to the residence of the inputs that have been used, and paid, in order to provide the public service, and tax revenue according to the residence of the legal subjects of the tax, irrespective of whether this tax has been shifted or not to another territory¹⁴.

Two very concrete examples may help to understand the essential difference between these two basic methodologies. The first is a classic example –the service of defense– which illustrates very well the different treatment that these two approaches give to pure public goods; that is, goods whose provision is indivisible and from whose consumption no one can be excluded.

Taking the particular example of Catalonia, we observe that nowadays this region houses very few military forces. Suppose, to be concrete, that the only forces are those of the Pedralbes barracks in Barcelona, and the Talam Military Academy of non-commissioned officers in the province of Lleida. According to the 2010 figures given by GC (2013), the cost of this deployment in terms of wages, salaries, maintenance, investment and other concepts is €362 million. The cash flow approach would value the activity of the central Government in the area of Defense in Catalonia in €362 million (4.6% of the total Defense budget). The fiscal incidence approach, on the other hand, would value the service of defense provided to Catalan residents in €1,243 million, approximately 16% (the relative population of Catalonia) of the total Defense budget, under the reasoning that the provision of this service is a pure public good that benefits equally all Spaniards.

Consider the same example from another perspective: supporters of the independence of Catalonia use the Catalan fiscal balance as a measure of the yield that the Government of an independent Catalonia would obtain respect the present situation. The relevant question here is: if the Government of a future independent Catalonia decides that Catalans should have the same level of military protection as the one they enjoy today, how much would this Government spend? Even for a non-specialist in Defense matters, as it is my case, it would seem untenable that the same protection service could be provided with only the €362 million at which the cash flow approach values the military activity of the central Government in Catalonia. I should think that to give the same level of service, an independent Catalonia would want to belong to NATO, and that the conditions for membership would be that Catalonia contributed to the Alliance, not only with the corresponding fee, but also with an army of the characteristics of the present Spanish army, scaled down to the smaller Catalan population.

That is, the cost of Defense of an independent Catalonia would be (in 2010 values) around the €1,243 million given by the fiscal incidence approach.

Defenders of the cash flow approach argue that what fiscal balances must measure is the impact of the central Government budget on the level of economic activity in the region under consideration. But this is not the relevant question if we want to find out whether the central Government gives more than it takes, or takes more than it gives. The wage that the central Government pays to a soldier stationed in Catalonia is the result of a market transaction between the central Government and an individual who in exchange for this wage offers his time and skills. And the same reasoning should apply to the derived transactions that this soldier might make with his income when he buys goods and services in Catalonia or elsewhere.

This aspect of the problem can better be seen in the following second example: Suppose that an agricultural epidemic caused by a particularly malignant mosquito breaks out in Extremadura and the occidental part of Castile-La Mancha. The only company, internationally reputed and very prosperous, that can solve the problem, developing the adequate pesticide and implementing its application on the field, is a Catalan company. Its headquarters are in Barcelona, all its plants are located in Catalonia and all its workers reside in that region. After the pertinent contacts, the Spanish Ministry of Agriculture signs a contract with this company for a total cost of €50 million. How would this budget operation by the central Government be reflected under the two basic approaches defined above? The fiscal incidence approach would simply look at the final beneficiaries and would allocate the whole of this expenditure to Extremadura and Castile-La Mancha, in proportion to the respective affected areas. No quantity whatsoever would be assigned to Catalonia. On the other hand, the cash flow approach would take as the relevant characteristic the residence of the company that has received the €50 million payment and would assign this expenditure to Catalonia. No assignation would appear for either Extremadura or Castile-La Mancha.

Obviously, the cash flow approach is not the appropriate method to identify and value the services received by a given region as a consequence of the budget activity of the central government. Someone might say that, irrespective of the final beneficiaries, the fact is that €50 million have gone to Catalonia, and this is good for Catalans and for the economic activity of the region. However, as far as the issue that concerns us here, this is irrelevant. The €50 million payment received by the company is the market compensation to defray the cost incurred by this company to develop and implement the pesticide plus the associated benefit. The transaction is by definition equilibrated. Do these €50 million matter as far as the welfare of Catalans? Do these €50 million make any difference to the level of economic activity of the region? The answer is no to both questions. What matters to the welfare of Catalan people and to the prosperity of the region is the existence of this company and its know-how. If the company had not received this mandate from the central Government, it could have served demands from other clients. The €50 million is the opportunity cost that this company has to face in order to supply the central Government with the services re-

quired. The real final beneficiaries of the budget activity of the central Government are farmers in Extremadura and Castile-La Mancha, no matter the Catalan location of the company that has solved their problem.

It could be argued that this argument is correct if the economy has all its resources fully occupied, but not if the economy has a significant unemployment rate. This is an interesting question because it allows us not only to see the approximate character of the fiscal balance concept as is empirically estimated, but also to elaborate further on the deficiencies of the cash flow approach *vis-à-vis* the fiscal incidence approach.

To begin with, notice that in an economy with unemployment the correct answer to the second example is still given by the fiscal incidence approach. The economy may display unemployment, but that does not affect the company that delivers the service, inasmuch as, by assumption, its activity does not depend in any crucial way on the central government's demand for services. Nothing in the argument changes, whether or not unemployment is assumed to exist.

The answer is somewhat more complex when we refer to the first example. Essentially, behind this criticism lies the idea that in an economy with unemployment, on top of the direct effects from public expenditure, there exist other indirect effects, via additional economic activities, that would not have been generated otherwise. The Talam Military Academy, located in a fairly rural area of the Catalan interior, generates a salary for instructors and students, but also benefits shops, hotels and restaurants in the nearby city of Tremp. It could be adduced that, in these conditions, the cash flow approach is better than the fiscal incidence approach to gauge the economic impact of Government's fiscal activity, but this is not the case.

As far as the direct effect is concerned, the central government has spent €362 million in defense services in Catalonia, and Catalonia has given in exchange hours of work, goods and services the market value of which is €362 million. The direct net value of this transaction is exactly zero. So, on this account, the cash flow approach fails: it values in €362 million a transaction, the net direct effect of which is nil.

Regarding the indirect effect, suppose that the €362 million expenditure has generated indirect economic activity the value of which is €50 million, which otherwise, given the existence of unemployed labor, would have not arisen. Evidently, here we find value added which, in net terms, after taking into account the unemployment benefits saved by the central Government (which Catalonia no longer receives), we value in €20 million. Now, it is true that these €20 million are not identified by the fiscal incidence approach, but nor are they identified by the cash flow approach. So the fiscal incidence approach fails because it has not measured this net indirect effect (a 1.6% underestimation). The cash flow approach fails because (i) has not measured the indirect net effect and (ii) has taken as valid the value of a market transaction which has (almost) nothing to do with the defense service received by the Catalan population (in total, a 71.4% underestimation).

It is true that the initial argument assumes a full employment economy, but it is also true that indirect macroeconomic effects are not easy to measure empirically. This should not be construed as a justification of the concept of fiscal balance, but rather as a remainder of the approximate character of this concept¹⁵. Also, a last line of defense of the cash flow approach would argue that payments to factors are real benefits to their owners, whatever is exchanged for them. But this could only be true supposing a zero opportunity cost for these factors, which is a hypothesis that does not fit well either with observation, or with the general tenets of economic theory¹⁶. For our purposes what matters is that the fiscal incidence approach gives an approximation of what ideally we would like to measure, while the cash flow approach gives an altogether different thing: the market value of a transaction between the central government and economic agents located in a given region, which has little to do with the cost/value of the public service provided to the inhabitants of this region.

2.3. Present Spanish practices

The two methods actually used in Spain –the benefit method and the monetary method– do not perfectly match the two basic approaches discussed in the previous section¹⁷. There is no problem with the benefit method, as this follows exactly the fiscal incidence (Musgrave/Gillespie) approach, but not so with the monetary method, which is a hybrid of the two basic approaches. Indeed, as far as revenue is concerned, the monetary method is very close to the fiscal incidence approach, whereas to assign expenditures it uses the cash flow approach for general indivisible expenditures and, in particular, for wages and salaries, and a mixture of the fiscal incidence and cash flow approaches for the rest of expenditures.

It is useful to gain some perspective by briefly reviewing the Spanish literature on territorial fiscal balances, drawing on the excellent Barberán (1999) survey of twenty six Spanish studies that range from 1960 to 1997, and Uriel and Barberán (2007) that extend the survey with ten more contributions until 2005.

Of the three early Spanish studies cited in note 5, Trias-Fargas (1960), although frequently cited and influential, is not a proper study of fiscal balances, but rather of the notional balance of payments between the province of Barcelona and the rest of Spain. However, the other two –Petit (1965), and Ros-Hombrevella and Montserrat (1967)– do correspond quite closely to what we know as regional fiscal balance studies, and are both based on financial flows recorded in the provincial delegations of tax and spending units of the central Government. Data availability, rather than methodology, seems in this case to have been the determining issue. And this is the rule for the following eight studies, although with an increasing concern about the economic interpretation of the data and, consequently, about the need to correct the information obtained from provincial official flow statistics¹⁸. We have to wait until Castells (1979) for a direct and explicit application of the theory of economic incidence to an estimation of the Catalan fiscal balance for 1975. The author, in the Musgrave/Gillespie tradition, uses a variety of incidence assumptions, and presents also results

using the cash flow approach. This was an influential contribution that left its mark in many subsequent Spanish studies in this area.

The next study worth highlighting is Colldeforns (1991) for her rejection of the fiscal incidence approach and defense of the cash flow approach to assign expenditures. She rejects the welfare dimension of fiscal incidence, and values as relevant the impact of central Government budget policy on the economic activity of a region, which she understands is better measured by the cash flow approach. Her territorial assignment of expenditures, however, does not follow a pure cash flow method, but rather she inaugurates the use of the official SICOP¹⁹ data base to allocate a part of central government expenditures without the use of indirect criteria, using cash flow criteria only on the non-territorialized part of SICOP (mainly general indivisible expenditures). Colldeforns is clearly a forerunner of what later was to be known as the monetary method.

The extension considered in Uriel and Barberán (2007) adds nine contributions to the Barberán (1999) list, five of which opt unambiguously for the fiscal incidence approach, three for the method originated by Colldeforns (with some variations), and two which present in the same exercise estimates using both types of methodologies. In all cases, an extensive use of the SICOP data base is made.

We therefore have a long Spanish tradition of regional fiscal balance studies, with a first period marked by the use of the cash flow approach, mainly a consequence of the unquestioned use of available revenue and payment statistics of tax and spending coming from provincial delegations of the corresponding national ministerial departments. A second period, initiated with the Castells (1979) paper, in which the fiscal incidence approach is accepted as the correct method and is generally used, and in which calculations based on cash flow assumptions are also made. And a third period initiated with the hybrid method used by Colldeforns (1991), which has signified a certain revival of the use of the incidence approach for revenue and the cash flow approach (qualified by the use of SICOP) for expenditure²⁰.

This is the background on which an official decision regarding the need to unify methodological approaches was taken. Strangely, given the disparate results that follow from them, both basic approaches –or rather the two methods based on them: the benefit method and the monetary method– were accepted as adequate by a panel of academics and public officials convened by the official Spanish Institute of Fiscal Studies (IEF, 2006), and subsequently endorsed by another panel of experts convened by the GC (GC, 2009). It is therefore important to know what exactly the benefit and the monetary methods sanctioned by these panels are.

The benefit method is simply the fiscal incidence approach.

The monetary method, although it shares many of the characteristics of the cash flow approach, it differs from it in significant ways. Following the definition given in IEF (2006), “[in the monetary method] tax revenue is assigned geographically according to the location

of the economic capacity subject to tax [...], which may be income, wealth or consumption, and non-tax revenue according to the residence of the agents or organs that make the corresponding payment (p. 15)". Particularly in the case of tax revenue, this is not a cash flow criterion, since the distribution of macroeconomic indicators of tax capacity does not necessarily coincide with that of revenue collected. Nor is a fiscal incidence criterion, since for many taxes the burden may have shifted to other regions. In practical terms, however, given that the empirical indicators used to assign revenue territorially are similar, the results of the two methods are very close.

Regarding expenditures, and following with IEF (2006), "[in the monetary method expenditures] are assigned, in the case of operations involving goods and services (final and intermediate consumption, and gross investment) to the territory where these expenditures take place and, in the case of operations involving the distribution of resources (salaries, subsidies, social benefits, and current and capital transfers) to the territory where these resources are destined. Particular operations, like interest paid on public debt [and others], are exempted from this criterion and are distributed according to some global indicator (like population or others)" (p. 15)²¹. Here again, except for salaries, this is not a cash flow criterion, nor is it a fiscal incidence criterion, since in many cases the place where the goods purchased are sent or the infrastructures located has little to do with the residence of the beneficiaries of this expenditure. Think, by way of example, of the salaries paid to all the civil servants attached to general indivisible services and located in Madrid, a squadron of fighter planes purchased in Germany and stationed in Aragón, or the high-speed rail tracks (and associated infrastructures) that cross a region without stations on this line. In fact, what this criterion seems to do is to define a method that maximizes the direct use of the SICOP data base, whatever the resulting distribution means, and ensures that public salaries are assigned mostly to Madrid²².

It is difficult to understand how such a contrived and economically meaningless method was ever agreed by a panel of experts. The justification given in the same IEF (2006) report may give some inkling into the issue: "the monetary method aims at measuring the effect of [the] central public sector on the economic activity of a given territory, determining how their macroeconomic magnitudes vary in terms of production and consumption (p. 91)". But we have argued above that this is far from the case, as it is pretentious to suppose that the territorial macroeconomic effects of the Government's budget policy –a long-run, general equilibrium set of effects– could be estimated by the simple impact measure of, for instance, the examples mentioned in the previous paragraph. All the salary expenses registered by the monetary method are simple market transactions, and many investments in equipment and infrastructures may have meant payments to factors which are located/reside in other regions or abroad. None of this information is given (or indeed should be given) by the SICOP data base, which (it must be remembered) is an accounting instrument to help civil servants with the management of the central Government budget.

The report of the Catalan panel (GC, 2009) gives a justification under similar lines: "The use of one method or the other depends on the objective of the analysis: the monetary method

tries to measure the economic impact generated by the activity of the public sector in a given territory, while the benefit method tries to calculate the [change in] welfare of individual residents in this territory as a result of the activity of the public sector. [...] The two approaches are complements rather than substitutes. The monetary method is the correct one to analyze the influence of public sector's activity on the economic growth of a region, while the benefit method is more appropriate to analyze the public sector's effect in terms of redistribution and equity (p. 9)".

This is reminiscent of Mushkin's justification of the benefit and cash flow approaches advanced more than fifty years before: "The two measures [...] serve different purposes and are useful for different kinds of analysis. [...] The benefit approach [...] traces federal expenditures to the recipients of the services and payments for which the federal programs are designed. In contrast, a dollar-flow approach is designed to trace the funds from their taxpayer sources to the recipients –federal employees, other individuals and families receiving welfare payments and benefits, holders of the public debt, and those who produce the goods and services which go into commodities purchased by the federal government (Mushkin, 1957; p. 436)". But notice a very important difference: Mushkin does not delude herself about the aims of the cash flow approach: it simply traces the flow of money that goes from the taxpayer to the recipient, whoever that is, and whatever are the reasons why he is the recipient. This is a task that may be of concern to government statisticians, but pretty uninteresting to economists. Compare Mushkin's realism with the untenable claim of the two Spanish panels regarding the capacity of the monetary method to measure macroeconomic effects on economic activity and growth²³.

2.4. An empirical comparison

How different are the fiscal balances obtained with the monetary and benefit methods? Tables 1 and 2 give the results of estimating revenues, expenditures and fiscal balances in 2005, for the seventeen Spanish Autonomous Communities plus the two Autonomous cities of Ceuta and Melilla, using the monetary method (table 1) and the benefit method (table 2). The results for the monetary method are taken from IEF (2008) and those for the benefit method from Uriel and Barberán (2007).

Year 2005 is the last for which estimates of the whole set of fiscal balances for all regions are available. There are more recent estimates (up to 2010) of the Catalan fiscal balance published by the Catalan Government, but it is difficult to assess properly the difference between the two methods using only the results for a single autonomous community. Also, two different sources are used –IEF (2008) and Uriel and Barberán (2007)– because, although IEF (2008) contains estimates using the two methods, the ones for the benefit method include the category "rest of the world" which, quite unnecessarily, and despite its significant magnitude, is not assigned to the communities, whereas this problem is not present in the case of Uriel and Barberán (2007).

Table 1
FISCAL BALANCE (R-E) 2005, MONETARY METHOD (€ million)

	<i>R^a</i>	<i>E^b</i>	<i>R-E</i>	<i>(R-E)/GDP (%)</i>
Balearic Islands (BAL)	6,703	3,512	3,191	14.1
Catalonia (CAT)	46,323	31,515	14,808	8.7
Valencia (VAL)	24,425	18,850	5,575	6.3
Madrid (MAD)	46,906	37,994	8,912	5.5
Navarre (NAV)	2,741	2,253	488	3.2
Murcia (MUR)	6,376	5,877	499	2.1
Basque Country (BC)	9,600	8,842	758	1.4
Rioja (RIO)	1,819	1,862	-44	-0.7
Canary Islands (CAN)	9,140	9,730	-590	-1.6
Aragon (ARA)	7,670	8,180	-510	-1.8
Castile-LaMancha (CLM)	8,765	9,868	-1,103	-3.6
Andalucia (AND)	33,853	39,582	-5,729	-4.6
Cantabria (CTB)	3,072	3,643	-571	-5.0
Castile and Leon (C&L)	12,377	16,069	-3,692	-7.5
Galicia (GAL)	12,820	16,626	-3,807	-8.2
Asturias (AST)	5,720	8,500	-2,780	-14.2
Extremadura (EXT)	4,030	6,725	-2,695	-17.7
Ceuta (CEU)	340	727	-388	-28.7
Melilla (MEL)	311	732	-421	-33.9
Total	242,991	231,087	11,904	1.3

Source: MEH (2008) and author's own calculations.

^a *R*: Revenue.

^b *E*: Expenditure.

Table 2
FISCAL BALANCE (R-E) 2005, BENEFIT METHOD (€ million)

	<i>R^a</i>	<i>E^b</i>	<i>R-E</i>	<i>(R-E)/GDP (%)</i>
Madrid (MAD)	47,748	26,810	20,938	13.0
Catalonia (CAT)	45,929	34,926	11,003	6.5
Balearic Islands (BAL)	5,392	4,022	1,369	6.0
Valencia (VAL)	24,416	21,245	3,170	3.6
Rioja (RIO)	1,646	1,588	58	0.9
Murcia (MUR)	6,271	6,183	88	0.4
Cantabria (CTB)	3,309	3,361	-52	-0.5
Navarre (NAV)	2,230	2,335	-105	-0.7
Aragon (ARA)	7,337	7,592	-255	-0.9
Basque Country (BC)	7,946	9,830	-1,884	-3.4
Andalucia (AND)	35,423	40,514	-5,091	-4.0
Castile and Leon (C&L)	12,569	15,383	-2,814	-5.7
Castile-La Mancha (CLM)	8,196	10,028	-1,832	-6.0

Table 2 (Continued)
FISCAL BALANCE (R–E) 2005, BENEFIT METHOD (€ million)

	<i>R</i> ^a	<i>E</i> ^b	<i>R-E</i>	(<i>R-E</i>)/GDP (%)
Canarias (CAN)	7,706	10,345	-2,639	-7.2
Galicia (GAL)	12,939	16,300	-3,361	-7.2
Asturias (AST)	5,606	7,995	-2,389	-12.2
Extremadura (EXT)	4,280	6,655	-2,375	-15.6
Ceuta (CEU)	267	592	-325	-24.0
Melilla (MEL)	237	590	-353	-28.4
Total	239,447	226,294	13,153	1.4

Source: Uriel and Barberán (2007), and author's own calculations.

^a *R*: Revenue.

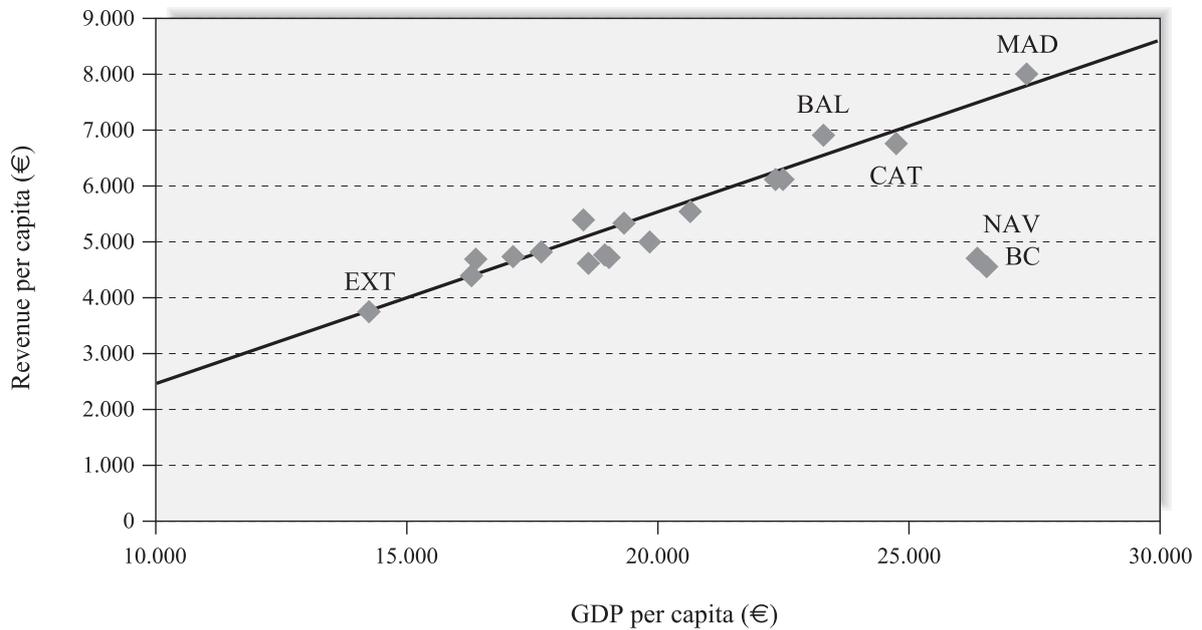
^b *E*: Expenditure.

As tables 1 and 2 indicate, the use of one method or the other makes a lot of difference to the estimates of fiscal balances²⁴. For some regions (Navarre, Basque Country and Rioja), it even changes the sign of the balance. The comparison between Catalonia and Madrid is particularly telling. With the monetary method Catalonia's fiscal balance is €14,808 million and Madrid's €8,912 million; both adverse to the respective region and Catalonia's balance 66.2% larger than Madrid's. With the benefit method both balances continue to be adverse to each region, but Catalonia's balance falls to €11,003 million and Madrid's raises to €20,938 million; now the fiscal balance of Madrid is 90.3% larger than that of Catalonia. Seen from another point of view, the monetary method overestimates the Catalan fiscal balance by 34.6%, and underestimates Madrid's balance by 57.4%.

From a horizontal distribution perspective, figure 1 shows that as far as revenue is concerned the results of the two methods are very similar, both showing a significant proportional relation between revenue and income. If anything, the relationship is stronger in the case of the monetary method than in the case of the benefit method, as it should be expected given the closer reliance of the former on macroeconomic indicators. This however comes at the cost of introducing a degree of uniformity in the tax behavior of the different communities which is artificial. For instance, the reasonably well-established higher level of compliance of Madrid versus Catalonia and, particularly, the Balearic Islands, which is very well reflected in the estimates from the benefit method, disappears completely when the monetary method is used²⁵, as so it does the particular tax regimes applicable to the Canary Islands and the two autonomous cities Ceuta and Melilla.

Regarding expenditure, however, the results that come out from the two methods are very different. As figure 2 shows, the relationship between expenditure per capita and GDP per capita is very weak irrespective of the method used. Therefore, at least at the level of aggregation given by regional means, we cannot refute the hypothesis that in Spain public expenditure is proportional to population. The real difference is the much greater dispersion of the scatter diagram when the observations are generated by the monetary method (Panel A) than when they are generated by benefit method (Panel B). Leaving aside the two foral com-

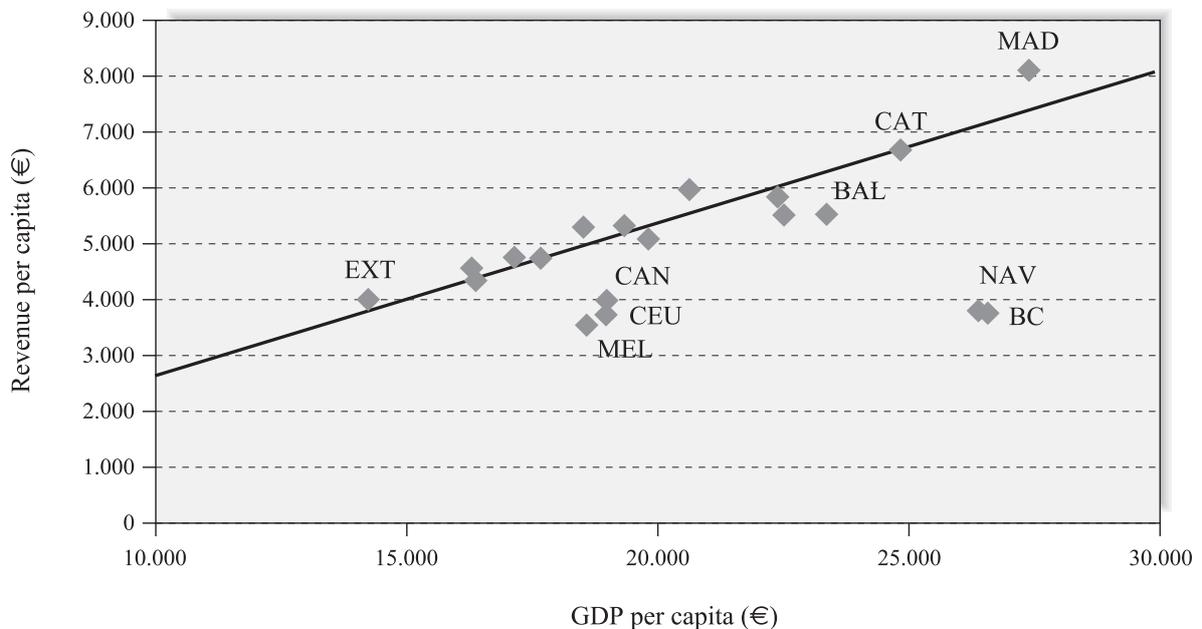
**A. Revenue per capita versus GDP per capita, 2005
Monetary Method**



The regression line excludes NAV, BC, CEU and MEL. The line is $(R/N) = 557 + 0.3028 * (GDP/N)$; $R^2 = 0.95$ (the coefficient with an asterisk is significant at the 5% level). N: Region's population; GDP: Region's Gross Domestic Product.

Source: MEH (2008) (Estimation FM-1) and author's own calculations.

**B. Revenue per capita versus GDP per capita, 2005
Benefit Method**



The regression line excludes NAV, BC, CEU and MEL. The line is $(R/N) = 76.4 + 0.2709 * (GDP/N)$; $R^2 = 0.81$ (the coefficient with an asterisk is significant at the 5% level).

Source: Uriel and Barberán (2007) and author's own calculations.

Figure 1. Monetary Method versus Benefit Method: Revenue

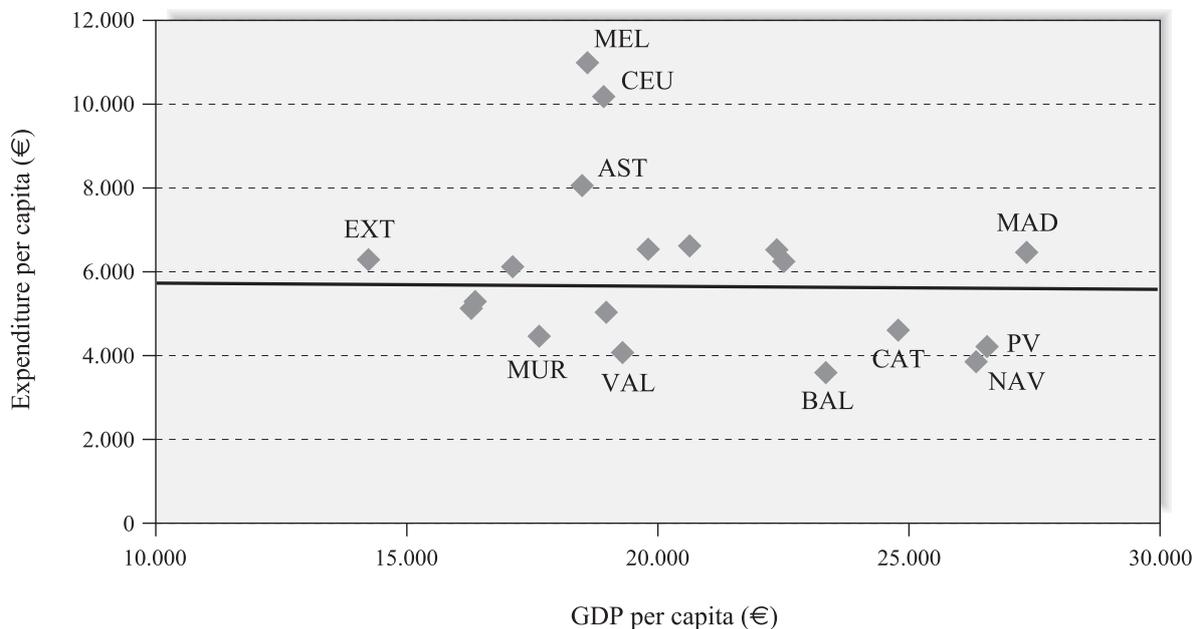
munities (Basque Country and Navarre) and the two autonomous cities (Ceuta y Melilla), the monetary method places Madrid well above the regression line (16%), and Catalonia and the Balearic Islands well below (18% and 27% respectively), a direct consequence of the assignment of general indivisible expenditures mostly to Madrid. The benefit method, on the other hand, reduces this dispersion drastically, placing these three communities much closer to their respective position on the regression line: Madrid is placed just below the regression line (only a 5% deviation from it) Catalonia shifts just over the line (1% deviation) and Balearic Islands, although still below the line, reduces its deviation from 27% to 20%. And the same happens to Valencia and Murcia: they remain below the regression line with both methods, but their deviations go down from 27% to 17% in the case of Valencia, and from 22% to 18% in the case of Murcia.

Finally, figure 3 shows the resulting fiscal balances from the two methods. The relationship between the fiscal balance as percentage of GDP and GDP per capita is significant in both cases, but much stronger when fiscal balances are estimated with the benefit method than with the monetary method (the R^2 of the two regressions are 0.71 and 0.47 respectively). Fiscal balances obtained with the monetary method are much more dispersed around the regression line than those calculated with the benefit method. Not only that, the relative configuration of Madrid, Catalonia and Balearic Islands in Panel A (monetary method) is very difficult to explain, and quite contrary to what we would expect from an economic point of view. Ordered by GDP per capita, Madrid is the richest region followed by Catalonia and Balearic Islands. And yet, Madrid has the smallest fiscal balance (5.5% of regional GDP) followed by Catalonia (8.7%) and Balearic Islands (14.4%). Madrid's fiscal balance is even smaller than Valencia's (6.3%), which is a region almost 30% poorer in terms of GDP per capita. This again is caused by the significant overestimation of the central expenditure assigned to Madrid (and therefore by the corresponding underestimation of that assigned to the other regions) due to the assignment of most of the indivisible categories of expenditure to this region, a choice completely devoid of economic sense.

These results are made right when we consider in Panel B the configuration of fiscal balances estimated with the benefit method. Consistently with the much better fit of the regression, all observations deviate much less from the line than was the case with the monetary method and, more revealingly, the absurd orderings of fiscal balances and regional wealth of Panel A get completely redressed. Now Madrid, Catalonia, Balearic Islands and Valencia, which in terms of GDP per capita are ranked 100, 90.7, 85.3 and 70.7 respectively, get, all of them, positive fiscal balances (more revenue obtained in the region than services provided there by the central Government) ranked 100, 49.7, 46.4 and 46.4. Also, Catalonia, with a fiscal balance of €11,003 million (6.5% of GDP) is right on the position we would expect it to be, given the average fiscal policies applied by the central Government²⁶.

There are other anomalous results, like those of Navarre and the Basque Country, which despite being richer than Catalonia, Balearic Islands and Valencia have negative fiscal balances (-0.7% Navarre and -3.4% the Basque Country), and are positioned far below the regression line. This, however, is not so much evidence of favoritism by the part of the central

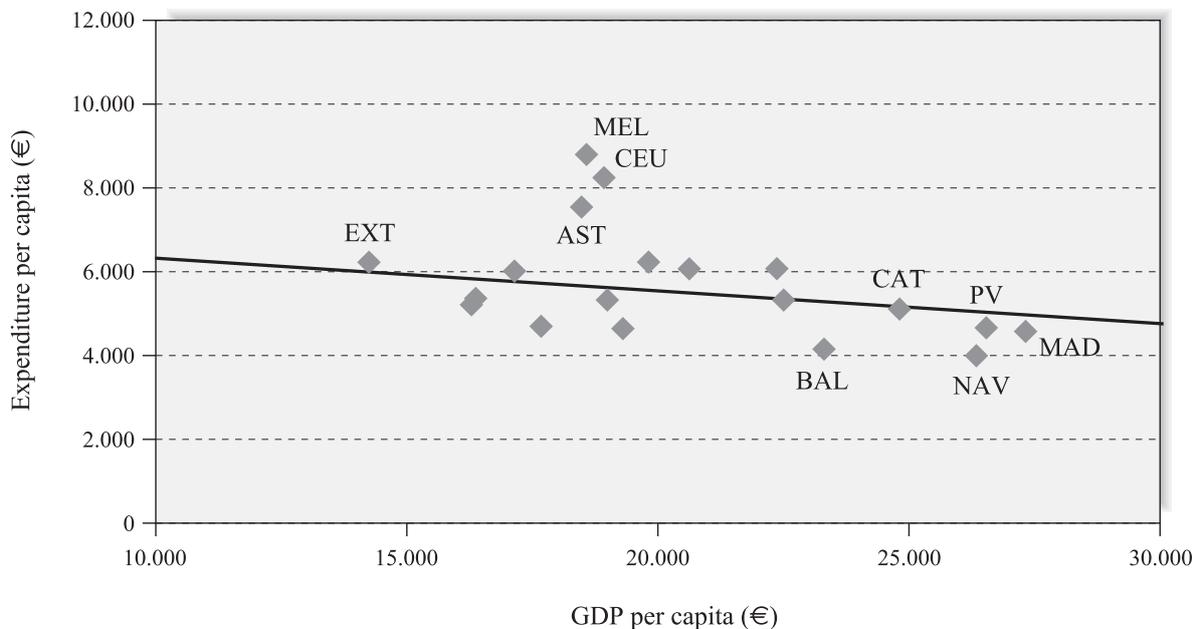
**A. Expenditure per capita versus GDP per capita, 2005
Monetary Method**



The regression line excludes NAV, BC, CEU and MEL. The line is $(E/N) = 5956 * -0.0146 (GDP/N)$; $R^2 = 0.02$ (coefficients with an asterisk are significant at the 5% level).

Source: MEH (2008) (Estimation FM-1) and author's own calculations.

**B. Expenditure per capita versus GDP per capita, 2005
Benefit Method**

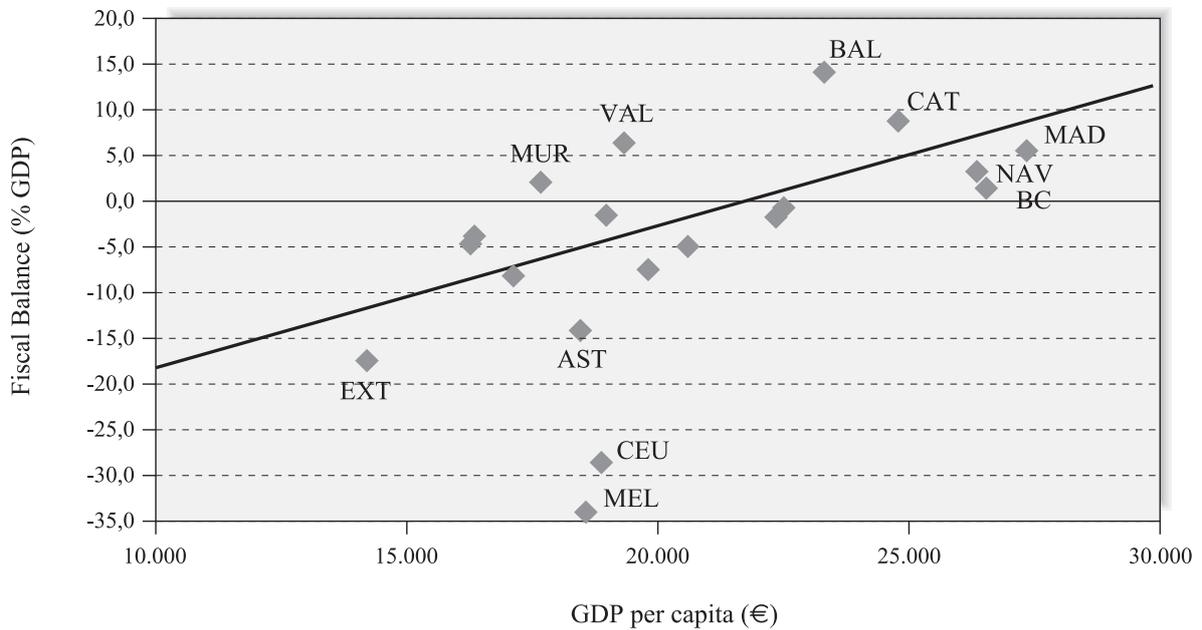


The regression line excludes NAV, BC, CEU and MEL. The line is $(E/N) = 7381 * -0.0942 ** (GDP/N)$; $R^2 = 0.15$ (coefficients with one/two asterisks are significant at the 5%/10% level).

Source: Uriel and Barberán (2007) and author's own calculations.

Figure 2. Monetary Method versus Benefit Method: Expenditure

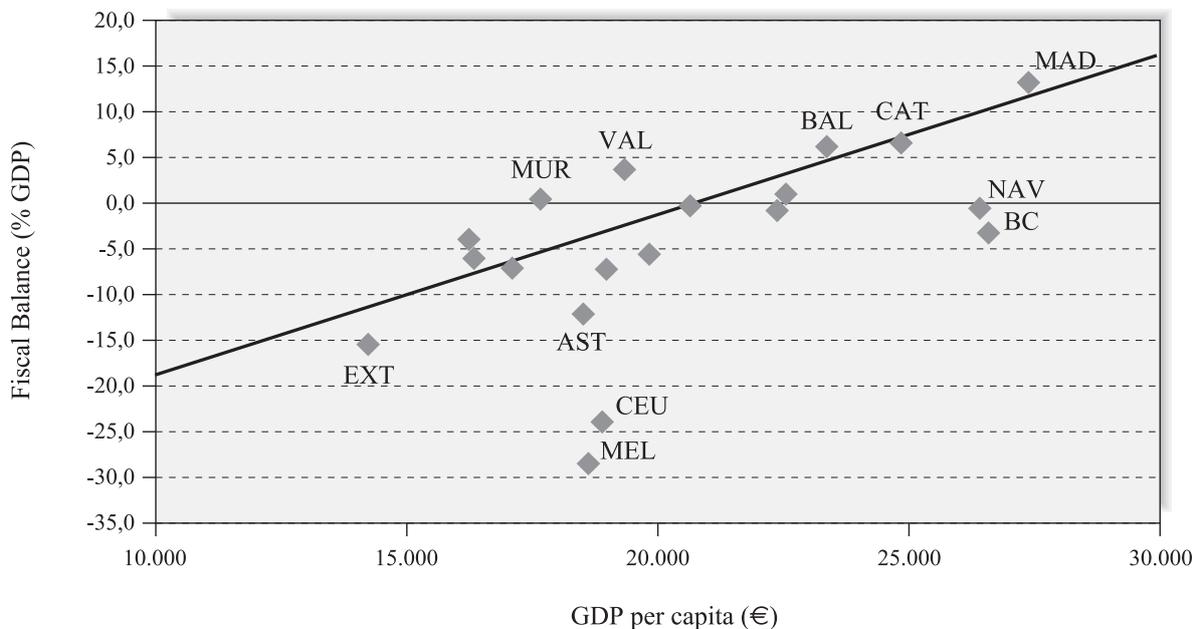
**A. Fiscal Balance (R-E), 2005
Monetary Method**



The regression line excludes NAV, BC, CEU and MEL. The line is $(FB/GDP) = -34.3* + 0.0016* (GDP/N)$; $R^2 = 0.47$ (coefficients with an asterisk are significant at the 5% level). FB: Fiscal Balance.

Source: MEH (2008) (Estimation FM-1) and author's own calculations.

**B. Fiscal Balance (R-E), 2005
Benefit Method**



The regression line excludes NAV, BC, CEU and MEL. The line is $(FB/GDP) = -37.2* + 0.0018* (GDP/N)$; $R^2 = 0.71$ (coefficients with an asterisk are significant at the 5% level). FB: Fiscal Balance.

Source: Uriel and Barberán (2007) and author's own calculations.

Figure 3. Monetary Method versus Benefit Method: Fiscal Balance

Government's budget policy, as the consequence of the extremely favorable *foral* system of regional finance that these two communities enjoy in comparison with the *common* system applied to the other fifteen communities. The case of the Basque Country is particularly disconcerting: it occupies the second position in terms of GDP per capita (only 2.9% less than Madrid) and, as Table 2 shows, the tenth in terms of fiscal balance as a percentage of GDP, being a net user of central budget resources, rather than a net contributor, as would correspond to its relatively high level of wealth²⁷.

The picture that emerges from these data is pretty clear. At least for 2005²⁸, the stylized facts of the regional effect of the Spanish central Government's fiscal policy were as follows: (i) the revenue obtained is proportional to regional income; (ii) the cost of goods, services and transfers provided is proportional to regional population; therefore, (iii) the fiscal balance (revenue minus cost) must be increasing in regional income per capita. This is what the empirical evidence shows, and it does so in a statistically much stronger way when the fiscal balance is estimated with the benefit method than with the monetary method. This constitutes *prima facie* evidence in favor of the benefit method, particularly if we additionally look at the relative ordering of particular regions in the two dimensions of fiscal balance relative to GDP and income per capita. With the monetary method, Madrid, Catalonia and Balearic Islands are ordered in the opposite way from what economic reasoning would lead us to expect: the higher is the region's average income per capita, the lower is its fiscal balance. With the benefit method, on the other hand, the empirical evidence confirms the expected positive relationship between regional fiscal balances and regional wealth.

Naturally, although comforting, none of the above empirical results should be construed as a proof that the monetary method is wrong. In principle, central Government's fiscal policy could be such as to generate the distribution of fiscal balances observed in Panel A –although it must be acknowledged that such an outcome would be almost impossible with general and regionally non-discriminatory tax laws and expenditure policies. The simple reason why the monetary method is wrong is its complete lack of economic sense.

3. Institutional perimeter and coverage of fiscal balances

The practical estimation of fiscal balances is full of traps that must be anticipated and avoided. Two such difficulties concern the definition of the institutional limits to which these balances refer, and the choice of operations to consider.

In the case of regional fiscal balances, the first difficulty is to a certain extent removed since by definition what we want to measure is the regional effect of central Government budget activity. This suggests that the institutional limits should be those that correspond to the definition of central Government, which in our case has been given in note 3 above. However, the existence of the European Union, a higher level Public Administration, the operations of which also have regional effects, complicates the matter somewhat. The complication is not so much the regional effects of these European Union (EU) operations, but the fact that they are all done

through the agency, and in many cases financial involvement, of the central Government. It is tempting in such a situation to leave out the direct operations of the central government with the EU. This is precisely what is done in the 2006–2010 balances estimated by the Catalan Government (GC, 2012 and 2013), which excludes revenue coming from the EU (fundamentally, structural funds) and the Spanish contribution to the financing of the EU budget (fundamentally, VAT and GNI based own resources, and traditional own resources). Unfortunately, such course of action is bound to distort regional fiscal balances and should be corrected. Other things equal, revenue from the EU allows central Government to finance infrastructures and other programs (already accounted for in the regional fiscal balances) with less internally levied taxes than would otherwise be the case. So, this revenue should be included and be assigned to regions according to the distribution of GDP (or the distribution of the rest of revenue). And the Spanish contribution to the EU should also be included and be assigned according to the distribution of regional population since this is the general expenditure that allows our membership to the EU and makes our reception of structural funds possible²⁹.

Regarding the second difficulty, and consistently with our previous argument, the general principle is that all budget operations, without exception, on both revenue and expenditure should be considered in the calculation of fiscal balances. This has not always been like this. Due to lack of data or doubts about assignment criteria for general, indivisible expenditures, early attempts to estimate fiscal balances were frequently restricted to a relatively small number of operations. For instance, in the seventies, the exploitation of the British Central Statistical Office (CSO) data to allocate revenue and expenditure among households used around 60% of revenue (59% in 1978) and around 50% of expenditures (47% in 1978) (O'Higgins, 1980, pp. 30–31). Again, this distorts regional balances because in fact they are calculated on an artificial budget balance which has little to do with the real one, and may lead to “seriously misleading” distributional information³⁰.

When estimating regional fiscal balances, the only global balance that can be considered is the one that results from the execution of the central Government budget. If the global balance is the consequence of selective criteria applied to revenue and expenditure, or of the process of territorial assignation of revenue and expenditure, then the analyst is distorting the absolute magnitude, and may even alter the sign, of the particular fiscal balances attributed to each region. Therefore, all revenue and expenditure of the corresponding institutional perimeter has to be considered, and, if possible, all of it must be assigned to the regions. If for whatever reason this is not possible and some particular type of revenue or expenditure has to be ignored, then, in order to preserve the global balance, the corresponding compensation, by means of operations of the opposite sign, has to be applied.

This is relevant, for instance, to the exclusions that the Catalan Government applies in the recent studies of fiscal balances GC (2012 and 2013). It is correct to exclude chapters 8 and 9 of the budget because we are only interested in the real effects (including those of interest charges of the public debt) of budget policy. But it is not correct to ignore (or at least to ignore without the corresponding compensatory operation) revenue obtained from sales of real assets (chapters 5 and 6) or, as discussed above, all the operations connected with the

European Union. In 2010, these exclusions meant that the total amount of revenue considered was €15,098 million below the correct figure and expenditure €21,470 million below (GC, 2013, Table 1.6.1, p. 8). These exclusions change artificially the global balance and distort regional balances.

A case in point will soon arise when calculating the regional fiscal balances of the years 2011, 2012 and 2013. It will then be crucial to take into account all the resources employed by the central Government in the restructuring of the Spanish banking sector –around €50,000 million– because this expenditure has provided an evident service to society and therefore to regional residents, and it has also increased the central government deficit and added significantly to public debt. This debt (netted out of the possible recoveries obtained) will have to be serviced and will put pressure on taxes and expenditures in future years. Therefore, it will be difficult to explain the evolution of future taxes if we have previously ignored the expense incurred into the rescue the banking sector. There should be no particular difficulty in the assignation of these resources to the regions, both in what refers to actions directed to particular banks or to measures of a more general, indivisible nature that have helped the functioning of the whole financial system.

4. Structural and cyclical components of fiscal balances

Section 2 has dealt with the choice of method. We have argued that the benefit method is the correct one and thus, in what follows, we consider only this method. The choice of method, however, is not the only matter of interest. Another, important issue is the interpretation of fiscal balances over time.

It is a matter of arithmetics that the size of regional fiscal balances is affected by the overall balance of central Government³¹. Also, the overall balance of the central Government's budget, as it happens to all macroeconomic variables, is affected by the particular cyclical situation of the economy when the measurement is made. As a result of these forces, when the economy is cyclically expanding, all fiscal balances (defined as revenue minus expenditure) will tend to algebraically increase, since revenue increases with income while expenditure, at least in the part associated with programs cyclically sensitive like unemployment subsidies, will tend to decrease³². Contrariwise, when the economy is cyclically receding, all fiscal balances will tend to algebraically decrease.

Naturally, the effect of the cycle is not the only cause why deficits or surpluses may arise. A surplus will also arise out of planned excess revenue to reduce debt, or a deficit out of purposive excess expenditure combined with debt finance. We usually do not have the kind of knowledge we would need to discriminate between cyclical and other causes, but it is safe to assume that cyclical effects are by and large the most significant ones (Zabalza, 2010).

In any case, the temporal variability that these effects cause on regional fiscal balances may be important, and economists have found it convenient to isolate them from what would

be the more permanent, redistributive nature of inter-regional fiscal flows. There are many ways of doing this, and the empirical macroeconomic literature is full of examples of how to decompose an observed variable into its structural and cyclical components³³. The literature on fiscal balances, however, has tended to ignore all this accumulated knowledge and has approached the problem not so much by investigating econometrically the variation of fiscal balances over time, but by using only information on the current year to identify these two components. We shall illustrate this approach with reference to recent estimates of the Catalan fiscal balance for the period 2006-2010 (GC, 2012 and GC, 2013).

4.1. Adjustment via R

The €11,258 million (5.8% of GDP) fiscal balance for 2010 obtained by the Catalan Government using the benefit method (GC, 2013), is not the observed fiscal balance. The observed fiscal balance, the difference between the revenue obtained and the cost of the services provided by the central Government to Catalan residents in 2010, was €774 million (0.4% of GDP)³⁴. In that year, the revenue obtained from the region was €50,093 million and the expenditure made in Catalonia €49,319 million. The observed fiscal balance, therefore, was €774 million, a much smaller figure than that given by the Catalan Government.

To see where the €11,258 million figure comes from, define the fiscal balance of region i , B_i , as

$$B_i = R_i - E_i \quad (1)$$

where R_i and E_i are respectively central Government revenue and expenditure in this region. Rearranging equation (1) we obtain:

$$B_i = \left(\frac{R_i}{R} - \frac{E_i}{E} \right) E + \frac{R_i}{R} (R - E) \quad (2)$$

where terms without subscripts refer to nationwide magnitudes. The first term can be interpreted as measuring the structural redistributive impact of central Government fiscal policy and the second the effect of the cycle. The cyclical term in (2) can also be written as $(R_i/R)B$, where:

$$B = R - E \quad (3)$$

is the central Government budget balance. If $B > 0$, the central Government runs a surplus and if $B < 0$ it runs a deficit, $B = 0$ being the budget equilibrium position that separates the two previous regimes. The budget will depart from this equilibrium position to the extent that, for whatever reason (cyclical or purposive), the central Government's budget shows a deficit or a surplus. In fact, as far as this decomposition is concerned, the cycle is defined exclusively

in terms of these three positions –deficit, surplus and equilibrium– of the overall central Government’s balance.

For our purposes, the important issue is that the cyclical term adds volatility to the observed balance, affects its magnitude and may even change its sign. So, in order to identify the long run, redistributive effect of inter-regional flows it is important to extract this cyclical effect by measuring what the fiscal balance of region i would be if the central Government’s deficit was zero, $B=0$, which turns out to be the first term on the right hand side of (2),

$$B_i^{sr} = \left(\frac{R_i}{R} - \frac{E_i}{E} \right) E \quad (4)$$

The particular assumption behind this expression is that R is adjusted (raised or lowered depending on whether the central Government runs a deficit or a surplus) so as to make $R=E$ and thus $B=0$. We call this assumption “adjustment via R ” (Zabalza, 2010), and B_i^{sr} the structural balance of region i when the adjustment is done via revenue.

Expression (4) can also be interpreted as a measure of the sustainable fiscal stance of central Government’s fiscal policy in region i , to the extent that expression (4) is also region i ’s fiscal balance if to observed revenue we add region i ’s share of the current overall deficit. Let us call revenue obtained in region’s i and adjusted in this fashion R_i^* . Then, the adjusted balance is:

$$R_i^* - E_i = \left[R_i - \frac{R_i}{R} (R - E) \right] - E_i = \left(\frac{R_i}{R} - \frac{E_i}{E} \right) E = B_i^{sr}, \quad (5)$$

which effectively is the same as that measured in expression (4).

Evaluating for 2010 the two components of (2) we obtain:

$$\text{Structural balance (via } R\text{): } B_i^{sr} = \left(\frac{R_i}{R} - \frac{E_i}{E} \right) E = \text{€}11,258 \text{ million}, \quad (6)$$

and

$$\text{Cyclical balance (via } R\text{): } B_i^{cr} = \frac{R_i}{R} (R - E) = \text{€}10,484 \text{ million}, \quad (7)$$

given that $R=264,363$; $E=319,692$; and $B = (R-E) = \text{€}55,329$ million.

The €11,258 million figure given by the Catalan Government is therefore the estimate of the structural component of the 2010 Catalan fiscal balance: a measure of the redistributive effect of central Government budget policy. However, see that in 2010, together with this structural balance comes a cyclical balance of –€10,484 million. That is, a balance in favor of Catalonia caused by the particularly adverse cyclical circumstances of the economy.

In 2010 (a bad cyclical year), the central Government, in the exercise of its responsibilities, provided to Catalonia more public services (particularly unemployment subsidies), and obtained from this region less tax revenue than those associated with the structural balance: in net terms, an excess of resources for Catalonia worth €10,484 million. The complete decomposition of the observed balance is:

$$\begin{array}{rclcl} \text{Observed fiscal balance} & = & \text{Structural fiscal balance} & + & \text{Cyclical fiscal balance} \\ 774 & = & 11,258 & + & (-10,484) \end{array}$$

The structural balance is thus a derived concept that comes out of the observed balance, and is necessarily associated to a given cyclical balance. It seems reasonable that, in order to understand reality, we should have information, and be able to interpret, these three related numbers. To give information on only one of them is to provide a partial explanation.

Not everyone agrees with this. The Catalan Government, in the recent updates of the regional fiscal balance (GC, 2012 and 2013) only gives information on the structural fiscal balance, purposely ignoring the observed and cyclical fiscal balances. It gives a reason for that: to consider only the structural balance “is consistent with the assumption that when the central [Government] runs a deficit that leads to an increase in the public debt, this is financed with an increase in taxes (GC 2012, p. 13; and GC 2013, p. 9)”. This, as shown above, is the interpretation of (4) as the financially sustainable stance of central Government’s fiscal policy in region i , but such interpretation, which is perfectly acceptable, in no way justifies ignoring the observed and implied cyclical balances.

Behind the steadfastly opposition by the Catalan Government to give explicit information on the cyclical balance, lies the idea that to talk of two types of balances is to mix concepts that are not comparable because the cyclical balance is a loan that Catalans will have to return. The idea of non-comparability is incorrect. The two concepts –structural and cyclical balances– are the result of an arithmetic decomposition of the observed balance: both are balances. Naturally, as it should be with a decomposition that aims to be useful, each of them has a different interpretation: the structural balance aims at measuring the permanent, long-run effect of and the cyclical one the short-run effect of central Government’s fiscal policy.

To associate the favorable Catalan cyclical balance to a loan that Catalans will have to return is a metaphor that I could perfectly subscribe. But I do not see the need for metaphors when the meaning of the cyclical fiscal balance does not involve any difficulty. The –€10,484 million cyclical fiscal balance is not money that the central Government loans to Catalan citizens, or to the Catalan Government, but the negative central Government balance that results from its budget activity in this region in an adverse cyclical context, in which tax revenue falls significantly over trend and expenditures, particularly those associated to unemployment, increase also significantly. Naturally, in a favorable cyclical context, these effects will be of the opposite sign: over trend, revenue will increase, expenditures will decrease and the central Government will run a positive cyclical fiscal balance. To be

descriptively more realistic, there is no such thing as the return of a loan, but rather a compensatory effect that in the high phase of the cycle the central Government, in compliance of its tax and expenditure responsibilities, exerts through the collection of taxes in Catalonia that exceed the cost of services provided to the region. Also, the fact that the favorable Catalan cyclical balance will be compensated in the future, in no way justifies that it should not be explicitly considered in 2010. This balance represents a net expense for the central Government and a net income for Catalonia. Therefore it must be accounted in 2010, as a cyclical balance of the opposite sign will be accounted when the economy expands.

Another way of seeing this is that, as it is shown in (5), to go from the observed balance (expression 1) to the structural fiscal balance (expression 4) you add, even if on notional terms, obligations to Catalan citizens to the tune of $-(R_i/R)(R-E)$ (recall that in 2010 $R < E$). If this is so, it is only fitting to enquire, in application of the double entry principle of accounting, what is the counterpart of these added obligations; what it is that Catalans obtain in exchange for these added obligations. And naturally this counterpart is the cyclical balance $(R_i/R)(R-E)$: the excess of expenditure over revenue incurred by the central Government in 2010 in Catalonia, so as to allow this region, despite its structurally sizable adverse fiscal balance (€11,258 million), to end up paying in fact an excess of taxes over expenditure received of only €774 million.

The measurement of the regional redistributive effect of central Government activity, which is what the structural fiscal balance does, is of course important. But so it is to understand the implied cyclical effect of this activity. The estimation of the structural balance is *model dependent* and, unfortunately, we do not have a unique, indisputable model to carry out this task. The next section presents another way of decomposing the observed balance into its structural and cyclical components, but surely there are other models, all of them sufficiently reasonable, that would allow us to reach the same objective. The structural and cyclical effects are not independent. Each model yields a different structural balance and thus a different cyclical balance. The only thing that remains unchanged is the observed balance, and it is therefore prudent never to lose sight of this magnitude.

4.2. Adjustment via E

The decomposition (2) used by the Catalan Government is not the only one we could use. Another one is the following:

$$B_i = \left(\frac{R_i}{R} - \frac{E_i}{E} \right) R + \frac{E_i}{E} (R - E). \quad (8)$$

Both expressions –(2) and (8)– are arithmetically valid, but now the two balances are defined differently: the level variable of the structural balance is total revenue R (rather than total expenditure) and the cyclical balance distributes the total deficit according to relative

expenditure (E_i/E) (rather than relative revenue). The form that the structural balance now takes is the specification one would obtain if E is adjusted (lowered or raised depending on whether the central Government runs a deficit or a surplus) so as to make $E=R$ and thus $B=0$. We call this assumption “adjustment via E ”, Zabalza (2010).

Theoretically there is nothing objectionable to this second decomposition, and yet results are significantly different:

$$\text{Structural balance (via } E\text{): } B_i^{se} = \left(\frac{R_i}{R} - \frac{E_i}{E} \right) R = \text{€}9,310 \text{ million.} \quad (9)$$

$$\text{Cyclical balance (via } E\text{): } B_i^{ce} = \frac{E_i}{E} (R - E) = \text{€}8,536 \text{ million.} \quad (10)$$

and

$$\begin{array}{rclcl} \text{Observed fiscal balance} & = & \text{Structural fiscal balance} & + & \text{Cyclical fiscal balance} \\ 774 & = & 9,310 & + & (-8,536) \end{array}$$

Now we have a structural balance of €9,310 million and a cyclical balance of –€8,536 million, to be compared respectively with €11,258 and –€10,484 million obtained with the first decomposition. So, compared to present results, the first decomposition overestimates the structural and cyclical balances by 20.9% and 22.8% respectively.

The Catalan Government would possibly object to decomposition (8), inasmuch as in the official report it makes clear that the adjustment of revenue “requires to distribute the [central Government] budget deficit [...] according the [...] territorial distribution of revenue in each year” (GC 2012, p. 13; and GC 2013, p. 9) rather than to distribute it according to relative expenditure, which is what (8) does. This is an interesting point because it makes clear the easiness with which the loan metaphor regarding the cyclical balance can lead to error. The fact that the national debt will eventually be paid with private sector resources, says nothing whatsoever about how this payment will be distributed among regions. The distribution will depend on how, at the expansion phase of the cycle, central Government taxes and expenditures are regionally distributed. That is why the loan metaphor is so farfetched. There is no amortization of a loan; what we have is a compensation carried out through the same central Government’s budget policy in the expansive phase of the cycle. The regional distribution of this compensation, therefore, does not depend only on revenue but also on expenditures.

It is important to play down the significance of the two decompositions considered here. First, both of them are approximations which belong to the same family, to the extent that they are based on arithmetic decompositions. Second, both use extreme assumptions as to the way central Government adjusts its budget to make $B=0$ ³⁵. And third, there are in principle other, more econometrically oriented methods to decompose time series into its structural and cyclical components, which would not necessarily give the results obtained here.

4.3. The dubious role of interest charges in the structural balance

The structural balance is the fiscal balance we would observe if the central Government deficit was zero, $B=0$. If this is so, the two decompositions considered above are internally inconsistent with the assumption on which they are based. If we assume that the central Government deficit is financed as it arises by increasing revenue or decreasing expenditure, and therefore that no public debt accumulates, it is wrong to include interest charges in expenditure E_i and E , since there is no debt to service. So, to correct for this, we should redefine the decomposition shifting interest charges from the structural to the cyclical component. Taking decomposition (2) (adjustment via revenue), the correct specification would be:

$$B_i = \left(\frac{R_i}{R} - \frac{E'_i}{E'} \right) E' + \frac{R_i}{R} (R - E') - (E_i - E'_i), \quad (11)$$

where E'_i is expenditure net of interest charges in the Catalan region, and E' is the sum of E'_i for all regions. Interest charges are thus shifted from the structural balance to the cyclical balance.

To identify the structural balance, the underlying assumption now is that R adjusts so as to make $R = E'$ thus eliminating the primary deficit and making the parenthesis of the second term equal to zero. Also, since no primary deficit ever arises, interest charges cease to play a role and the third parenthesis is too reduced to zero.

The numerical estimates of these new definitions of the two components are, for the data of 2010:

$$\text{Structural balance (via } R): B_i^{sr'} = \left(\frac{R_i}{R} - \frac{E'_i}{E'} \right) E' = \text{€}9,911 \text{ million}, \quad (12)$$

$$\text{Cyclical balance (via } R): B_i^{cr'} = \frac{R_i}{R} (R - E') - (E_i - E'_i) = \text{€} -9,137 \text{ million}, \quad (13)$$

and

$$\begin{array}{rcccc} \text{Observed fiscal balance} & = & \text{Structural fiscal balance} & + & \text{Cyclical fiscal balance} \\ 774 & = & 9,911 & + & (-9,137) \end{array}$$

Only this correction, which is obviously needed, would lower the 2010 structural fiscal balance from the €11,258 million figure given by GC (2013) to €9,911 million. Neglecting this issue leads to overestimate the structural balance by 13.6%. As a consequence, the cyclical balance also falls (in absolute terms) from –€10,484 million to –€9,137 million; a 14.7% overestimation.

The correction, of course, is also needed for the decomposition (8). The corresponding corrected expression is:

$$B_i = \left(\frac{R_i}{R} - \frac{E'_i}{E'} \right) R + \frac{E'_i}{E'} (R - E') - (E_i - E'_i),$$

where the structural balance (via E') is:

$$B_i^{se'} = \left(\frac{R_i}{R} - \frac{E'_i}{E'} \right) R, \quad (14)$$

and the cyclical balance (via E'):

$$B_i^{ce'} = \frac{E'_i}{E'} (R - E') - (E_i - E'_i). \quad (15)$$

Table 3 shows the effect of this correction for the two methods of adjustment with reference to the 2010 Catalan fiscal balance. Structural (and cyclical) fiscal balances are now significantly smaller and, since the greatest correction affects the method of adjustment via revenue and the smallest corresponds to the adjustment via expenditure, nearer to each other. For instance, concentrating on the structural balance, the initial range of estimates was from €9,310 million (via E') to €11,258 million (via R), a difference of €1,948 million. With interest charges properly accounted, the corresponding range goes from €8,731 million to €9,911 million, a difference of €1,180 million.

Table 3
OVERESTIMATION OF 2010 CATALAN STRUCTURAL FISCAL BALANCE
DUE TO INCLUSION OF INTEREST CHARGES (€ million)

Fiscal Balance	Adjustment method	
	Via R	Via E
A. With interest charges		
Structural (4) & (9)	11,258	9,310
Cyclical (7) & (10)	-10,484	-8,536
Observed (1)	774	774
B. Without interest charges		
Structural (12) & (14)	9,911	8,731
Cyclical (13) & (15)	-9,137	-7,957
Observed (1)	774	774
C. Percentage overestimation with interest charges ((A/B)-1)*100		
Structural (%)	13.6	6.6
Cyclical (%)	14.7	7.3
Observed (%)	0	0

Note: Numbers in parenthesis correspond to the expressions used to calculate the indicated effects.

5. Regional balances explained

We now pose the question: are the Catalan structural balances estimated in the previous section large or small? Or more generally, what are the explanatory factors that lie behind the Catalan observed fiscal balance? In a sense, in Section 4 we have already identified one such factor: the effect of the cycle. Inevitably, most of the temporal variation of the observed balance is due to the effects of the cycle on revenue and expenditure. But even after having cleaned up the observed balance from its cyclical component, what explains the variability of the remaining structural balance? Part of this variability is explained by the heterogeneity of Spanish regions, as all countries generate inter-regional economic flows if regions are sufficiently different in terms of wealth and population, leaving another part unexplained.

For instance, in terms of the decomposition via R , with interest charges shifted out of the structural component (expression 11), and referring to the 2010 Catalan figures, we would explain the observed regional fiscal balance, B_i , of €774 million, first in terms of a structural balance (expression 12) of €9,911 million, and a cyclical balance (expression 13) of –€9,137 million. So a first conclusion is that in 2010 the cyclical component of the central Government budget policy in Catalonia was very significant and favorable to this region. In comparison with a hypothetical situation of budget equilibrium (primary deficit equal to zero), in 2010 the central Government raised less tax revenue and spent more in programs such as unemployment benefits. Seen from the opposite angle, in that economically very weak year and with respect to budget equilibrium, Catalan residents obtained in public goods and services €9,137 million more than they paid in taxes.

Having identified the cyclical effect –the first element of the explanation– how do we explain the structural balance? As seen above, the structural balance measures the redistributive component of fiscal interregional flows for an overall primary deficit equal to zero. A significant part of this component must be explained by the heterogeneity of Spanish regions in terms of wealth. We should expect that, purely for this cause, in rich regions the central Government collected more in taxes than what it provided in public goods and services, and vice versa for poor regions. A useful reference that captures this heterogeneity, which many economists would accept as reasonable, is the normative fiscal balance, B_i^n , that would be generated if the central Government obtained revenue according to the regional distribution of income, and made expenditures according to the regional distribution of population,

$$B_i^n = \frac{Y_i}{Y} R - \frac{N_i}{N} E, \quad (16)$$

where Y_i and Y are respectively region i 's and total GDP, and N_i and N are region i 's and total population. The structural form of (16), $B_i^{ns'}$, is therefore ³⁶

$$B_i^{ns'} = \left(\frac{Y_i}{Y} - \frac{N_i}{N} \right) E'. \quad (17)$$

Out of the €9,911 million structural balance, $B_i^{ns'}$, explains €8,158 million, 82.3% of the total. On our assumptions, this adverse €8,158 million balance for Catalonia should be cause of no concern as it is what we would expect given the relative wealth of this region. This leaves unexplained the remaining €1,753 million (17.7% of the total structural balance), which could in principle be considered excessive. So the conclusion, at this stage, is that in 2010 the excess of the Catalan fiscal balance over what could be considered normal was €1,753 million, just 0.9% of the GDP of this region, much smaller than the €16,543 million, 8.4% of GDP, figures propagated by the Catalan Government, as indicative of the fiscal exploitation to which it was subjected by the central Government.

Even the unexplained €1,753 million part may not all of it be unjustified. For instance, the normative reference (16) considers revenue strictly proportional to income, when we know that some taxes are progressive; or expenditure guided by population, when we know that some expenditure programs depend also on age and other characteristics. But to carry out this analysis, we would need disaggregated data on revenue and expenditure which would take us far beyond the limits of the present exercise. The analytical framework on which this more disaggregated exercise could be carried out is given by the difference between the observed and normative balances, both in their structural form, as follows:

$$B_i^{s'} - B_i^{ns'} = \left[\left(\frac{R_i}{R} - \frac{Y_i}{Y} \right) - \left(\frac{E'_i}{E'} - \frac{N_i}{N} \right) \right] E'. \quad (18)$$

Therefore, at the level of disaggregation considered in this exercise³⁷, the two expressions

$$\left(\frac{R_i}{R} - \frac{Y_i}{Y} \right) E', \quad (19)$$

and

$$\left(\frac{E'_i}{E'} - \frac{N_i}{N} \right) E' \quad (20)$$

give respectively the contribution of revenue and expenditure to the non-explained part of the structural balance³⁸. The contribution of revenue is €760 million, because the central Government collects in Catalonia more taxes than what it would correspond by the region's relative income, and that of expenditure €993 million because the central Government spends in this region less than what it would correspond by the region's relative population. In 2010, revenue contributed 43.4% of the non-explained part of the structural balance and expenditure 56.6%³⁹. The diagram shown in figure 4 summarizes the explanation of the observed fiscal balance just described.

Table 4 presents the four explanatory factors (rows 1, 2.1, 2.2 and 2.3) of the Catalan observed fiscal balance of 2010 implied by the diagram of figure 4, using the two adjustment

methods (via R and via E). In all cases, as in the diagram of figure 4, interest charges have been shifted from the structural to the cyclical balance as shown in expression (11). The effects obtained when the method of adjustment is via R are those shown in figure 4. In general, the effects estimated using the adjustment via E are 11.9% lower than those estimated with the adjustment via R . Other than that, the relative weight of each effect is the same whatever the method of adjustment: structural regional heterogeneity explains 82.3% of the structural balance, revenue 7.7% and expenditure 10%.

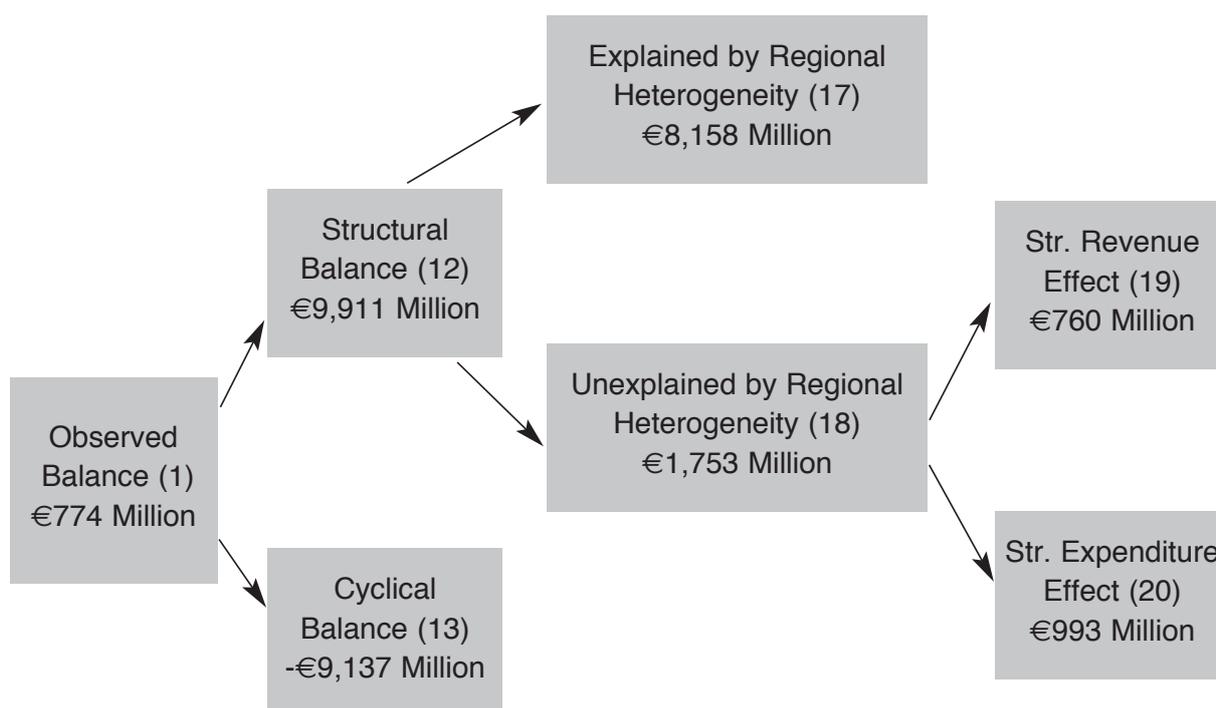


Figure 4. Explanation of the 2010 Catalan Observed Fiscal Balance. Interest charges shifted from structural to cyclical balance. Via R

Note: Figures in parenthesis correspond to the equations used to measure the indicated effect

As can be seen in rows 2.2 and 2.3 of the table, the part of the structural balance that is left unexplained by regional heterogeneity (the sum of the revenue and expenditure effect) is €1,753 and €1,545 million depending on whether the method of adjustment is via R or via E . In terms of Catalan GDP (row 4) we are talking of 0.9 and 0.8 percentage points. Both of them are very small differences in relative terms, indicative that structural fiscal balances, at least in 2010, deviated little from what we would expect given the economic and demographic characteristics of the Catalan region. The claim that Catalonia is discriminated against by the fiscal policy of the central Government is not corroborated by the data.

Table 4
EXPLANATION OF THE 2010 CATALAN OBSERVED FISCAL BALANCE. INTEREST CHARGES SHIFTED FROM STRUCTURAL TO CYCLICAL BALANCE (€ million)

	Adjustment method ^a	
	Via <i>R</i>	Via <i>E</i>
1. Cyclical Balance	-9,137	-7,957
2. Structural Balance	9,911	8,731
2.1 Regional Heterogeneity	8,158	7,187
2.2 Revenue Effect	760	670
2.3 Expenditure Effect	993	875
3. Observed Balance (3=1+2)	774	774
4. (2.2+2.3)/GDP (%)	0.9	0.8

Source: Author's own calculations.

^a Adjustment method to make the central Government primary deficit equal to zero.

6. Central Government's budget activity over time

The technicalities discussed in Section 4 should not hide the fact that the way in which public finance economists have tried to disentangle the structural and cyclical components of observed fiscal balances is methodologically weak. The method adopted is based exclusively on arithmetic decompositions which ignore the temporal statistical information contained in the basic revenue and expenditure time series, and force analysts to adopt heroic and insufficiently verified assumptions. The range of different estimates is too wide for comfort.

The time has come, I think, to pay more attention to the tools of time series analysis to extract from the revenue and expenditure series their respective cyclical and structural components. The results of this more econometrically oriented approach should not necessarily substitute present arithmetic decompositions but rather be used alongside them. This would have the healthy effect of forcing us to look at revenue and expenditure in a more disaggregated manner, rather than putting all our attention into a single number, the meaning of which no one knows for certain. Indeed, this should be done in any case, because it is by identifying particular taxes or particular programs of expenditure, and by estimating their income elasticity, that we can begin to understand what the effect of the cycle on fiscal balances is.

The problem with this time series approach is the lack of consistent temporal data. The longest stretch of time for which fiscal balance studies have been carried out using the same methodology, covering the same range of budget operations and for the same institutional perimeter, is 2006-2010, and this refers only to Catalonia (GC, 2012 and 2013)⁴⁰. Longer consistent time series for all Spanish regions, stretching over one or more economic cycles, are urgently needed to perform such an exercise.

In the meanwhile, we must work with the data that is available. Table 5 shows, in 2010 Euros, the evolution of the observed fiscal balance for Catalonia during the period 2006-2010. These, in a sense, are the hard facts⁴¹. All the rest, all the structural and cyclical components discussed in Section 4, are the result of data manipulations, which depend on strong assumptions and which have to be treated with extreme care. The period is rather short, but is sufficiently varied in terms of economic performance and fairly symmetric. The data show that the central Government, in the exercise of its responsibilities, has territorial effects that are quite variable over time. In good times, such as in 2006 and 2007, fiscal balances tend to be large and adverse to Catalonia (in 2010 Euros, €16,737 and €17,744 million respectively) due to the high levels of tax revenue and low levels of unemployment subsidies. In a year of transition, such as 2008, the fiscal balance drops substantially (to €6,586 million) but it is still adverse to Catalonia. And in bad times, such as in 2009 and 2010, the fall of tax revenue and rise of expenditure on unemployment subsidies reduce the Catalan fiscal balance to a relatively small magnitude (€774 million in 2010) or even make it negative (−€4,131 million), and thus favorable to this region, as it happened in 2009.

Table 5
OBSERVED CATALAN FISCAL BALANCES. YEARS 2006-2010 (2010 € million)

	2006	2007	2008	2009	2010
1. Revenue	58,433	61,060	52,726	46,494	50,093
2. Expenditure	41,696	43,316	46,140	50,626	49,319
3. Observed Balance (3=1-2)	16,737	17,744	6,586	−4,131	774

Source: GC (2012 and 2013).

Instead of only one, now we have five figures that tell a reasonable and interesting story of the effect over time of central Government budget activity in the Catalan region. The question that we now pose is the following: even within the area of the arithmetical decompositions discussed above, can we identify structural and cyclical effects that make use of the temporal information given by these data?

Consider the average of the observed fiscal balance over the available five year period (2006-2010), \bar{B}_i ,

$$\bar{B}_i = \frac{1}{5} \sum_{t=1}^5 B_{it} = \frac{1}{5} \left(\sum_{t=1}^5 R_{it} - \sum_{t=1}^5 E_{it} \right).$$

Now, decompose this expression to identify a redistributive, structural component and a cyclical component using the adjustment via R , to obtain:

$$\bar{B}_i = \frac{1}{5} \left[\left(\frac{\sum R_{it}}{\sum R_t} - \frac{\sum E'_{it}}{\sum E'_t} \right) \sum E'_t \right] + \frac{1}{5} \left[\frac{\sum R_{it}}{\sum R_t} (\sum R_t - \sum E'_t) - (\sum E_{it} - \sum E'_{it}) \right], \quad (21)$$

where the first term is the structural balance, $\bar{B}_i^{rs'}$, and the second term the cyclical balance, $\bar{B}_i^{rc'}$. Or, using the adjustment via E' ,

$$\bar{B}_i = \frac{1}{5} \left[\left(\frac{\sum R_{it}}{\sum R_t} - \frac{\sum E'_{it}}{\sum E'_t} \right) \sum R_t \right] + \frac{1}{5} \left[\frac{\sum E'_{it}}{\sum E'_t} (\sum R_t - \sum E'_t) - (\sum E_{it} - \sum E'_{it}) \right], \quad (22)$$

where the first term is the corresponding structural balance, $\bar{B}_i^{es'}$, and the second the cyclical balance, $\bar{B}_i^{ec'}$. Given the cyclical nature of these variables, we expect that the difference between $\sum R_t$ and $\sum E'_t$ should narrow when measured over a complete cycle. Therefore, the difference between the two estimates (via R and via E') of the structural and cyclical balances should narrow as well. This provides a handy empirical criterion not only to identify the structural balance without having to make any assumption as to which of the two extreme adjustment assumptions (via R or via E') is the adequate one, but also to identify the period of analysis of interest as that for which the difference $\sum R_{it} - \sum E'_{it}$ is the smallest possible in absolute terms.

The same applies to the average of the normative balance (16). The two decompositions, via R and via E' , are:

$$\bar{B}_i^n = \frac{1}{5} \left[\left(\frac{\sum R_{it}^n}{\sum R_t} - \frac{\sum E'_{it}^n}{\sum E'_t} \right) \sum E'_t \right] + \frac{1}{5} \left[\frac{\sum R_{it}^n}{\sum R_t} (\sum R_t - \sum E'_t) - (\sum E_{it}^n - \sum E'_{it}^n) \right], \quad (23)$$

$$\bar{B}_i^n = \frac{1}{5} \left[\left(\frac{\sum R_{it}^n}{\sum R_t} - \frac{\sum E'_{it}^n}{\sum E'_t} \right) \sum R_t \right] + \frac{1}{5} \left[\frac{\sum E'_{it}^n}{\sum E'_t} (\sum R_t - \sum E'_t) - (\sum E_{it}^n - \sum E'_{it}^n) \right], \quad (24)$$

where, as in (21) and (22), the first term of each expression is the corresponding structural balance, and the second term the cyclical balance, and

$$R_{it}^n = \frac{Y_{it}}{Y_t} R_t; \quad E_{it}^n = \frac{N_{it}}{N_t} E_t; \quad E'_{it}^n = \frac{N_{it}}{N_t} E'_t.$$

Therefore, an explanation such as that shown in Table 4 for year 2010 can also be obtained regarding these 2006-2010 average structural and cyclical balances.

This is done in table 6, where we see that, as expected, the estimates obtained with the two methods of adjustment are very close to each other, and that this is the case for both cyclical and structural balances. Also, we see that the cyclical balance, whatever the method of adjustment, is much smaller than that obtained in table 4 for the year 2010. The overall closeness is sufficient so as to, for purposes of simplicity, use the mean of the two methods of adjustment, which is shown in the third column of the table. According to these results, the average observed fiscal balance of the central government budget activity in Catalonia, in the period 2006-2010, was €7,542 million (3.6% of GDP), of which the average structural balance was €10,533 million (5.1%) and the average cyclical balance –€2,991 million (–1.4%). Regional heterogeneity explains €7,848 million (3.8% of GDP) of the €10,533 million of the structural balance, revenue deviations from the norm €957 million (0.5%), and expenditure deviations €1,728 million (0.8%).

Table 6
EXPLANATION OF THE CATALAN OBSERVED FISCAL BALANCE.
AVERAGE 2006-2010. INTEREST CHARGES SHIFTED FROM STRUCTURAL
TO CYCLICAL BALANCE (2010 € million)

	Adjustment Method ^a		Mean <i>R&E</i>	Mean <i>R&E</i>
	Via <i>R</i>	Via <i>E</i>	2010 € million	% GDP
1. Cyclical Balance	-3,088	-2,895	-2,991	-1.4
2. Structural Balance	10,630	10,437	10,533	5.1
2.1 Regional Heterogeneity	7,920	7,776	7,848	3.8
2.2 Revenue Effect	966	949	957	0.5
2.3 Expenditure Effect	1,744	1,712	1,728	0.8
3. Observed Balance (3=1+2)	7,542	7,542	7,542	3.6
4. (2.2+2.3)/GDP (%)	1.3	1.3	1.3	

Source: Author's own calculations.

^a Adjustment method to make the central Government primary deficit equal to zero.

The unexplained part of the structural balance (the sum of the revenue and expenditure effects) now rises to 1.3% of GDP (versus 0.9% in 2010), but it is still a small figure that in no way justifies the claim of the Catalan secessionist movement that the central Government discriminates against Catalan citizens. Also, it should be remembered that this is the unexplained part of the structural balance with respect to reference (16), the nature of which is rather aggregated. Should we be able, with more detailed data, to identify different types of taxes and expenditure programs, this unexplained part would probably be reduced significantly. Finally, the contribution of revenue and expenditure to the unexplained part of the structural balance during the period 2006-2010 was 35.6% and 64.4% respectively, as compared to 43.4% and 56.6% for 2010. At the present level of aggregation, revenue deviations from the norm contribute about one third of the total unexplained part, and expenditure deviations two thirds.

In table 7 and figure 5 we compare the average structural balance of €10,533 million just estimated and the annual observed balance, to see the implied annual cyclical effects of the central Government's budget activity in Catalonia. The interpretation of the cyclical effects turns out to be perfectly reasonable: with respect to the average structural balance, in the good years the central Government obtains in Catalonia more revenue than the services it provides (€6,204 million in 2006 and €7,211 million in 2007), while in the bad years Catalonia benefits from public services that cost more than the revenue paid (−€3,947 million in 2008, −€14,665 million in 2009 and −€9,759 million in 2010). Over this period, in 2010 Euros, the accumulated central Government deficits in years 2008-2010 were €168,989 million, while the accumulated surplus of years 2006 and 2007 were €55,256 million. Therefore, in this period at least, despite its fairly symmetric configuration around the position of budget equilibrium, we do not observe a full elimination of the accumulated deficit, but only a 32.7% of it⁴².

Table 7
AVERAGE STRUCTURAL AND CYCLICAL FISCAL BALANCES.
YEARS 2006-2010 (2010 € million)

	2006	2007	2008	2009	2010
1. Observed Balance (1=2+3)	16,737	17,744	6,586	-4,131	774
2. Average Structural Balance	10,533	10,533	10,533	10,533	10,533
3. Cyclical Balance	6,204	7,211	-3,947	-14,665	-9,759

Source: GC (2012 and 2013) and author's own calculations.

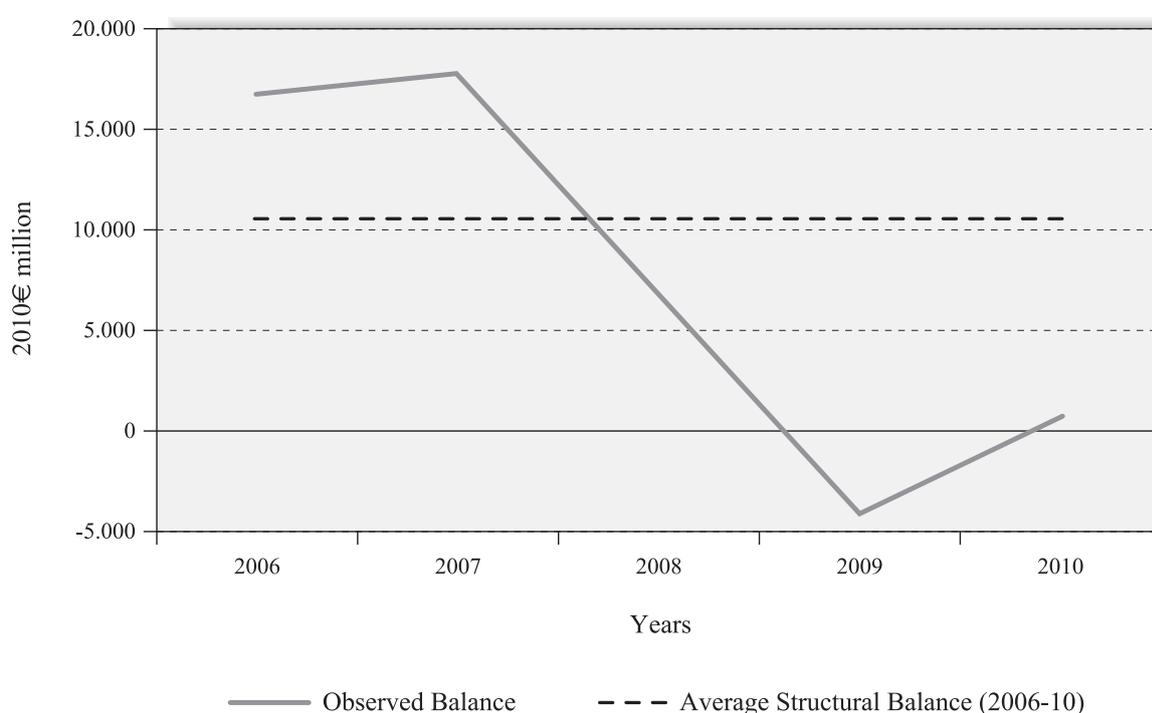


Figure 5. Observed and Average Structural Balance

Source: GC (2012 and 2013) and author's own calculations.

7. Concluding remarks

Richard Bird is right when he says that “measuring [regional] ‘fiscal flows’ is conceptually difficult, inherently subject to considerable political bias, and in any case of surprisingly little use or relevance in determining good policy” (Bird, 2003; p. 1). And yet, rather than applying our skills to other, more worthy endeavours, here we are, considering the intricacies of regional fiscal balances and, in particular, discussing the economic meaning of the estimates obtained in Spain. The reason, however, is easy to understand. Like it or not, estimates of regional fiscal balances figure today prominently in the Spanish political arena, associated to the recent emergence of the Catalan secessionist movement. The purported

large and adverse fiscal balance of the region *vis-à-vis* the central Spanish Government is blatantly used as the main economic justification of the independence of Catalonia, regardless of the many reserves that surround these estimates. So it is in a sense inevitable that academic opinion should participate in this debate with objectivity and reasoned arguments. To end my contribution to this debate, four last remarks may be in order to emphasize some points made above that I consider important.

The first is that measuring the regional incidence of central Government budget policy is not an easy task. To start with, we do not have at our disposal time series of data on revenue and expenditure, allocated among regions with a homogeneous methodology, using the same coverage of operations, for the same institutional perimeter and stretching over a long period. Data, on the other hand, that are necessarily based on approximations of the economic concepts of value and territorial assignation of public services that we would ideally like to measure, and on tax incidence assumptions that we have not been able to verify empirically. Despite its limitations, the mere collection and treatment of evidence is perhaps the first task we should attempt in order to understand the effect of the economic cycle on regional fiscal balances and thus be able to disentangle cyclical from structural effects.

A second problem is that public finance economists have traditionally approached the analysis of observed fiscal balances and the identification of structural and cyclical balances exclusively on the basis of arithmetical decompositions, which to a very large extent ignore the temporal statistical information contained in the data, and force analysts to adopt strong assumptions. This procedure is deficient because it may lead to unreasonably large structural components, and cyclical components that by implication also take very large absolute values. We need to look at this problem from a fresh angle. More from the perspective of the time series analyst interested in understanding the change over time of fiscal balances and the effect of economic activity on this change. This will probably require us to go behind aggregate series of revenue and expenditure, and look at the income elasticity of specific taxes and expenditure programs over the economic cycle. A welcomed move, because it will make us more resistant to the fatal attraction exerted by the single number that represents the regional fiscal balance: a number that hides everything and means very little.

My third remark is that we must come to terms with the absurd situation posed by the apparent acceptance of two methods of estimating regional fiscal balances. There is no such thing as both methods being right depending on the objective pursued. If we want to measure the balance between services received and costs borne, there is only one method economically meaningful: the fiscal incidence approach. The cash flow approach only makes sense for accounting purposes; and variants of the cash flow, such as the monetary method occasionally used in Spain, serve for nothing. Time and good practice will no doubt put things right, but it is disappointing to observe the consensual conclusions of official panels in favor of the coexistence of both methods. This seems to be the outcome more of political transaction than of outright academic discussion. Economists must resist the tremendous pressure towards consensus that always builds up in such panels and assert their right to a personal vote or opinion.

Lastly, we must be conscientious of the serious limitations of our knowledge in this field and act very prudently in the transmission of results to the political class. If such results do not fit perfectly with political interests or if they need to be subject to stringent qualifications, beware because then the chances are that our opinions will be misunderstood and will be misused.

Notes

1. I attribute these words to Richard Musgrave, when strictly speaking the quote is taken from a collective work by members of a seminar in public finance held at the University of Michigan in 1949, and directed by Professors R. S. Ford and R. A. Musgrave. See Musgrave *et al.* (1951).
2. See Generalitat de Catalunya (2012 and 2013). For ease of reference, we will denote the term Generalitat de Catalunya by the acronym GC. In the four year period that goes from 2009 to 2013 the Generalitat de Catalunya (regional Catalan Government) has published estimates of the central Government fiscal balance in Catalonia for the years 2002 to 2010.
3. Strictly, the scope of the central public administration used in the calculation of this figure is central Government, Autonomous Government Organs, Public Entities and Social Security Administration.
4. See GC (2013). This source gives, in addition to the €16,543 million estimate, other estimates that will be considered below. The €16,000 million figure, however, is the one that has been used most often in press conferences, political debates and media coverage, to illustrate the extent of the burden that Catalonia has to bear as a result of central government's fiscal activity.
5. Early examples of these type of studies are Trias-Fargas (1960), Petit (1965) and Ros-Hombravella and Montserrat (1967).
6. Most of this interest has appeared in media and political circles. As far as academia is concerned, and with the exception of Bosch, Espasa and Solé-Ollé (2010), to which we refer below, there have been no new scientific developments, nor are they expected in the near future.
7. In addition to the work by Musgrave and collaborators cited above, other early efforts include Tucker (1951) and Bishop (1961).
2. See Barna (1945), Adler (1951), Tucker (1953), Conrad (1954), Gillespie (1965), and Ruggles and O'Higgins (1981).
9. See Musgrave *et al.* (1951) for a thorough analysis of the strong assumptions under which fiscal incidence studies had to work.
10. Aaron and McGuire (1970) distinguish between the cost value of and the marginal willingness to pay for public goods. If the marginal utility of income decreases with income, rich people would be willing to pay more for a given public service than poor people. Assigning the value of public services merely on the basis of costs tends to undervalue the real benefits received by individuals in the top brackets of the income distribution. See also Brennan (1976).
11. Musgrave *et al.* (1951) take the view that the simplifications described above "can be defended only because they are essential in order to reduce the problem to empirically manageable terms. They cannot be defended by arguing that the resulting concept of money burden is endowed with analytical significance which it does not possess" (p. 9).
12. Perhaps on account of the procedures used by the US Public Administration to collect regional statistics on these flows.
13. See Ambrosanio *et al.* (2010), Van Rompuy (2010) and Ruggeri (2010) for, respectively, the Italy, Belgium and Canada studies.

14. The fiscal incidence approach is the Musgrave/Gillespie method reviewed above and the cash-flow approach is the Mushkin dollar-flow approach.
15. This opens a whole new range of issues concerning the long-run general equilibrium effects of budget policy, which are not usually considered in fiscal incidence studies, and which in fact change the same concept on incidence (Musgrave, 1959; pp. 205-217). See also Catsambas (1978; pp. 11-13) on the concept of long-run general equilibrium fiscal incidence.
16. In our first example it would be wrong to assume a zero shadow wage for military instructors, and very arguable for students. Adler (1951) puts this point nicely: “The money-flow concept is, by implication at least, based on the assumption that the income of government employees, for instance, would be zero if the government did not employ them. This assumption is clearly untenable if we conceive of an economy as anything even vaguely approaching a general equilibrium system in which there are forces tending toward the elimination of such maladjustments as unemployment.” Cited in Mushkin (1957; p. 436)
17. Names vary somewhat depending on authors. The benefit method is also called the burden-benefit method or the benefit flow method. The monetary method is also called the monetary flow method. For expediency we use in each case the shortest alternative.
18. A particular case is Lluch *et al.* (1976). In their estimation of the central Government fiscal balance in the region of Valencia, they point out the deficiencies of official provincial tax revenue statistics and correct them using relative income and population indicators.
19. The Spanish Government, through the General Controller, manages the budget process by means of an accounting system called SICOP (*Sistema de Contabilidad Presupuestaria*). Since 1996 this data base contains a territorial code (area to which the expenditure is destined), which is the feature that since Colldeforns (1991) has been systematically exploited by Spanish researchers on fiscal balances. However, not all expenditure programs can be territorialized: in the SICOP data base, as Uriel and Barberán (2007) state “there exist territorialized and non-territorialized expenditures, and among the latter those destined to several autonomous communities, central services and those strictly non-allocable on a regional base (p. 137)”. For 2010, the relative magnitudes of these categories were: territorialized, 49.5%; several communities, 24.1%; central services, 17.1% (of this, the largest part, 14.8%, corresponds to interest charges of the public debt); abroad, 1.3%; and non-regionally allocable, 7.9%. See GC (2013; p. 31).
20. The SICOP data base is a bit of a “black box” as far as the criteria of territorial allocation used. The only information really given is the physical location of the expenditure in question, which clearly is not the same as the destiny of the payments made by the Government, which would be the criteria followed by a strict cash flow methodology, nor is it an unambiguous indication of the residence of the beneficiaries of the corresponding public service, as in the case of rail travel infrastructures, which may be localized in a given region but mostly enjoyed by passengers in other regions. The territorial location of public expenditure given by SICOP is a potentially useful source of information for both economic incidence and cash flow approaches, but from that starting point these approaches need to apply many adjustments if they want to remain faithful to their essential aims.
21. It is surprising that the report should qualify “salaries” as an operation “involving the distribution of resources” alongside genuine distributive transfers such as “social benefits”.
22. For most expenditures, the criterion used by the monetary method to distribute the part of SICOP corresponding to “several communities” or to “non-regionally allocable” expenses, is to assign this part according to the distribution of “territorialized expenditure”, thus in fact ignoring the reserve implied by the SICOP code regarding the location of these expenditures. What the method does not ignore is the code “central services” which is systematically used to assign the corresponding expenditure to Madrid, irrespective of the economic nature of this expenditure.
23. It remains to explain why Mushkin, who in her two articles (Mushkin, 1956 and 1957) gives ample proof of her perfect understanding of the concept of territorial economic incidence, is willing to put side by side two such disparate approaches. I can only think of the fact that while she wrote her two pieces she was institutionally affiliated to the public administration as economist in the US Department of Health, Education and Welfare.

24. Here we disregard the small overall surplus that both exercises show (1.3% of GDP for the calculation using the monetary method, and 1.4% for the one using the benefit method), although this issue is considered in detail below.
25. See Zabalza (1999) for a territorial analysis of the relative level of compliance in the IRPF.
26. In fact, Catalonia has a fiscal balance 0,2 percentage points of GDP lower than the 6.7% of GDP that would be predicted by the average fiscal policy of central Government.
27. See Zabalza and López-Laborda (2014) for a comparison between the foral regional finance system, applied to the autonomous communities of the Basque Country and Navarre, and the common regional finance system, applied to the other fifteen autonomous communities.
28. By and large, we should expect these results to hold as well for other years.
29. As far as the calculation of fiscal balances, we are talking of a membership fee like those paid to NATO or to the UN. The fact that this fee is calculated with reference to tax or economic performance parameters does not change the above argument. A different criterion, however, should be used with “own traditional resources” (customs duties and sugar levies) because in the case of these resources Spain acts as a mere tax collector agent on behalf of the European Commission. These “own traditional resources” should be excluded from the calculation of fiscal balances because they belong to the direct relationship between the European Commission and Spanish taxpayers.
30. Peacock (1974, p. 155), cited in O’Higgins (1980, pp. 30-31).
31. The overall central Government’s balance may even affect the sign of regional fiscal balances.
32. See that this statement is not contradictory with the one made in Section 2.4 regarding the lack of influence of regional income on central Government’s expenditure. That was a statement of a cross section nature, applicable at a given moment in time. The present statement looks at the effect of regional income on central Government’s expenditure over time.
33. See De Castro *et al.* (2008) for a particular example regarding the estimation of the cyclical component of the Spanish public deficit, and Gadea *et al.* (2012) for an analysis of the correlation of regional cycles and the extent to which we can speak of a common Spanish cycle.
34. The €774 million figure can be worked out from the information contained, but not explicitly given, in the official Catalan Government report GC (2013).
35. See Zabalza (2010) for a third intermediate alternative to these two extreme decompositions, based on the assumption that the adjustment is done by means of both revenue and expenditure, in a proportion that is related to the different cyclical nature of these two flows.
36. Recall that in all these comparisons we are assuming that interest charges do not belong into the structural balance. Thus, to assure comparability with (12), the level variable of (17) is E' , which excludes these charges.
 The full decomposition of expression (16) into a structural and a cyclical component is $B_i^{n'} = [(Y_i/Y) - (N_i/N)E'] + [(Y_i/Y)(R - E') - (N_i/N)(E - E')]$; the first square bracket corresponds to the structural component (expression 17) and the second to the cyclical component.
37. Expression (18) can be additively decomposed into as many expenditure programs and types of tax revenue as the data, and the analytical capacity to determine meaningful distributive criteria, permit. This is in fact the type of analysis recently (07/03/2014) proposed by De la Fuente, Barberán and Uriel (2014) in the new “System of Territorial Public Accounts” (SCPT) sponsored by the central Government, although with a normative reference that differs from (16). Instead of distributing total revenue according to regional income and total expenditure according to relative population as we do here, they define a reference in which revenue and expenditure are distributed, both of them, according to relative population.
38. The corresponding structural effects obtained adjusting the total deficit via E' , would be equal to expressions (17) to (20) only that the level variable would be R instead of E' . Expression (20), for example, would be $[(E_i'/E') - (N_i/N)]R$ and so on.

39. Although not strictly comparable, since cycle effects are handled in a somewhat different manner, the application of the De la Fuente, Barberán and Uriel (2014) normative reference (see note 37 above) to the present data would give a much larger relative contribution of revenue, 81.7%, and a much smaller expenditure contribution, 18.3%, than the ones estimated here with the normative reference (16), 43.4% and 56.6% respectively.
40. The study of the Catalan Government for the period 2002-2005 (GC, 2009) is not strictly comparable to those for the period 2006-2009 (GC, 2012) and 2010 (GC, 2013), due to the different criteria followed regarding the inclusion of public companies.
41. The word “hard” should naturally be subjected to qualification since the basic “observed” data, as we have seen in Section 2, are themselves estimates that depend on strong assumptions.
42. It should be noticed that in this particular period, the years when the central Government runs a surplus are previous to the years when huge deficits appear. So it is to be expected that the compensation of the significant increase in debt incurred during the crisis is yet to come. In fact, as of 2010 (the last year of our series), the incidence of deficits caused by the crisis is not yet over. Under current plans (Ministerio de Economía y Competitividad, 2013), the central Government does not expect to eliminate the primary deficit until 2016. From the point of view of compensation, an interesting period to consider would be the one that goes from the peak previous to the present crisis (2006/2007) until the time when the central Government has managed to stabilize public debt at a level it considers sustainable (possibly around the 60% of GDP mark). The problem is that this objective, under current plans, will not be reached until 2030.

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Resumen

Este artículo pasa revista a la metodología básica utilizada para estimar la incidencia regional de impuestos y gasto público, que denominamos el enfoque de la *incidencia fiscal*, y lo compara con el enfoque del *flujo monetario*, que mide la recaudación impositiva y el gasto en términos de los flujos monetarios asociados. En este contexto, el trabajo examina críticamente la versión particular del enfoque del *flujo monetario* que se utiliza en España. El artículo también considera las distintas formas en las que la profesión económica ha intentado descomponer los saldos fiscales en un componente estructural o distributivo y en otro cíclico, y examina críticamente la práctica actual al respecto.

Palabras clave: balanzas fiscales regionales, incidencia de los impuestos y del gasto, efectos cíclicos y estructurales.

Clasificación JEL: H2, H5, H22, H30, H61, H62.