A review of the empirical literature about the relationship between fiscal decentralization and economic growth

Revisión de la literatura empírica acerca de la relación entre descentralización fiscal y crecimiento económico

Sonia Esteban-Laleona
Pablo de Frutos-Madrazo
María Cristina de Miguel-Bilbao*

Abstract

Traditionally, academic debates about the benefits that the existence of multilevel government structures provide have been directly related to the gains in efficiency that derive from the processes of decentralization of the Public Sector. However, as of the last decades, the Public Finance has broadened its analysis towards other questions, one of them being whether the fiscal decentralization influences positively in the economic growth of a country. The objective of this document is to provide evidence on results of the main investigations out of topic, examining, both the temporal and space horizons selected in these studies, comparing the conceptual framework and the methodology used by the different authors.

Keywords: fiscal decentralization, economic growth.

Resumen

Tradicionalmente, los debates académicos sobre los beneficios que la existencia de estructuras multinivel de gobierno proveen se han centrado en los incrementos en eficiencia que se derivan de procesos de descentralización del sector público. Sin embargo, en décadas recientes, el financiamiento público ha llevado este análisis hacia otras cuestiones, una de ellas es si la descentralización fiscal influencia de manera positiva el crecimiento económico de un país. El objetivo de este documento es brindar evidencia sobre los resultados de las principales investigaciones derivadas de este tópico, examinar los horizontes tanto temporales como espaciales seleccionados en estos estudios, comparando los marcos conceptuales y las metodologías usadas por los diferentes autores.

Palabras clave: descentralización fiscal, crecimiento económico.

* Universidad de Valladolid, Campus Duques de Soria, España. Correos-e: sesteban@.uva.es, pablof@.uva.es, cdmiguel@efc.uva.es.

Introduction

The relationship between fiscal decentralization and economic growth is a relatively new line of investigation. The traditional vision of the Theory of Fiscal Federalism, only emphasizes the largest profits of efficiency that derive from the processes of decentralization of the Public Sector. Nevertheless, in the last decades a new line of investigation arises that tries to discover if the processes of fiscal decentralization can, equally, promote the economic growth of a country. More concretely, this new field of analysis is inspired by the reflections made by Oates (1993). Oates argues that if from a static perspective, the main benefits that derive from the installation of multilevel government systems are expressed in terms of economic efficiency; then from a dynamic perspective the potentialities of the fiscal decentralization can be translated in terms of economic growth.

Nevertheless, the existence of several government levels acting on the same territory suggests immediately the question of the analysis of advantages and inconveniences of fiscal decentralization, so much in the taking of decisions about the public budgetary policies as in their incidence in citizens welfare who cohabit in the different jurisdictions.

The theory of the Fiscal Federalism under the outlined question has provided diverse arguments about the functions, objectives and assignment of competitions among the different coexistent government levels, mainly, in terms of efficiency and redistribution of public spending and revenues (Oates, 1972). Restrictions on fiscal instruments at the disposal of the different government levels add realism to the analysis proposed and at the same time stand out the existence of a tradde-off between efficiency and redistribution. Tradde-off that is raised when there are asymmetries in the information (Bird, 1993; Boadway, 1979, 2001) or discrepancies among the objectives wanted by subcentral and central government levels (Oates, 1998).

Although this article is not aimed to be an approach of the different doctrinal postures about the tradde-off between efficiency and redistribution, we believe convenient to expose, succinctly, the advantages and inconveniences of fiscal decentralization that are more outstanding , in connection with the social welfare.

On one hand, it should be pointed out that, when we try to quantify the profit of social welfare that could be produced by fiscal decentralization we should consider so much the grade of heterogeneity between the different territories as differences of costs in the provision of public services (Oates, 1972; Boadway, 2001). In general, as we have already commented, the subcentral governments, due to their biggest proximity to those administered, possess a knowledge about preferences and cost con-

ditions that are not available to the central government, since the natural tendency of this last one is the uniform provision although there are differences among regions. Moreover, subcentral governments present a better bias and capacity for internalizar the economic externalities that take place in their territories (Porto, 2003).

Similarly, the political component is positioned as one of the advantages of the decentralization. A decentralized government in the field of public finance contributes to the practice of democracy.[1] This can be beneficial in countries that do not have a well-established democratic tradition. The delegation of responsibilities from the central government to regional governments will provide great benefits in terms of increased efficiency of public spends, and therefore economic growth (Iimi, 2005). In addition, the decentralization can be considered as a mechanism which allows to increase the participation of population in the solution of more nearby problems, contributing in this way to give priority to the management of public spends in terms of achieving greater degrees of efficiency (Bodman and Ford, 2006).

On the other hand, fiscal decentralization can improve regional development and technical progress (Oates, 1999). When an environment of imperfect information and, furthermore, a great variety of innovative measures are carried out to try to solve the same regional social and economic problems, innovative jurisdictions generate information that can very valuable for the rest. In turn, competition among fiscal communities can make public officials from certain regions give services at the minimum possible cost, increasing so the technical efficiency in their jurisdiction (Martínez and McNab, 2003). The main inconvenience is that competition can lead some subcentral governments undersupply public services and basic infrastructures, what will impact negatively in regional economic growth (Break, 1967).

On the other hand, a potential problem of fiscal decentralization is the fiscal competition among different levels of government. In fact most of the doctrinal literature about this topic see the competitive behavior between administrations like an inefficiency cause more than like an improvement. However, there are authors that think the competition plays an important paper in the contention of public spending (Brennan and Buchanan, 1980; Oates, 2001). Also, the alternative to the competition among different government levels is the coordination or cooperation among jurisdictions. The benefits of social welfare provided by the coordination are due to the fact that minimizes the political uncertainty and

---

[1] See, for exemple, Blair (1988), Martínez and Mcnab (1998, 2006b) and Dethier (2000).

it favors the negotiation and the resolution of interregional conflicts (King, 1988, 1995).

In short, the arguments set out before allow us to consider that fiscal decentralization advantages are usually superior to inconveniences regarding their relation with the social welfare.

The transcendency of this document resides in the fact of being able to offer a *reading guide* that serves as a reference point to be able to investigate how fiscal decentralization contributes to economic growth and explains the mechanisms involved. In consequence, a rigorous analysis has been made on the most outstanding empiric investigations about the impact that the existence of multilevel government structures have on the economic growth of a country. This document summarises the main results that are derived from all these investigations, examining, both the temporal and space horizons selected in these studies, comparing the conceptual framework and the methodology used by the different authors, evaluating the indicators used in the construction of the *fiscal decentralization* variable and the specification of the growth dependent variable.

1. Conceptual framework on the connection between fiscal decentralization and economic growth

Many of you have discussed the costs and benefits that the establishment of multilevel government structures provides. In fact, the developed focus up until recent dates has been centered on analyzing how, from a static perspective, decentralization can promote the economic efficiency of the system. The possibility that subcentral governments can satisfy, to a greater extent, the necessities of the individuals of their jurisdictions have been the main argument fenced in favor of the decentralization of those public goods and services whose benefits have clear space delimitations. Equally, with the aim of reaching bigger bench marks of efficiency, the existence of certain public services whose benefits expand along the whole national territory advises that the central government should be responsible for its supply.

It is also necessary to remember that the main issue in the Theory of Fiscal Federalism is not simply the dichotomy between centralization and decentralization. Each government level has an important role to carry out. The challenge that should be reached is to assign the responsibilities and the authority for government's functions to the appropriate levels. From this perspective, fiscal institutions should be designed to be able to incorporate incentives so that the governing class can select policies that promote the economic growth of their regions. In this sense, the traditional vision of the Theory of Fiscal Federalism develops new lines of

investigation, amongst those we can outline if fiscal decentralization promotes economic growth.

Concretely, in the last decades, one of the most concerning matters, in different international organizations is to determine if the economic activity of inferior units of government can, to a certain point, foment the economic growth of a country. To this respect, the plans to establish a connection between the phenomena of the economic growth and the fiscal decentralization have been more an intuitive question than a normative work (Esteban *et al.,* 2006, 2008).

The idea that underlies in this branch of the analysis of the Fiscal Federalism is that, if from a static front, the fiscal decentralization of the Public Sector promotes the economic efficiency, from a dynamic one it is able to promote economic growth (Oates, 1993). The sub-central administrators know the necessities of infrastructures of their territories better than the central government and, therefore, they can satisfy them, in a greater measure. Equally, economic literature offers another possible explanation on the phenomenon cause-effect of economic growth and of fiscal decentralization: interpreting this last idea as a superior good (Bahl and Linn, 1992). Only in countries with relatively high per capita income levels decentralization ends up being attractive, in the sense that its benefits can be much more exploited that their disadvantages. Nevertheless, like Oates (1999) exposes, the relationship among the income level per capita of a country and the grade of decentralization of its Public Sector should not be interpreted as a monolithic relationship. It is not true that the decentralization is intensified without limits depending on level of income of a country but rather an optimal level of fiscal decentralization has to exist to be able to maximize the economic growth of a country.

From this perspective, Martínez and Mcnab (2003) tink about that the direct impact between fiscal decentralization and economic growth may be uncertain. However, they argue that potential indirect effects on both process can exist. It is, decentralization may have an indirect impact on economic growth, through consumer efficiency, producer efficiency, the geographical distribution on resources, macroeconomic stability, corruption and captures by elites. Specifically, Martínez and McNab (2006a) make a model that establishes the potential indirect influence of decentralization on growth through its impact on macroeconomic stability. More recently, Feld *et al.* (2009) offer a broad survey of this subject and they analyse the potential impact of intergovernmental transfers on structural change as channel through which may have an impact on aggregated economic performance. From a theoretical point of view, Schnellenbach *et al.* explain that "a status quo bias implies political preferences in regions that are subjected to structural changes

typically tend towards preserving the declining incumbent industry"
(2009: 28). They investigate whether different fiscal institutions lead
policy-makers to take different responses to the declive of well established
industries. Schnellenbach *et al.* (2009) results suggest that transfers in
cooperative federalism are used for income policies rather than to foster
structural changes.[2]

In the light discussions above, empirical evidence are, however, not in
contradiction with theoretical approaches.

2. Empiric evidence on the connection between fiscal decentralization and economic growth

The intuition that the processes of decentralization can potentialize the
economic growth of a country has originated, by the middle of the nine-
teen-nineties, different works whose purpose was to contrast its empiric
validity. With the purpose of making easier the interpretation of the results
reached in different studies, we can establish the following classification.
On one hand, the investigations that center their interest in analyzing the
relationship between fiscal decentralization and economic growth from
a point of view establishing comparisons with other countries (cross-
country studies). On the other hand, studies that limit themselves to
verify the impact that multilevel government structures causes on the
growth of a certain country (single-country studies) (Anexxes I and II).

In cross-country studies, there are a range of studies that reflects in
quantitative terms the existent relationship between fiscal decentralization
and economic growth. The most outstanding contributions correspond
to Oates (1995), Phillips and Woller (1997), Davoodi and Zou (1998),
Yilmaz (2000), Thieben (2000, 2003, 2005), Martínez and McNab
(2006a), Iimi (2005), Bodman and Ford (2006), Thornton (2007) and
Baskaran and Feld (2009).

The remaining investigations center their interest in determining the
connection of both processes from a regional or national perspective (the
single country analysis).

1. The behavior of the Chinese economy is analyzed in the studies of
   Zang and Zou (1998, 2001), Jin *et al.* (2005), Lin and Liu (2000),
   Jin and Zou (2005) and Qiao *et al.* (2008).
2. The influence of the process of fiscal decentralization on the eco-
   nomic growth of the United States is depicted in the investigations
   of Xie *et al.* (1999), Akai and Sakata (2002) and Akai *et al.* (2007).

---

[2] Feld and Schnellenbach (2010) offer an excellent survey of the current literature on fiscal fe-
deralism and long-run economic performance.

3. Behnisch *et al.* (2003) analyze the German experience.

4. The repercussion of fiscal federalism in the economic performance of the Swiss Cantons is studied in Feld *et al.* (2004).

5. The behavior of regions of India in connection with economic growth is interpreted by Zhang and Zou (2001).

6. The evidence of regional growth in Russia is studied in the investigation of Desai *et al.* (2003).

7. Finally, Carrion *et al.* (2006), Pérez and Cantarero (2006), Solé and Esteller (2006) and Esteban (2006) are among the most recent studies, and they indicate the effect that fiscal decentralization has caused on the economic growth of the Spain.

3. Chosen variables

The previous spatial grouping is fundamental when examining the suitability of the variables used by the different authors. The tables in the annexes number 1 and 2 picks up the dependent and fiscal variables used.

3.1. *Dependent variable*

Dependent variable used in the majority of cross-country studies is the growth rate of real Gross Domestic Product (GDP) per capita, coming from International Financial Statistics of the international Monetary Fund or of World Development Indicators of the World Bank (GDP). Nevertheless, exceptions are Phillips and Woller (1997), Martínez and McNab (2006a) and Bodman and Ford (2006), who employ the logarithm real of GDP per capita (GDP'). Alternately, Thieben (2000, 2003, 2005) uses different indicators to reflect the growth rate of the economy of a country. This is, average growth rate of real gross fixed capital formation –deflated by the producer price index– (GKAP), total factor productivity growth derived as a component of a macroeconomic production function (TFPG) and average gross investment share of GDP (INVGDP). On the other hand, Iimi (2005) and Thornton (2007) use the average growth rate real of GDP per capita for each country (GDP).

With the same approach, in single-countries studies, the dependent variable used is the growth rate of real province (state) income (Gypreg) that comes from the Official Institutes of Statistic of the considered country. Nevertheless, Behnisch *et al.* (2003) opt to use *the rate of total factor productivity growth* (TFPG); Desai *et al.* (2003) select *industrial output of the it region* deflated by the regional price deflator. And lastly, in the Spanish case, Solé and Esteller (2006) elaborate two indicators that pick up investments by all the levels of government divided by the

previous year's capital stock. These indicators reflect two different types of spending categories: roads (I^r_{it} / R_{it-1}) and education (I^e_{it} / E_{it-1}).

3.2. Explanatory variables

The measurement of fiscal decentralization used by the majority of empirical studies as an explanatory variable is, at least, problematic. The issue is that there is no single, fiscal decentralization is multidimensional. Traditionally, researches are defined on the basic of a single dimension of decentralization (share for subnational governments in general expenditures or tax revenues). As Martínez and McNab suggest, "There are many aspects of a country's fiscal affairs that ca be more or less decentralized" (2003: 1608). That is, it can be the case that a country may be more decentralized, because its subnational government have more significant autonomous sources of revenues, or greater freedom in how to make expenditures decisions on the services provided at the subnational level or the level of decentralization may be small because regional officials are not democratically elected and are only accountable to central government authorities (Bodman and Ford, 2006). Also, it has been noticed that different methods of measuring the degree of descentralization have produced opposite correlation from empirical analysis of impact of decentralization on economic growth. One reason for this discrepancy could be inconsistency of measures (Halder, 2007). Fortunately, the empirical literature ha evolved significantly in the precision with which the explanatory variable for fiscal decentralization is measured. For this reason, Halder (2007) has attempted to construct the Composite Radio (CR). He considers the grant given by the central authority to the sub-national authorities to be an important player "This is because expenditure by the subnational levels of government might be often financed by grants from the central government. In such a case, the authorities of the lower of the government are not necessarily reflected in the expenditure decisions. The grants are more likely to be tied for specific projects" (Halder, 2007: 6). Equally, the paper has brought in the average size of jurisdiction as a measure of decentralization. Such a size is measured in two ways, in terms of area and population. The smaller the size index, the more decentralized is the government.

From the available literature, we can state that different measures of fiscal decentralization produce different outcomes when they are used in regressions for the same dependent variable.

In cross-country studies, the database more widely used is The Government Finance Statistics (GFS) of the International Monetary Fund (IMF). Most authors choose the budget data approach and they approximate the

degree of fiscal decentralization using the share of sub-national government expenditures/revenues in general government expenditures/revenues; net of intergovernmental transfers (FD-Exp or FD-Rev).

Nevertheless, in certain investigations, together with these indicators, other types of statiscal are included. This way, Oates (1995) uses an alternative measurement for the independence of sub-national levels. This author employs the *self-reliance* ratio (SR), as the share of own revenues of lower levels in their total revenues.

Phillips and Woller (1997), on the other hand, build two additional variables of fiscal decentralization. On one hand, the ratio of local government expenditures to total government expenditures minus defense and social security expenditures (FD-Exp$_{NDEP}$). On the other one, they design a variable (FD-Revgia) by means of the transformation of the conventional indicator of tributary decentralization (FD-Rev). Concretely, FD-Revgia is defined as the ratio of local revenues minus grants-in-aid to total government revenues.

In turn, Thieben (2000) chooses different measures of fiscal decentralization. On one hand, it uses the variables already used by other authors (FD-Exp and SR). On the other hand, it makes a simple transformation indicator of FD-Exp to test for *hump-shaped* relationships between economic performance and fiscal decentralization (FD-Exp^2). Finally, he elaborates an indicator (CHSR) to test whether increasing self-reliance of subnational governments have effects on economic growth.

Additionally, Thieben (2003, 2005) uses in an alternative way, together with the indicators of fiscal decentralization already employed in the year 2000, three dummy variables that are denoted FD-Exphigh for *high degree of fiscal decentralization*, FD-Expmed for *medium degree of fiscal decentralization* and FD-Explow for *low degree of fiscal decentralization*. In turn, for Thieben (2005) the model is augmented with a variable dummy (CD), which is assumed as 1 if the governmental system is centralised and 0 if it is federal.

Iimi (2005) incorporates a measure of *political freedom* (PF) that reflects the degree of political transfer to the municipal level. The reason is that political freedom is closely linked with decentralization mechanisms and thus with economic growth in the following sense. "Firstly, one might think that the benefits of fiscal decentralization depend on how much political freedom a country enjoys. If freedom is low, the benefits based on the Tiebout mechanism may not be strongly realized. If freedom is high, the benefits may be realized" (Iimi, 2005: 453). According to this perspective, an interaction term FD*PF should be of particular interest, since it allows us to test the hypothesis of fiscal decentralization and political freedom as complementary.

Bodman and Ford's (2006) analysis incorporates traditional measures of fiscal decentralization (FD-Exp and FD-Rev) and a number of new measures that attempt to account for different degrees of sub-national fiscal autonomy. The dimension of fiscal decentralization considered in this study, and the most important dimensions, is to what extent is fiscal decision-making decentralised? This paper presents three measures of tax revenue (tax-only) decentralization: subnational own tax revenue (TDEC1), sub-national own and shared tax (TDEC2) and total subnational tax revenue (TDEC3), all calculated as the share of general government tax revenue. On the other hand, own taxes refer to those taxes for which the sub-national government can determine the tax rate or tax bases or both (RDEC1, RDEC2 and RDEC3).

Bodman and Ford's (2006) study also provides two measures of expenditures decentralization. These measures are based on total sub-national expenditure and lending, minus loan repayments, as a percentage of consolidated general government expenditures, without social security payment (EDEC1 and EDEC2). EDEC1 excludes transfers to other levels of government, whereas EDEC2 includes transfers to other levels of government net of received transfers.

Futhermore, Bodman and Ford's (2006) paper uses *hump-shaped* indicatores based on the traditional budget dates measures. The countries were divided into five equal sized groups, denoting very low, low, medium, high and very high decentralization (FD).

Finally, a number of other measures of government decentralization, omitted from previous studies of federal decentralization and growth, are considered in the Bodman and Ford's (2006) paper.

1. The number of sub-national jurisdictions in the intermediates and lower tiers of government is considered (NSGVT).
2. An indicator was included to account for electoral decentralization (Elect). Taking the value of 0 if there are no sub-national elections, 1 if either local or intermediate tiers of government are elected, or 2 if both are subject to elections.
3. The indicator of constitutional structure is an index of federalism, one to five-point scale (FU): *a)* unitary and centralized; *b)* unitary but decentralized; *c)* semi-federal; *d)* federal but centralized, and *e)* federal and decentralized.
4. Resource decentralization is considered using the ratio of subnational government employees to central government employees (Employ).

The independent variables of decentralization of Thornton's (2007) study are the average tax revenue of sub-national governments stemming from the tax bases and tax rates over which they have full discretion, Ownrev, and a variable to test for the notion of *hump-shaped* relation between fiscal decentralization and growth proposed in Thieben's (2003) study, which is a quadratic indicator of Ownrev, (Ownrev)*(Ownrev).

And, Lastly, Baskaran and Feld (2009) present two different decentralization measures. The first measure (Rev.DEC.1) is similar to the one used by Thornton (2007). It is constructed by summing all sub-federal tax revenues for which sub-federal governments may determine either rates, bases or both, and then dividing the sum by total government tax revenues. The second measure (Rev.DEC2) is constructed by summing all tax revenue from shared taxes for which sub-federal governments may codetermine the revenue distribution or other allocation details of the joint taxation system, and then dividing the sum by total government tax revenues.

If we center on single-countries studies, the indicators that are used mostly are the shares of spending/revenues by each level of government in consolidated government spending/revenues across all levels, both in absolute terms as in values per capita, or their derivations (FD-Exp; FD-Rev). Nevertheless, in Akai and Sakata (2002), apart from the conventional indicators of revenues (FD-Exp) and expenses (FD-Rev), they also elaborate three additional statistical. On one hand, those that seek to reflect the grade of fiscal autonomy of a sub-central government in a State (*AI* and *AII)*. On the other hand, a normalized statistical one (PRI) which reflects both revenue and expenditure aspects of fiscal decentralization.

AI is defined as the ratio of local government's own revenue to total revenue, with revenues excluding federal grants; *AII* is the ratio of local government's own revenue to total revenue, with revenues including federal grants; and *PRI* represents a decentralization measure that incorporates both revenue and expenditure shares. The production-revenue indicator (PRI) is defined as the mean of FD-Exp and FD-Rev.

On the other hand, Lin and Liu (2000) and Desai *et al.* (2003) apply an alternative focus of the measure of decentralization fiscal applied. In the first study, the fiscal decentralization measure is *the marginal retention rate of locally collected budgetary revenue* (MRR-Taxrev). In this study, the fiscal decentralization measure is determined by how many the revenue increments were kept by provincial governments. Whereas Desai *et al.* (2003) use as a measure of fiscal incentives, *the tax revenue retention rate* (RR-Taxrev). This variable reflects only official taxes, collected and accounted for in regulating government budgets.

In an alternative way, Feld *et al.* (2004) depict the grade of fiscal decentralization by means of the application of six alternative statisticals. These authors use the habitual indicators of revenues and expenses used in the literature (FD-Exp and FD-Rev) and four more that capture concrete aspects of the Swiss model of decentralization. The first statistical (Mat-Grants) reflects the matching grants per capita received in each Swiss Canton. This variable reflects the financial importance that the matching grants have in the model of cooperative federalism in Switzerland. The second indicator (Fisc-Comp) indicates that the higher the difference of average tax burden of the neighboring cantons, the higher the pressure of tax competition on the cantonal and local tax authorities. On the other hand, the variable fragmentation (Fragm) is constructed by the number Communes in a Canton divided by population. It is supposed to capture the lack of exploiting economic of scale. Lastly, Urbanization (Urban), measured by the share of people living in urban areas, is included to represent the new field of economic geography that reflects that urban economic centres develop more strongly that the periphery.

Qiao *et al.* (2008)'s studie define two measures. The first measure is similar to the one used in most studies; decentralization is defined as the share of provincial fiscal expenditure in total fiscal expenditure in per capita terms (FD-Exp per cap). The second measure is the index equity in the regional distribution of fiscal resources (Equity). This measure is defined as the ratio of the share of fiscal resources to the share of population of a province as the province's relative share of fiscal resources.

On the other hand, Solé and Esteller (2006) opt, for the Spanish case, for the definition of two variable Dummies. These indicators reflect the moment when decentralization took place in the responsibilities of road and education in each one of the Spanish regions. dcr_{it} is a dummy equal to 1 if the regional government has the responsibility of providing regional roads. Alternatively, $dece_{it}$ is weighted sum of a dummy equal to 1 if the regional government has the responsibility of providing primary and secondary education, and a dummy equal to 1 if the regional government has the responsibility of providing higher education, with the weights being the average share of both education levels in total education investment.

Finally, Esteban (2006) uses as a variable of fiscal decentralization the percentage of public expense attributed to Spanish Autonomous Communities with respect to the total of government expenditure in these Communities (Descgto).

4. Conceptual framework employed

The theoretical model mostly backed by economists has been that of Davoodi and Zou (1998). The theoretical framework on which these authors base theirs studies is the endogenous growth model of Barro (1990), where the production function has multiple inputs including private and public spending. This perspective is adopted by Davoodi and Zou (1998), Zhang and Zou (1998, 2001),[3] Xie *et al.* (1999), Akai and Sakata (2002), Akai *et al.* (2007),[4] Iimi (2005), Jin and Zou (2005), Carrión *et al.* (2006), Pérez and Cantarero (2006), Esteban (2006) and Baskaran and Feld (2009). Concretely, in the model of Davoodi and Zou (1998), the public spending is divided in three government levels and the spending shares are determined assigned at the different government levels with the macroeconomic objective of maximization of the growth. The essential implication of the models is that for a given share of total government spending to GDP, the growth-maximizing government budget shares are proportional to the relative productivity of federal and local level governments.[5]

On the other hand, the studies of Lin and Liu (2000), Martínez and Mcnab (2006a), Thieben (2003, 2005); Feld *et al.* (2004) and Bodman and Ford (2006) use a different approach. Following Mankiw *et al.* (1992), these authors use the model of exogenous growth of Solow (1956) and they introduce the fiscal decentralization as a variable explanatory of the growth rate of output per capita. The cornerstone of these last works is to admit that the exogenous parameter not only reflects technological aspects of the economy but also a measure of the economic performance of the decentralized Public Sector. *I.e.* the level of technology reflects not just technology but also differences in resource endowment and institutions across countries/regions and over time, as well as in other non-bservable countries/region-specific characteristics. This disintegration of the term *technological progress* is consistent with the economic literature

[3] In turn, Zhang and Zou (2001) outline a greater complexity in the question of the sub-central government expenditure, that increase the previous approach and develops a model that links multiple sectors of public spending to multiple levels of government and economic growth.

[4] Equally, Akai et al. referring to Barro (1990) developed a model, which considers differences in the quality as well as complementarities of public services.

[5] As Iimi (2005) indicates an interpretation of Davoodi and Zou (1998)'s model is that "When the productivity effect of sub-national level government spending is relatively large compared with the central government expenditure, fiscal decentralization has a positive effect on the growth rate. However, holding the relative productivity constant between governments, fiscal systems that are excessively decentralized are likely to lower economic growth" (Iimi, 2005: 453). Therefore, it is logical to expect that allocating budgetary resources to less productive levels of government is harmful for the economic efficiency and therefore, for the economic growth of a country. This implies that if the sub-national governments are inefficient and faulty in the supply of local public goods, the fiscal decentralization is not the best option.

about the growth and with the hypotheses of conditional convergence (Barro, 1990; Sala, 1994).

In any case, the previous studies probably use a theoretical framework ad-hoc, since they don't allow to identify the causes of the estimated effect of decentralization in the economic growth of a country. In this sense, the procedure used by Sollé and Esteller (2006) is quite different to that employed in previous investigations. This authors consider the assignment process among alternative investments and, then, they compare it with the effect that this assignment process causes in decentralized decision-taking scenario as in another centralized. In this point of the analysis, if the assignment process differs among the two contexts of decision-taking, they are able to identify the inefficiency taken place under the centralized government structure. Also, combining the obtained results with the estimates of the effects of the outlined alternative investments (roads and education) on the economic growth, they can determine the gain from the output due to the better assignment in the investments in the decentralized decision-taking scenario.

Among the two most backed theoretical focuses, models of endogenous court *versus* models of exogenous court, it seems that there is a clear preference to contrast the influence of the processes of fiscal decentralization empirically on the economic growth from an environment of endogenous growth (Annexes I y II). Concretely, the fact stands out that most of the studies of individual countries are based theoretically on the contributions of Barro (1990), where the government expenditure assigned at each government level is added to the production function as one more productive input.

5. Empiric methodology

The econometric specifications that are used, mainly refer to two particular procedures in the treatment of the data: regressions with cross-section data as opposed to those that are solved on a panel of data (Annexes I y II).

In the panels of data the variables of annual frequency are usually used. Although, it is true that, it is possible to establish panels with data averages of more than a year of frequency, with the purpose of grasping the possibility of long term effects. This is the case detected in Davoodi and Zou (1998) and Phillips and Woller (1997) who use a panel on average data covering five years or decenal frequency, in the first case; and of annual frequency, triennial and five-year, in the second case.

The pros and cons of these two types of data treatment are discussed in the investigations of Thieben (2000, 2003). This author grants, in

both studies, a bigger priority to the regressions of cross-section with data annual averages. However, in spite of most authors lean for the methodology applied on panel data, Akai and Sakata (2002) use regressions with cross-section data and they introduce a variable dummy that picks up the specific characteristics of each country.

Equally, one empirical issue that should be considered before analysing the relation between decentralization fiscal and economic growth concernid the potencial endogeneity of fiscal decentralization to the growth process. A significant body of empirical literature suggest that the level of income is a determinant of decentralization fiscal (Oates, 1972; Panizza, 1999; Eller, 2004). As it is suggested in Bodman and Ford (2006)'s report, development stimulates demand for variety and quality in the range of public services being provided whilst increasing the revenue raising capacity of governments, making decentralization affordable. "If federal decentralization has a high income elasticity, then higher income per capita may allow the constitution of a new level of decentralization. If fiscal decentralization affects economic growth, then the new level of decentralization will in turn have an impact on the of income. Thus suggest a potential bidirectional relationship between fiscal decentralization and economic growth" (Bodmand and Ford, 2006: 13). Moreover, Breuss and Eller (2004) and Iimi (2005) acknowledge that unobservable and omitted variables that tend to simultaneously may also exit. If is this the case, then simply including fiscal decentralization in a growth regression could lead to simultaneity bias.

The different channel of interference and potencial bi-directional causalities between fiscal decentralization and economic growth have not been sufficiently considered within theoretical models or empirical specifications, respectively. Breuss and Eller (2004) suggest that given potential bi-directional causalites it is also necessary to address the research regarding the impact of economic growth on fiscal decentralization and examine the various channels of interference. "It is important to specify the determinants and dimension of both fiscal decentralization and economic growth and clarify wich exogenous variables determine simultaneously the two variables of inters (*e.g.* population growth)" (Breuss and Eller, 2004: 8). If fiscal decentralization and economic growth are endogenously related then failure to control for this econometric issue would result in inconsistent parametres estimate. And additional problem in testing and controlling for endogeneity is the lack of control variables that are correlated with decentralization, uncorrelated with growth, and available across countries and time. The literature of data has focused primarily on the contemporaneous relationship between decentralization

and growth; ignoring for the most part the potential for time-wise causality (Martínez and Mcnab, 2003: 610).

From this point of view, the results of some researches assume that there is one way causality between fiscal decentralization and economic growth; whereas others authors consider that there are some problems in Ordinary Least Square (OLS) estimations, and provide corrected estimations of results. In order to provide correct estimates, most of the studies value the effect of fiscal decentralization by considering endogeneity. They correct these potential problems, using Three Stage Least Squares (TSLS) and adding the Instrumental Variables (IV) to the exogenous ones already included in the basic regression model.

Regarding the estimator used by different authors, the estimador of OLS is the one that prevails in most of studies. Nevertheless, Zhang and Zou (1998), Yilmaz (2000) and Thieben (2000) use the estimator of General Least Square (GLS); Akai et al. (2007) opt for Maximum Likelihood (ML) estimation; Desai *et al.* (2003) use the Three Stage Least Squares (3SLS) estimate to minimize the simultaneity and endogenousity of some explanatory variables that can be the case of the transfers received by the subcentral governments.

More specifically, and among the most recent investigations, Bodman and Ford (2006) go even further in Thieben's (2000, 2001) analysis of the relationship between fiscal decentralization and the components of the growth equation. His study uses pooled cross-section regression. On the other hand, in Thieben (2005) the simple OLS method is used with the assumption that the independent variables are exogenous. The estimate is a pure cross-section analysis; that is, short-term time effects were eliminated by forming averages to enable only the long-term effects to be measured. Equally, in Thornton (2007), given the relatively small sample size, the estimation technique was OLS with average data for the period. Whereas the use of OLS in this context implies that the explanatory variable is exogenous, which may be problematic, the relatively small sample prevents the use of an alternative Instrumental Variable (IV) method. In the same way, in Iimi (2005) and Esteban (2006) the estimation results are based on the OLS and IV technique using data averages for the period of reference.

Jin and Zou (2005) use a panel data set for 30 provinces in China. The regression analysis in this study uses the panel data sets combining time series and cross section. All coefficients are estimated with fixed-effects with corrections for panel heteroskedasticity and and panel serial correlation.

Of particular note, comparing the ols and iv results, the iv models tend to estimate systematically smaller effects of fiscal decentralization than the ols regressions, implying that the ols results are biased.

6. Discussion about the results from the literature review

In theory, it is expected that the decentralization lead to efficient provision of local public services and a rapid economic growth but the empirical evidence has shown that there is not a direct relation cause-effect between fiscal decentralization and economic growth is ambiguous.

The results of the studies on the impact of fiscal decentralization on economic growth that have been conducted on a cross-country analysis, indeed end up with controversial results (Annex i).

Iimi (2005) finds that fiscal decentralization has a significant positive impact on per capita growth, implying that the transfer of fiscal functions to sub-national governments is condicive to economic growth.

Thieben's (2005) studies can conclude that decentralization does generally have a positive influence on growth. The results show that fiscal decentralization can promote growth to limited extents. Countries with medium decentralization have a slightly higher investment ratio and slightly higher growth in total factor productivity than countries with a high or a low degree of decentralization.

Similarly, Bodman and Ford (2006) suggest that whilst little evidence of a direct relationship between fiscal decentralization and economic growth is found, some evidence is found to support the hypothesis that a medium degree of fiscal decentralization is positively related to growth in the capital stock and level of human capital.

At the same time, the empirical results presented in Thornton (2007) suggest that when measures of fiscal decentralization are limited to the revenue over which sub-national governments have real autonomy, there is no statistically significant relationship between fiscal decentralization and economic growth. Whereas, when revenue decentralization is measured by only those own-revenue, over which sub-national government have full discretion, fiscal decentralization does not appear to affect economic growth of mid ot high income countries. He indicates that "A serious problem with much of the literature on the macroeconomic impact of fiscal decentralization is that it fails to make an appropriate distintion betwen administrative and substantive decentralization by not recognizing that high sub-national revenue and spending shares do not necessarily indicate high local autonomy" (Thornton, 2007: 65). Baskaran and Feld (2009) find that there is no evidence that revenue decentralization leads to lower growth rates. "On the contrary, there is even some evidence that sub-federal con-

trol over shared taxes is beneficial for economic outcomes. On the other hand, federations seem to have lower growth rates" (Baskaran and Feld, 2009: 17).

On the other hand, the empirical results concerning the impact of decentralization on economic growth for individual countries are not less ambiguous than those detected in the studies among countries (Annex II). As Jin y Zou (2005) suggest, the effects of fiscal decentralization on any given case depend critically on the nature of fiscal institutions and the type political system. These authors suggest that expenditure and revenue decentralization levels should further diverge to benefit provincial growth. In the first phase (1979-1993), provincial economic growth is negatively associated with expenditure decentralization and positively associated with revenue decentralization. The negative association between expenditure decentralization and provincial real GDP growth rate is consistent with Zhang and Zou's (1998) results. Hence, their interpretation, that the central government may be in a better position to undertake public investment with nation-wide externalities in the early stages of economic development, is supported by this result. In the second phase (1994-1999), the regression results testing the relationship between fiscal decentralization and growth for the period after 1994, when the tax assignment system was applied, suggest that there is no significant association between expenditure decentralization and provincial economic growth. Meanwhile revenue decentralization is found to be negatively associated with provincial economic growth, with a high level of statistical significance.

On the other hand, in the case of the Indian economy, Zhang and Zou (2001) find a positive and significant relationship between the per capita fiscal decentralization shares and state economic growth in India; While in the case of the Chinese economy the results of Zhang and Zou (1998) reproduce themselves.

Jin *et al.* (2005), however, find a weakly significant positive effect of expenditure decentralization on the economic growth of the same sample of Chinese provinces over time. The most important difference between these is that Zhang y Zou (1998) do not use time dummies.[6] Lin and Liu (2000) corroborate the result of a positive impact of decentralization on economic growth in Chinese provinces for the period 1970 to 1993.

Opposed to Zhang and Zou (1998)'s theories, Qiao *et al* (2008) indicate that fiscal decentralization significantly affected economic growth. These findings may be explained not only by the differences in the

---

[6] Jin *et al.* (2005) use the empirical methodology of Zhang and Zou (1998) including a variable dummy that grasps the effects of the national macroeconomic fluctuations.

specifications of economic models usual in the two studies, but by the difference in the time periods covered by the two data sets. Fiscal decentralization significantly affected economic growth but at the cost of less geographical equity. Morever the relationship between the level of decentralization and economic growth is non-linear.

Desai *et al.* (2003) find that an increase in the retention tax (as a share of locally generated taxes that are left with the regional budget), for most Russian regions is generally accompanied by stronger economic growth.

From another perspective, Feld *et al.* (2004) indicate that matching grants have a negative impact on economic performance while tax competition is at least not harmful to economic performance. Tax competition appears to induce Swiss Cantons to allocate public funds more efficiently so that economic performance of a canton could improve.

Exploring the American economy, Xie *et al.* (1999) also find for the US states insignificant coefficients on local and state spending shares, but they argue that these insignificant fiscal decentralization shares indicate consistency with growth maximization. Akai and Sakata (2002) demonstrate that the expenditure decentralization positively affects economic growth of the US states. However, decentralization on the revenue side and the indicators for fiscal autonomy of sub-national levels do not have a significant impact. Equally, Akai *et al.* (2007) underline the positive influence on economic growth. These authors test the hypothesis of a *hump-shaped* relationship between fiscal decentralization and economic growth and find that US states with a low degree of fiscal decentralization tend to grow stronger.

Examining the impact on growth from the perspective of centralization, Behnisch *et al.* (2003) report a statistically significant positive effect of overall centralization on the German productivity growth.

As for as Spanish economy is concerned, Carrion *et al.* (2006), Pérez and Cantarero (2006) and Esteban (2006) emphasize on the fact that the contribution that the Spanish fiscal decentralization process has had positive effects on regional economic growth.

Equally, the analysis of the Spanish economy done by Solé and Esteller (2006) confirm the hypothesis of the *Decentralization Theorem* concerning the greater responsiveness of sub-central government to local needs. Their results show the need of decentralizing investment in order to maximize the rate of economic growth. This way, roads and educational investments made by sub-central governments in Spain is much more sensitive to changes in output than the investment made by central government. As Solé and Esteller (2006) suggest, if sub-central governments are more responsive to needs than the central government, the composition of the capital stock under centralization is not efficient.

Therefore, the Spanish fiscal decentralization process would have eliminated this distortion.

Overall, there is a large empirical literature on the relationship between fiscal decentralization and economic growth. However, some results indicate that this connection is inconclusive. To make good this relation, Feld *et al.* (2009) offer a survey of these empirical studies, and also use a quantitative meta-analysis to explore the true size of effects and to evaluate its significance. "In the context of decentralization and economic growth, the idea is to pool the estimates from several studies and to calculate an average effects" (Feld *et al.* 2009: 33). That is, they explore whether the choice of a particular measure of decentralization, a particular specification modifies the estimated effects. They report a tendency in the studies that there is a mild positive effect of fiscal decentralization, when is properly measured as a type of competitive government. As they conclude, the meta regressions shed more light on which study characteristics tend towards support for a positive impact of fiscal decentralization on economic growth. Mainly, "this relationship is expected in developed countries lending support to the suspicion that fiscal decentralization is having much different effects in less developed than in developed countries. In addition, single country studies tend to indicate a positive effects of federalism on economic growth which may be the results of their possibility to consider the specific differences a country more strongly" (Feld *et al.,* 2009: 48).

Conclusions

In theory, it is expected that decentralization will lead to efficient provision of local public services and will result in a rapid economic development. However, the studies presented here suggest that the relationship between fiscal decentralization and economic growth is ambiguous.

More concretely, in cross-country analysis the main conclusion that can be extracted is that a hump-shaped relationship seems to exist between the processes of fiscal decentralization and economic growth. Also, due to the specific problem in developing countries, it is necessary to limit the empirical analysis only to high income-countries. In high income-countries, the results suggest that the gains in growth that can be achieved through decentralization are limited. Successive increase of a relatively low degree of fiscal decentralization does stimulate investment and as a result, it promotes economic growth. But there seem to be a point beyond which, further decentralization no longer results in progress. The economic explanation that emerges from these results is that if the grade of fiscal decentralization is too high, intervention by central government

that would promote growth is not performed, and public goods with clear spatial delimitations of its benefits will not have spillover effects with their repercutions. In the same way, too low a degree of decentralization can lead to loss of economic growth because the local government offices would not have sufficient incentives to produces public goods as efficiently as possible, as a consequence of such knowledge not sufficiently taken into account.

While in studies within a single country, the effects of fiscal decentralization on any given case depend critically on the nature of the fiscal institution and political system in place. Nevertheless, the results seem to lean towards the hypothesis that a medium degree of fiscal decentralization tends to best promote economic growth. In other words, an optimal grade of decentralization would be able to capitalize a country's economy at a larger pace than it would be at inferior levels or superiors of fiscal decentralization.

As a final conclusion, cross-country studies as well as single-country analysis, tend to be inconclusive and they offer ambiguous and differents results. Among the factors that can cause these ambiguous and differents results, the ones that stand out most are, the different methodological approaches, the analytical unit applied (studies among countries vs. studies single country) and the diverse designs of the variable fiscal decentralization. In this sense, future research may consider developing more disintegrated measures of fiscal decentralization. The degree of decentralization should not be measured by the share of expenditure/revenue of lower level with respect to total expenditure/revenue of the government. In turn, it seems necessary to measure the differences in current autonomy among jurisdictions. It is necessary to elaborate measures of fiscal decentralization that represent changes in fiscal decentralization or grasp qualitative restrictions of sub-national autonomy. In equal manner, it would be advisable that those publicly responsable for each country's Official Institute of Statistics draw up better and wider ranged time series data. Finally, it is important to note that new investigations, based on theoretical models that are able to verify the relationship that lies between fiscal decentralization and economic growth, are very necessary. For example, it is required further research to come up with a clearer identification of the transmission channels by which fiscal decentralization should promote economic growth.

Annex I

Empirical studies on the influence of fiscal decentralization on economic growth in cross-country studies

Author	Space field	Time field	Dependent variable	Variable of FD	Analytical framework	Empiric methodology	Main results
Oates (1995)	40 countries	1974-1989	GDP	FD-Exp, SR	Not explicit any theoretical model	No details available	Positive and significant correlation between fiscal decentralization and economic growth
Phillips and Woller (1997)	23 countries LDC	1974-1991	GDP	FD-Exp, FD-ExpN-DEF, FD-Rev, FD-Rev$_{GIA}$	Levine and Renett (1992) and Sala-i-Martin (1997)	Panel data. Fixed Effects Model. OLS	Fiscal decentralization no robust effect on economic growth
Davoodi and Zou (1998)	46 developing and developed countries	1970-1989	GDP	FD-Exp	Model of endogenous growth of Barro (1990)	Panel data. Fixed Effects Model. OLS	Decentralization of spending reduces economic growth, but this relation is not significantly
Yilmaz (2000)	46 countries	1971-1990	GDP	FD-Exp	Not explicit any theoretical model	Panel data. Fixed Effects Model. GLS	Decentralization is not significant to economic growth
Thieben (2000)	26 developed and developing countries	1975-1995	GDO, GKAP, TFPG	FD-Exp, FD-Exp^2, SR, CHSR	Model of endogenous growth without providing more particulars	GLS	The capital formation is positively related to the increments of the sub-central governments' self-reliance
Thieben (2003)	21 developed countries	1973-1998	GDO, INVGDP, TFPG	FD-Exp, FD-Exp^2, FD-Exp$_{LOW}$, FD-Exp$_{MED}$, FD-Exp$_{HIGH}$, FD-Rev, SR	Model of economic growth of Solow enlarged by Mankiw *et al.* (1992)	GLS	Convergence of the countries of high-income of de oecd toward a medium degree of decentralization of expenditures can promote the economic growth

Continúa Anexo 1...

Author	Space field	Time field	Dependent variable	Variable of FD	Analytical framework	Empiric methodology	Main results
Martínez and McNab (2006a)	52 developed and developing countries.	1972-1997	GDP		Model of economic growth of Solow enlarged by Mankiw et al. (1992)	Panel data. Fixed Effects Model. GLS	Fiscal decentralization is positively related to macroeconomic stability
Thieben (2005)	21 High-income OECD countries	1973-1998	GDP, INVGDP, TFPG	FD-Exp$_{LOW}$, FD-Exp$_{MED}$, FD-Exp$_{HIGTH}$ and CD	Model of economic growth of Solow enlarged by Mankiw *et al.* (1992)	OLS	The hypothesis that fiscal decentralization can promote growth has a limited extent
Iimi (2005)	51 countries	1997-2001	GDP	FD, PF and FD*PF	Endogenous growth model provided by Davoodi and Zou	OLS and IV	Fiscal decentralization has a significant positive impact on growth
Bodman and Ford (2006)	21 OECD countries	1981-1998	GDP	FD-Exp, FD-Rev, TDEC, RDEC, EDEC, FD, NSGUT, Elect, FU, Employ	Model of economic growth of Solow (1956)	OLS	Medium degree of decentralization is best for the growth in both physical and human capital
Thornton (2007)	19 OECD countries	1980-2000	GDP	Ownrev, Ownrev*Ownrev	Not explicit any theoretical model	OLS	No robust effect of revenue decentralization to economic growth
Baskaran and Feld (2009)	23 OECD countries	1975-2001	GDP	Rev.DEC.1; Rev.DEC.2	Endogenous growth model provided by Davoodi and Zou	Panel data; OLS; random effects, fixed effects estimations	Fiscal decentralization and economic growth are unrelated but there is some evidence that sub-national control over shared taxes is beneficial for growth

Source: Own elaboration.

Annex II

Empirical studies on the influence of fiscal decentralization on economic growth in single-country studies

Author	Space field	Time field	Dependent variable	Variable of fd	Analytical framework	Empiric methodology	Main results
Zhang and Zou (1998)	28 provinces of China	1980–1992	GYP_{REG}	FD-Exp, FD-Exp$_{EB}$, FD-Exp$_{B+EB}$	Model of endogenous growth of Barro (1990)	Fixed Effect Model. GLS	Fiscal decentralization has a negative and significant impact on the economic growth
Jin *et al.* (2005)	29 provinces of China	1982–1992	GYP_{REG}	FD-Exp, FD-Exp$_{EB}$, FD-Exp$_{B+EB}$	Model of endogenous growth of Barro (1990)	Fixed Effect Model. GLS	Decentralization of expenditure promote the economic growth
Xie *et al.* (1999)	50 states of USA	1948–1994	GYP_{EST}	FD-Exp	Model of endogenous growth of Barro (1990)	OLS	Existing spending shares for local and state governments are consistent with the objective of maximizing economy's growth
Lin and Liu (2000)	28 provinces of China	1970–1993	GYP_{REG}	MRR-Rev	Model of neoclassical growth of Maniw *et al.* (1992)	Panel data. Fixed Effect Model	The fiscal decentralization contributes significantly to economic growth
Zhang and Zou (2001)	29 provinces of China	1987–1993	$GYP_{REG\ CHINA}$	FD-Exp	Model of endogenous growth of Barro (1990)	Panel data. Fixed Effect Model	Negative and significant association between fiscal decentralization and economic growth
	16 major states of India	1970–1994	$GYP_{REG\ INDIA}$	FD-Exp, FD-Exp$_{PC}$, FD-Rev, FD-Rev$_{PC}$		Panel data. Fixed Effect Model	Fiscal decentralization is positively and significantly associated with economic growth

Continúa Anexo II...

Author	Space field	Time field	Dependent variable	Variable of fd	Analytical framework	Empiric methodology	Main results
Behnisch *et al.* (2003)	Germany	1950-1990	TFPG	CEN-Exp, CEN-Exp$_{EP\&SC}$	They don't make reference to any theoretical pattern	Time series analysis (further details are not available)	Negative and significant association between expenditure decentralization and growth
Akai and Sakata (2002)	50 states USA	1992-1996	GYP$_{EST}$	FD-Exp, FD-Rev, A$_{II}$, AI$_{II}$, PRI	Model of endogenous growth of Barro (1990)	Fixed Effects Model. OLS	The estimated coefficient on fiscal decentralization is positive and statistically significant
Desai *et al.* (2003)	80 Russian regions	1996-1999	GYPt/GYP1990	rr-Taxrev	They don't make reference to any theoretical pattern	OLS and TSLS	Tax retention has a positive effect on the accumulative recovery output of regions
Feld *et al.* (2004)	26 Swiss Cantons	1980-1998	GYP$_{REG}$	FD-Exp, FD-Rev, MAT-Grants, Fisc-Comp, Fragm, Urban	Model of neoclassical growth of Maniw *et al.* (1992)	OLS and TSLS	Matching grants have a negative impact on economic performance while tax competition is at least not harmful to economic performance
Akai *et al.* (2007)	50 states of USA	1992-1997	GYP$_{EST}$	FD-Exp, FD-Rev	Model of endogenous growth of Barro (1990)	Maximum likelihood estimation	Hump-shaped relationship between fiscal decentralization and economic growth
Jin and Zou (2005)	30 provinces of China	1979-1993 1994-1999	GYP$_{REG}$	FD-Exp, FD-Exppc, FD-Rev, FD-Rev$_{PC}$	Model of endogenous growth of Barro (1990)	Panel data. Fixed Effects Model	Expenditure and revenue decentralization levels should further diverge to benefit provincial growth
Carrion *et al.* (2006)	17 Autonomous Communities	1980-1998 1991-1996	GYP$_{REG}$	FD-Exp y FD-Rev	Model of endogenous growth of Barro (1990)	Panel data. Fixed Effects Model. OLS	Process of decentralization has had a positive effect on economic growth

Source: Own elaboration.

References

Akai, Nobuo and Masayo Sakata (2002), "Fiscal Decentralization Contributes to Economic Growth: Evidence from State-Level Cross-Section Data for the United States", *Journal of Urban Economics*, 52, Elsevier, Amsterdam, pp. 93-108.

Akai, Nobuo, Yukihiro Nishimura and Masayo Sakata (2007), "Complementarity, Fiscal Decentralization and Economic Growth", *Economic of Governance*, 8 (4), Springerlink, New York, pp. 339-362.

Bahl, Roy and Johannes Linn (1992), *Urban Public Finance in Developing Countries*, Oxford University Press, New York.

Barro, Robert (1990), "Government Spending in a Simple Model of Endogenous Growth", *Journal of Political Economic*, 98, Elsevier, Amsterdam, pp. 108-125.

Baskaran, Thushyanthan and Lars Feld (2009), "Fiscal Decentralization and Economic Growth in OECD Countries: Is There a Relationship?", CESifo Working Paper Series, 2721, <SSRN:http://ssrn.com/abstract=1441152>, May 2010.

Behnisch, Alexej, Thiess Buettner and Dan Stegarescu (2003), "Public Sector Centralization and Productivity Growth: Reviewng the German Experience", ZEW Discussion Paper, 02-03, Ludwig-Maximilians University of Munich.

Bird, Richard (1993), "Threading the fiscal Labyrinth: Some issues in Fiscal Decentralization", *Nattional Tax Journal*, 46 (2), National Tax Associaton, Washington, pp. 207-228.

Blair, Harry (1998), "Spreading Power to the Periphery: An Assessment of Democratic Local Governance", *Program and Operations Assessment Report Nº 21*, USAID, Washington.

Boadway, Robin (1979), *Public Sector Economics*, Little, Brown and Company, Boston.

Boadway, Robin (2001), "La necesidad de compartir los ingresos fiscales", *Revista Internacional de Ciencias Sociales*, 167, UNESCO, Paris, pp. 103-110.

Bodman, Phil and Kathryn Ford (2006), "Fiscal Decentralization and economic Growth in the OECD", Macroeconomics Research Group, Discussion Papers 7, University of Queensland, Brisbane St. Lucia.

Break, George (1967), *Intergovernmental Fiscal Relations in the United States*, The Brookings Institution, Washington.

Brennan, Goffrey and James Buchanan (1980), *The Power to Tax: Analytical Foundations of a Fiscal Constitution*, Cambridge University Press, Cambridge.

Breuss, Fritz and Markus Eller (2004), "Fiscal Decentralization and Economic Growth: Is There Really a Link?", *Journal for Institutional Comparison*s, 2 (1), CESinfo-group, Munich, pp. 3-9.

Carrion-i-Silvestre, Josep Lluis, Marta Espasa and Toni Mora (2006), "Fiscal Decentralization and Economic Growth in Spain", XIII Encuentro de Economía Pública, febrero, Barcelona.

Davoodi, Hamid and Heng-fu Zou (1998), "Fiscal Decentralization and Economic Growth. A Cross-Country Study", *Journal of Urban Economic*, 43, Elsevier, Amsterdam, pp. 244-257.

Desai, Raj, Lev Freinkman and Itzhak Goldberg (2003), "Fiscal Federalism and Regional Growth, Evidence from the Russian Federation in the 1990s", Policy Research Working Paper 3138, World Bank, Washington.

Dethier, Jean-Jacques (2000), *Governance, decentralization, and Reform in China, India and Russia,* Kluwer Academic Press, London.

Eller Markus (2004), "The Determinants of Fiscal Decentralization and its Impact on Economic Growth", Working Paper 2809, Viena University of Economic-Business Administration, Viena.

Esteban, Sonia (2006), *La descentralización fiscal y el crecimiento económico. Aplicación a las Comunidades Autónomas de Régimen Común (1997-2001)*, Proquest Information and Learning Español, Madrid.

Esteban, Sonia, Pablo de Frutos and María José Prieto (2006), "La descentralización fiscal y el crecimiento económico regional: aspectos normativos", *10 Congreso de Economía de Castilla y León. Competitividad y marco institucional*, Junta de Castilla y León, Valladolid, pp. 515-529.

Esteban, Sonia, Pablo de Frutos and María José Prieto (2008), "Fiscal decentralization and economic growth. Empirical evidence from a regional perspective", *Regional and Sectoral Economic Studies*, 8 (1), La Coruña, pp. 1-25.

Feld, Lars, Gebhard Kirchgässner and Christoph Schaltegger (2004), "Fiscal Federalism and Economic Performance: Evidence from Swiss Cantons", Marburg Working Paper on Economic, 20, Philipps-Universität Marburg, Marburg.

Feld, Lars and Jan Schnellenbach (2010), "Fiscal Federalism and Long-Run Macroeconomic Performance: A Survey of Recent Research", <SSRN:http://ssrn.com/abstract=1566390>, May 20, 2010.

Feld, Lars, Thushyanthan Baskaran and Jan Schnellenbach (2009), Fiscal Federalism, Decentralization and Economic Growth: A Meta-Analysis, mimeo., University of Heidelberg, Heidelberg.

Halder, Pragna (2007), "Measures of Fiscal Decentralization", Andrew Young Scholl of Policy Studies, Georgia State University.

Iimi, Atsushi (2005), "Decentralization and economic growth revisited: an empirical note", *Journal of Urban Economic*, 57, Elsevier, Amsterdam, pp. 449-461.

Jin, Hehui, Yingyi Quian and Barry Weingast (2005), "Regional Decentralization and Fiscal Incentives: Federalism, Chinese Style", *Journal of Public Economics*, 89 (9-10), Elsevier, Amsterdam, pp. 1719-1742.

Jin, Jing and Heng-fu Zou (2005), "Fiscal decentralization, revenue and expenditure assignments, and growth in China", *Journal of Asian Economic*, 16, Elsevier, Amsterdam, pp. 1047-1064.

King, David (1988), *La economía de los gobiernos multinivel*, Instituto de Estudios Fiscales, Madrid.

King, David (1995), "Public Policies in a Multinivel Government Model", Papeles de trabajo, Instituto de Estudios Fiscales, Madrid.

Lin, Justin and Zhiqiang Liu (2000), "Fiscal Decentralization and Economic Growth in China", *Economic Development and Cultural Change*, 49-1, Elsevier, Amsterdam, pp. 1-23.

Mankiw, Gregory, David Romer and David Weil (1992), "A Contribution to the Empirics of Economic Growth", *Quarterly Journal of Economic*, 107 (2), Oxford University Press, New York, pp. 407-437.

Martínez-Vázquez, Jorge and Robert McNab (1998), "Fiscal Decentralization, Economic Growth, and Democratic Governance", International Studies Program Working Paper 9807, Georgia State University, Atlanta.

Martínez-Vázquez, Jorge and Robert McNab (2003), "Fiscal Decentralization and Economic Growth", *World Development,* 31, World Bank Group, Washington, pp. 1597-1616.

Martínez-Vázquez, Jorge and Robert McNab (2006a), "Fiscal Decentralization, Macrostability and Growth", *Hacienda Pública Española*, 179, Ministerio de Hacienda, Madrid, pp. 25-50.

Martínez-Vázquez, Jorge and Robert McNab (2006b), "Fiscal Decentralization and Democratic governance", in Paul Smoke, Eduardo J. Gómez and George F. Peterson (eds.), *Decentralization in Asia and Latin America: Towards a comparative Interdisciplinary perspective*, Edward Elgar Publishing, Massachusetts, pp. 15-41.

Oates, Wallace (1972), *Fiscal Federalism*, Harcourt Brace Jovanovich, New York.

Oates, Wallace (1993), "Fiscal decentralization and economic development", *National Tax Journal*, xlvi, National Tax Association, Washington, pp. 237-243.

Oates, Wallace (1995), "Comment on Conflicts and Dilemmas of Decentralization by Rudolf Hommes", in M. Bruno and B. Pleskovic (eds.), *Annual World Bank Conference on Development Economic*, The World Bank, Washington, pp. 351-353.

Oates, Wallace (1998), *The Economics of Fiscal Federalism and Local Finances*, Edward Elgar, Aldershot.

Oates, Wallace (1999), "An Essay on Fiscal Federalism", *Journal of Economic Literature*, 37, American Economic Association, Pittsburgh, pp. 1120-1149.

Oates, Wallace (2001), "Fiscal Competition and European Union: Contrasting perspectives", *Regional Science and Urban Economic,* 31, Elsevier, Amsterdam, pp. 133-145.

Panizza, Ugo (1999), "On the Determinants of Fiscal Decentralization: Theory and Evidence", *Journal of Public Economic*, 74 (1), Elsevier, Amsterdam, pp. 97-139.

Pérez, Patricio and David Cantarero (2006), "Descentralización fiscal y crecimiento económico en las regiones españolas", Papeles de Trabajo 5-06, Instituto de Estudios Fiscales, Madrid.

Phillips, Kerk and Gray Woller (1997), "Fiscal Decentralization and LDC Economic Growth: An Empirical Investigation", *Journal of Development Studies*, 34 (4), Routledge, London, pp. 139-148.

Porto, Alberto (2003), "La teoría del federalismo fiscal y las finanzas federales", Documento de Federalismo Fiscal 4-2003, Universidad Nacional de La Plata, Buenos Aires.

Qiao, Baoyun, Jorge Martínez-Vázquez and Yonsheng Xu (2008), "The trade off between Growth and Equity in Decentralization policy: China's experience", *Journal of Development Economic*, 86, Elsevier, Amsterdam, pp. 112-128.

Sala-i-Martin, Xavier (1994), *Apuntes de crecimiento económico*, Antoni Bosch, Barcelona.

Schnellenbach, Jan, Thushyanthan Baskaran and Lars Feld (2009), "Creative Destruction and Fiscal Intitutions: A Long-Run Case Study for Three Regions", Papers of Economic and Evolution, 0908, Max Planck Institute for Economics, Leipzig.

Solé-Ollé, Albert and Alejandro Esteller-Moré (2006), "Decentralized Provision of Public Inputs, Government Responsiveness to Local

Needs, and Regional Growth. Evidence from Spain", XIII Encuentro de Economía Pública, febrero, Barcelona.

Solow, Robert (1956), "A Contribution to the Theory of Economic Growth", *Quarterly Journal of Economic*, 70, Oxford University Press, New York, pp. 65-94.

Thieben, Ulrich (2000), "Fiscal Federalism in Western European and selected other countries. Centralization or decentralization? What is better for economic growth?", Discusión Paper 224, Deutsches Institut für Wirtschaftsforschung, Berlin.

Thieben, Ulrich (2003), "Fiscal decentralization and economic growth in high income OECD countries", *Fiscal Studies*, 24 (3), Institute for Fiscal Studies, London, pp. 237-274.

Thieben, Ulrich (2005), "Fiscal Decentralization and Economic Growth in Rich OECD Countries: Is there an Optimum?", *Economic Bulletin*, 41 (5), Springerlink, New York, pp. 175-182.

Thornton, Jhon (2007), "Fiscal decentralization and economic growth reconsidered", *Journal of Urban Economic*, 61, Elsevier, Amsterdam, pp. 64-70.

Xie, Danyang, Heng-fu Zou and Hamid Davoodi (1999), "Fiscal Decentralization and Economic Growth in the United States", *Journal of Urban Economics*, 45, Elsevier, Amsterdam, pp. 228-239.

Yilmaz, Serdar (2000), "The Impact of Fiscal Decentralization on Macroeconomic Performance", National Tax Association, Proceeding of the 92º Annual Conference on Taxation, Atlanta, October, 24-26.

Zhang, Tao and Heng Zou (1998), "Fiscal decentralization, public spending and economic growth in China", *Journal of Public Economic*, 67, Elsevier, Amsterdam, pp. 221-240.

Zhang, Tao and Heng Zou (2001), "The Growth impact of intersectorial and intergovernmental allocation of public expenditure: Whit applications to China and India", *China Economic Review*, 12 (1), Elsevier, Amsterdam, pp. 58-81.

Sonia Esteban-Laleona. Es doctora en economía aplicada por la Universidad de Valladolid. Actualmente trabaja en el Departamento de Economía Aplicada de dicha Universidad, Campus Duques de Soria. Sus líneas de investigación actual son: federalismo fiscal y crecimiento económico. Entre sus últimas publicaciones destacan: *La descentralización fiscal y el crecimiento económico. Aplicación a las Comunidades Autónomas de Régimen Común (1997-2001),* Proquest Information and Learning, Madrid, (2006); en coautoría: *"Status quo* de la influencia de la descentralización fiscal sobre el crecimiento económico de las regiones", XXXII *Reunión de Estudios Regionales,* Asociación Española de Ciencia Regional, Orense, pp. 1-22 (2006); en coautoría, "La descentralización fiscal y el crecimiento económico regional: aspectos normativos", *10 Congreso de Economía de Castilla y León. Competitividad y marco institucional,* Junta de Castilla y León, Valladolid, pp. 515-529 (2006); "Fiscal decentralization and econonomic growth. Empirical evidence from a regional perspective", *Regional and Sectorial Economic Studies*, 8 (1), La Coruña, pp. 1-25 (2008).

Pablo de Frutos-Madrazo. Es doctor en economía aplicada por la Universidad de Valladolid. Actualmente trabaja en el Departamento de Economía Aplicada de dicha Universidad, Campus Duques de Soria. Sus líneas de investigación actual son: federalismo fiscal y crecimiento económico. Entre sus últimas publicaciones destacan: en coautoría: *"Status quo* de la influencia de la descentralización fiscal sobre el crecimiento económico de las regiones", XXXII *Reunión de Estudios Regionales,* Asociación Española de Ciencia Regional, Orense, pp. 1-22 (2006); en coautoría, "La descentralización fiscal y el crecimiento económico regional: aspectos normativos", *10 Congreso de Economía de Castilla y León. Competitividad y marco institucional,* Junta de Castilla y León, Valladolid, pp. 515-529 (2006); en coautoría, "Fiscal decentralization and econonomic growth. Empirical evidence from a regional perspective", *Regional and Sectorial Economic Studies*, 8 (1), La Coruña, pp. 1-25 (2008).

María Cristina de Miguel-Bilbao. Es doctora por la Universidad de Valladolid, en el Departamento de Economía Financiera y Contabilidad, en el Programa de Gestión y Administración de Empresas, 2005, de la Universidad de Valladolid, donde trabaja actualmente. Sus líneas de investigación actual son: sistema financiero, entidades de economía social. Entre sus últimas publicaciones destacan: "Efectos de las fusiones de cajas

de ahorros de Castilla y León", *Revista de Contabilidad y Tributación*, 326, Centro de Estudios Financieros, Madrid, pp. 187-202 (2010); en coautoría: "Gestión de la Obra Beneficio Social de las Cajas de Ahorro", *Revista de Estudios Cooperativos*, 99, Escuela de Estudios Cooperativos, Madrid, pp. 60-84 (2009); "Cuentas anuales y plan de actuación para las fundaciones", *Revista de Contabilidad y Tributación*, 321, Estudios Financieros, Madrid, pp. 181-208 (2009).