

Status Quo of the Influence of Fiscal Decentralization on Economic Growth

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Abstract Traditionally, the 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 if the fiscal decentralization influences positively in the economic growth of a country. The objective of this document is to provide a “reading guide” for this new line of investigation on the influence of fiscal decentralization on economic growth.

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1. Introduction

The relationship between fiscal decentralization and economic growth is a relatively new line of investigation. The traditional vision of the Theory of Fiscal

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Federalism, only emphasizes the largest gains 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 (1993) 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.

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 of 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 especification of the growth dependent variable.

2. 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 in 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, for the sake of reaching bigger bench marks of efficiency, the existence of certain public services whose benefits expand along the whole national territory advises that the government level responsible for its supply should be at the central level.

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 intents 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.

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 than 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.

3. Theoretical Reference Model on the Connection between Fiscal Decentralization and Economic Growth

Currently, economic literature provides two approaches for the impact that fiscal decentralization provokes on one country's economic growth versus endogenous growth models. According to this classification, the provisions of the different models of economic growth are conditioned, mainly by the hypothesis of the function of production used and by the endogenous character or not of certain economic variables. While neoclassical economists granted a small space to the public intervention, endogenous models of growth support that public policies can affect long-term growth rates.

In a neoclassical environment, where variables economic determinants of growth are considered as exogenous determinants, Solow's, model (1956) and the changes posed by Mankin, Romer and Weil (1992) is presented as the more representative to identify analytically the possible influence of the tax decentralization on economic growth. Using a production function with perfect substitution among the productive factor, this would let Solow to develop a model where the last en-

gine of long term growth is only determined by exogenous technology changes¹. Therefore, in the neoclassical model of Solow, the instrumentation of policies to encourage savings and investment has no place and therefore, positive impact on the long-run rate². Income on a declining scale in capital accumulation are key in these models after setting up the connection exclusive between the rate of growth and technological progress.

This framework is used by Thieben (2003), Eller (2004), Martinez Vazquez and Macnab (2003), among others, to determine if there is a connection between the tax decentralization and economic growth. The cornerstone of these works is to admit that the exogenous parameter reflects not only technological aspects of the economy but also an economic performance of the Public Sector.

For its part, the emergence of endogenous growth models in the mid 1980s gives way to a new wave of research on the impact that results in the performance of the Public Sector on the rate of growth of the economy. The main difference of these models from neoclassic approaches is that these new models of economic growth show a positive long-term growth rate without having to assume that some of variables of the model increase in an exogenous way but in an endogenous one.

In an environment of endogenous growth, the theoretical models that analyze the influence causing the processes of fiscal decentralization in economic growth are supported analytically by the model initially developed by Rebelo (1991) and it is known as the AK's technology³. The Most relevant feature of the AK's

¹ The model provided by Solow (1956) uses an economy characterized by perfectly competitive markets of capital and labour, flexibility in pricing, the existence of full employment and a production function with constant returns to scale aggregated where productive factors are diminishing, allowing a perfect replacement between capital and labour.

² Greater savings alone will affect product level but not the rate of growth in *steady state*. Steady state is characterized by a time when the economy is situated at a specific level, it stops the process of capital accumulation the technological development is the only source of economic growth.

³ This technology known as AK, technology provides the easier endogenous model of growth they can conceive, generating a growth rate at steady state differentiable from

model is that they maintain the neoclassical assumptions of perfect competition and constant returns to scale and is reflected in diminishing returns to capital⁴.

From a perspective of endogenous economic growth, the model that supplies Barro (1990) becomes the starting point of this new wave of research. The main characteristic of Barro (1990) model is to incorporate in its role.

The production of public services as a productive input for private production. The productive role of public services is precisely that creates a direct connection between spending and economic growth. Nevertheless, and despite the relevance of the contributions of Barro (1990), endogenous growth models developed to date did not stopped in determining whether a Government, characterized by a multilevel governance structure, could affect the economic progress of a country.

It will be in the last nineties of the last century when different authors used the contribution of Barro (1990) to extend the analysis of economic growth to an extension of the literature of fiscal federalism. Zhang and Zou (19998) Davoodi and Zou (1998), Xie, Zou Davoodi (1999), Zhang and Zou (2001), Akai and Sakata (2002) are among others, the authors who have tried to establish whether there really is a connection between the process of decentralization of public spending and economic growth. All agree the use of the model of Barro (1990) as an analytical tool to demonstrate the contribution of decentralization in economic growth⁵.

zero. The characteristic more important of these models is that many of the factors under the neoclassical model only affecting the level of income, now also affect the rate of growth of this. In addition, these models provide freedom for the policies that affect savings and investment have an effect on the countries' long-run growth rate.

⁴ AK model is the simplest contribution endogenous growth theory. This approach is attributed to Rebelo (1991) who considered that the only way to achieve positive growth rates in a model with constant returns to scale, was to present the production function with constant returns to scale in relation to the factor which must be accumulated.

⁵ The role of production used is characterized by only with two inputs: private and public capital. The last of the input, in turn, broken in two or three levels of Government, according to the structure of Government of the country in question. Thus the level of decentralization is defined as the spending allocated to each level of Government total public expenditure.

Under this specification, Zhang and Zou (1998) used in their model a production function where public input is assigned by the central Government and by local and intermediate levels⁶. According to the model developed by Zhang and Zou (1998), fractions of public expenditure to be allocated to each level of Government in order to maximize economic growth in a country are equal to the ratios of individual productivity over the aggregate productivity. So that, if current spending shares do not correspond with these growth-maximizing shares, the Government should proceed to a reallocation between the three levels of Government to improve the country's growth.

4. 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 nineteen-nineties, different works whose purpose was to contrast its empiric validity. With the purpose of making the interpretation of the results reached in different studies easier, 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 an international focus. On the other hand, studies that limit themselves to verify the impact that multilevel government structures causes in the growth of a certain country.

From an international perspective (studies among countries), 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 (1999); Thieben (2000; 2003; 2005) Martínez-Vázquez and M. McNab

⁶ See Zang and Zou (1998) analytical development of the model of the authors.

(2003); Iimi (2006); Bodman and Ford (2006) and Thornton (2007), such and like it is shown in the Table 1.

Table 1: Data coverage - Status Quo of the studies among countries. *Source: self-elaboration.*

Author	Space field	Time field
Oates (1995)	40 countries without specification	1974-1989
Phillips and Woller (1997)	23 countries LDC	1974-1991
Davoodi and Zou (1998)	46 developing countries and OECD countries	1970-1989
Yilmaz (1999)	46 countries without specification	1971-1990
Thieben (2000)	15 countries of the UE, NO, SZ, JP, US, CA, AU, NZ, AR, BR, KR, ZA,	1975-1995
Thieben (2003)	14 countries of the UE, NO, SZ, JP, US, CA, AU, NZ, AR, BR, KR, ZA,	1973-1998
Martínez-Vázquez and McNabc (2003)	52 developed countries and developing countries	1972-1997
Thieben (2005)	21 High-income OECD Countries	1973-1998
Iimi (2005)	51 countries (7 low-income countries, 10 lower-middle countries, 12 upper-middle countries and 22 high income countries.	1997-2001
Bodman and Ford (2006)	21 OECD Countries	1981-1998
Thornton (2007)	19 OECD Countries	1980-2000

LDC = Least Developed Countries; OECD = Organisation for Economic Co-operation and Development; UE = European Union; NO =Norway; SZ = Switzerland; JP = Japan; US = United States; CA = Canada; AU = Australia; NZ = New Zealand; AR = Argentina; BR = Brazil; KR =Korea; ZA = South Africa.

The remaining investigations center their interest in determining the connection of both processes from a regional or national perspective (the single country analysis), as one can observe in Table 2:

1. The behavior of the Chinese economy is analyzed in the studies of Zang and Zou (1998); Jin, Quian and Weingast (1999); Lin and Liu (2000); Zhang and Zou (2001) and Jin and Zou (2005)
2. The influence of the process of fiscal decentralization in the economic growth of the United States is depicted in the investigations of Xie, Zou and

Davoodi (1999), Akai and Sakata (2002) and Akai, Nishimura and Sakata (2004).

3. Behnisch, Büttner and Stegarescu (2003) analyze the German experience.
4. The repercussion of fiscal federalism in the economic performance of the Swiss Cantons is studied in Feld, Kirchgässner and Schaltegger (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, Freinkman and Golberg (2003).
7. Finally, Carrion-i-Silvestre, Espasa and Mora (2006), Pérez and Cantarero (2006), Solé-Ollé and Esteller-Moré (2006) and Esteban (2006) are among the most recent studies, and they indicate the effect that fiscal decentralization has caused in the economic growth of the Spain.

5. Chosen Variables

The previous spatial grouping is fundamental when examining the suitability of the variables used by the different authors. The Table 3 picks up the dependent and fiscal variables used, as well as the statistical sources that this data proceeds from.

5.1. *Dependent variable*

As depicted in Table 3 the dependent variable used in the majority of the studies among countries 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-Vázquez and McNab (2003) and Boadman and Ford (2006), who employ the logarithm real of

Table 2: Data coverage - Status Quo of the single country analysis. *Source: Self-elaboration.*

Autor	Space field	Time field
Zhang and Zou (1998)	28 provinces of China	1980-1992
Jin, Quian y Weingast (1999)	29 provinces of Chinas	1982-1992
Xie, Zou, Davoodi (1999)	50 states of USA	1948-1994
Lin y Liu (2000)	28 provinces of China	1970-1993
Zhang y Zou (2001)	29 provinces of Chinas	1987-1993
	16 major states of India	1970-1994
Behnisch, Buettner Stegarescu (2003)	Germany	1950-1990
Akai y Sakata (2002)	50 states of USA	1992-1996
Desai, Freinkman, Goldberg (2003)	80 Russian regions	1996-1999
Feld, Kirchgässner and Schaltrdger (2004)	26 Swiss Cantons	1980-1998
Akai, Nishimura, Sakata (2004)	50 states of USA	1992-1997
Jin and Zou (2005)	30 provinces of Chinas	1979-1993
		1994-1999
Carrion-i-Silvestre, Espasa and Mora (2006)	17 Autonomous Communities	1980-1998
		1991-1996
Pérez and Cantarero (2006)	18 Autonomous Communities	1986-2001
Solé-Ollé and Esteller-Moré (2006)	44 provinces of Spain	1976-1998
Esteban (2006)	15 Autonomous Communities	1997-2001

GDP per capita (GDP^c). Alternatingly, 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 (GYREG) that comes from the Official Institutes of Statistic of the considered country (Table 4). Nevertheless, Behnisch, Büttner and Stegarescu (2003) opt to use “the rate of total factor productivity growth” (TFPG); Desai, Freinkman and Goldberg (2003) se-

Table 3: Chosen Variables - Status Quo of the studies among countries. *Source: Self-elaboration.*

Author	Dependent variable	Explanatory variable of the fiscal decentralization
Oates (1995)	GDP	FD-EXP, SR
Phillips and Woller (1997)	GDP'	FD-EXP, FD-EXP _{NDEF} , FD-REV, FD-REV _{GIA}
Davoodi and Zou (1998)	GDP	FD-EXP
Yilmaz (1999)	GDP	FD-EXP
Thieben (2000)	GDP, GKAP, TFPG	FD-EXP, FD-EXP ² , SR, CHSR
Thieben (2003)	GDP, INVGDP, TFPG	FD-EXP, FD-EXP ² , FD-EXP _{LOW} , FD-EXP _{MED} , FD-EXP _{HIGH} , FD-REV, SR
Martínez-Vázquez and McNabc (2003)	GDP'	FD-EXP, FD-REV
Thieben (2005)	GDP, INVGDP, TFPG	FD-EXP _{LOW} , FD-EXP _{MED} , FD-EXP _{HIGHTHY} CD
Imi (2005)	GDP	FD, PF y FD*PF
Bodman and Ford (2006)	GDP'	FD-EXP, FD-REV, TDEC1, TDEC2, TDEC3, RDEC1, RDEC2, RDEC3, EDEC1, EDEC2, FD, NSGUT, ELECT,FU, EMPLOY
Thornton (2007)	GDP	OWNREV, OWNREV*OWNREV

GDP= Rate Gross Domestic Product per capita; GDP'= logarithm real of rate Gross Domestic Product per capita; GKAP= average growth rate of real gross fixed capital formation; TFPG = total factor productivity growth; INVGDP = average gross investment share of real gross domestic product; FD-EXP/ FD-REV = share of sub-national government expenditures/revenues in general government expenditures/revenues, net of intergovernmental transfers; SR = share of own revenues of lower levels in their total revenues; FD-EXP_{NDEF}= ratio of local government expenditures to total government expenditures minus defense and social security expenditures; FD-REV_{GIA}= ratio of local revenues minus grants-in-aid to total government revenues; FD-EXP² = transformation indicator FD-EXP to test for "hump-shared" relationships between economic performance and fiscal decentralization; CHSR = indicator to test whether increasing self-reliance of subnational governments have effects on economic growth; FD_{LOW}/ FD_{MED}/ FD_{HIGH}= three dummy variables that are denoted for "low degree of fiscal decentralization" / for "medium degree of fiscal decentralization" / for "high degree of fiscal decentralization"; CD = variable dummy which is assumed as 1 if the governmental system is centralised and 0 if is federal; PF = measure that reflects the degree of political devolution at the municipal level; FD*PF = measure that allows us to test the hypothesis of fiscal decentralization and political freedom as complementary; TDEC1/TDEC2/TDEC3 = there measures of tax revenues decentralization: subnational own tax revenue/ subnational own and shared tax/ total subnational tax revenue; all calculated as the share of general government tax revenues; RDEC1/RDEC2/RDEC3 = own taxes refer to those taxes for which the sub-national government can determine the tax rate/ or tax bases or both; EDEC1/EDEC2 = percentage of consolidated general government expenditures, without social security payment; EDEC1 excludes transfers to other levels of government, whereas EDEC2 includes transfers to other levels of government net of received transfers; NSGUT = the number of sub-national jurisdictions in the intermediates and lower tiers of government; ELECT= indicator to account for electoral decentralization; FU = the indicator of constitutional structure is an index of federalism; EMPLOY = ratio of sub-national government employees to central government employees; OWNREV = the average tax revenues of sub-national governments stemming from the tax bases and tax rates over which they have full discretion; OWNREV* OWNREV = quadratic indicator of OWNREV.

lect “industrial output of the iit region” deflated by the regional price deflator. And lastly, in the Spanish case, Solé-Ollé and Esteller-Moré (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_{it}^r/R_{it-1}) and education (I_{it}^e/E_{it-1}).

5.2. *Explanatory Variables*

As for the explanatory variables that reflect the growth rate of an economy, the main divergences are in the definition of the fiscal decentralization indicators.

In the studies among countries, picked up in the Table 3, 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 statistical 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

Table 4: Chosen Variables - Status Quo of single-country analysis. *Source: Self-elaboration.*

Author	Dependent variable	Explanatory variable of the fiscal decentralization
Zhang and Zou (1998)	GYP_{REG}	FD-EXP, FD-EXP _{EB} , FD-EXP _{B+EB}
Jin, Quian and Weingast (1999)	GYP_{REG}	FD-EXP, FD-EXP _{EB} , FD-EXP _{B+EB}
Xie, Zou and Davoodi (1999)		FD-EXP
Lin and Liu (2000)	GYP_{REG}	MRR-REV
Zhang and Zou (2001)	$GYP_{REGCHINA}$	FD-EXP
	$GYP_{REGINDIA}$	FD-EXP, FD-EXP _{pc} , FD-REV, FD-REV _{PC}
Behnisch, Buettner and Stegarescu (2003)	TFPG	CEN-EXP, CEN-EXP _{EP&SC}
Akai and Sakata (2002)	GYP_{EST}	FD-EXP, FD-REV, AI _I , AI _{II} , PRI
Desai, Freinkman and Goldberg (2003)	GYP_t/GYP_{1990}	RR-TAXREV
Feld, Kirchgässner and Schaltrdger (2004)	GYP_{REG}	FD-EXP, FD-REV, MAT-GRANTS, FISC-COMP, FRAGM, URBAN
Akai, Nishimura and Sakata (2004)	GYP_{EST}	FD-EXP, FD-REV
Jin and Zou (2005)	GYP_{REG}	FD-EXP, FD-EXP _{pc} , FD-REV, FD-REV _{PC}
Carrion-i-Silvestre, Espasa and Mora (2006)	GYP_{REG}	FD-EXP y FD-REV
Pérez and Mora (2006)	GYP_{REG}	FD-EXP y FD-REV
Solé-Ollé and Esteller-Moré (2006)	I_{it}^r/R_{it-1}	$decr_{it}$
	I_{it}^e/E_{it-1}	$dece_{it}$
Esteban (2006)	GYP_{REG}	DESCgasto

GYP_{REG} = the growth rate of real state income; TFPG = the rate of total factor productivity growth; I_{it}^r/R_{it-1} I_{it}^e/E_{it-1} = two indicators that pick up investments by all the levels of government divided by the year's capital stock ; FD-EXP/FD-REV = share of expenditures/revenues by each level of government in consolidated government expenditures/revenues across all levels; FD-EXP_{EB}, FD-EXP_{B+EB}, FD-REV_{PC}, CEN-EXP, CEN-EXP_{EP&SC} = derivations of the indicator FD-EXP/FD-REV; MRR-REV = the marginal retention rate of locally collected budgetary revenue; AI_I = the ratio of government's own revenue to total revenue, with revenues excluding federal grants; AI_{II} = the ratio of local government's own revenue to total revenue with revenues including federal grants; PRI = the decentralization measure that incorporates both revenues and expenditure shares. The indicator is defined as the mean of FD- EXP and FD-REV; RR-TAXREV = the tax revenue retention rate; MAT-GRANTS = the matching grants per capita received in each Swiss Canton; FIS-COMP = the indicator indicates that the higher difference of average tax burden of the neighboring cantons, the higher the pressure of tax competition on the cantonal and local tax authorities; FRAGM = the number Communes in a Canton divided by population; URBAN = the share of people living in urban areas; $decr_{it}$ / $dece_{it}$ = two indicators that reflect the moment in that decentralization took place in the responsibilities of road ($decr_{it}$) and education ($dece_{it}$) in each one of the Spanish regions; DESCgasto = the percentage of public expense attributed to Spanish Autonomous Communities with respect to the total of government expenditure in these Communities.

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-EXP²). 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 devolution at 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 to 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 dimension, is the extent to which fiscal decision-making is decentralised. This paper presents three measures of tax revenue (tax-only) decentralization: subnational own tax revenue (TDEC1), subnational 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" indicators 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): (1) unitary and centralized; (2) unitary but decentralized; (3) semi-federal; (4) federal but centralized and (5) federal and decentralized;
4. Resource decentralization is considered using the ratio of sub-national government employees to central government employees (EMPLOY).

And, lastly, 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, $(OWNREV)^*(OWNREV)$.

If we center in single-countries studies, reflected in Table 4, 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, Freinkman and Goldberg (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 much of the revenue increments were kept by provincial governments. Whereas Desai, Freinkman and Goldberg (2003) use as a measure of fiscal incentives, "the tax revenue reten-

tion rate" (RR-TAXREV). This variable reflects only official taxes, collected and accounted for in regulating government budgets.

In an alternative way, Feld, Kirchgässner and Schaltegger (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. More concretely, this variable is measured by the difference of canton's tax, in the highest income tax bracket of a million Swiss francs annual taxable income, and the average of its neighboring cantons' tax burden in that bracket. 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 than the periphery.

On the other hand, Solé-Ollé and Esteller-More (2006) opt, for the Spanish case, for the definition of two variable Dummies. These indicators reflect the moment in that 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, " $dece_i$ "_t 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).

6. Conceptual Framework Employed

The theoretical model mostly backed by economists has been that of Davoodi and Zou (1998). The theoretical framework in which these authors sustain 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); Xie, Zou and Davoodi (1999), Zhang and Zou (2001)⁷; Akai and Sakata (2002), Akai, Nishimura and Sakata (2004)⁸ Iimi (2005); Jin and Zou (2005); Carrión-i-Silvestre, Espasa and Mora (2006); Pérez and Cantarero (2006); Esteban (2006). 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 model's essential implication 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 governments⁹.

⁷ In turn, Zhang and Zou (2001) outline a greater complexity in the question of the sub-central government expenditure, that augments the aforementioned approach and develops a model that links multiple sectors of public spending by multiple levels of government to economic growth.

⁸ Equally, Akai, Nishimura and Sakata (2004) referring to Barro (1990) developed a model, which considers differences in the quality as well as complementarities of public services.

⁹ As Iimi (2005) indicates an interpretation of the model of Davoodi and Zou (1998) is that "When the productivity effect of sub-national level government spending is relatively large compared with the central government expenditure, fiscal decentralization

On the other hand, the studies of Lin and Liu (2000), Martínez-Vázquez and M.Mcnab (2003), Thieben (2003; 2005)); Feld, Kirchgässner and Schalträdger (2004) and Bodman and Ford (2006) use a different approach. Following Mankiw, Romer and Weil (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-observable countries/region-specific characteristics. This disintegration of the term “technological progress” is consistent with the economic literature about the growth and with the hypotheses of conditional convergence (Barro, 1991; Sala-i-Martin, 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-Ollé and Esteller-Moré (2006) is quite different to that employed in previous investigations. Sollé-Ollé and Esteller-Moré (2006) 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

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.” 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.

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.

Table 5: Analytical Framework - Status Quo of the studies among countries. *Source: Self-elaboration.*

Author	Analytical Framework
Oates (1995)	Dissertation of the investigation made by Sang Loh Kim and Oates (Maryland)
Phillips and Woller (1997)	Methodology of the tests of robustness of Levine and Renett (1997) and Sala-i-Martin (1997)
Davoodi and Zou (1998)	According to the model of endogenous growth of Barro (1990) it establishes a production function of the type Cobb-Douglas that incorporates as an additional input the public expenditure of the different government levels
Yilmaz (1999)	Not explicit any theoretical model
Thieben (2000)	He only makes reference to the employment of a theoretical model of endogenous growth without providing more particulars
Thieben (2003)	He uses the model of economic growth of Solow enlarged by Mankiw, Romer and Weil (1992)
Martínez-Vázquez and McNab (2003)	It uses the model of economic growth of Solow enlarged by Mankiw, Romer and Weil (1992)
Thieben (2005)	He uses the model of economic growth of Solow enlarged by Mankiw, Romer and Weil (1992)
Imi (2005)	Methodology based on a version of the endogenous growth model provided by Davoodi and Zou
Boadman and Ford (2006)	Model of economic growth of Solow (1956)
Thornton (2007)	Not explicit any theoretical model

Among the two most backed theoretical focuses, models of endogenous court vs. 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. Concretely, like it is reflected in the Tables 5 and 6, the fact stands out that most of the studies of individual countries are sustained theoretically in 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.

7. 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.

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 the long term effects. This is the case detected in Davoodi and Zou (1998) and Phillips and Woler (1997) who use a panel with data averaging a five-year or decenal frequency, in the first case; and of annual frequency, triennial and five-year, in the second case.

The pros and contras of these two types of data treatment are discussed in the investigations of Thieben (2000; 2001). 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.

Regarding the estimator used by different authors, the estimator of Ordinary Least Square (OLS) is the one that prevails in most of studies. Nevertheless, the exceptions of this estimator appear depicted in Tables 7 and 8. For example, Zhang and Zou (1998), Yilman (2000) and Thieben (2000) use the estimator of General Least Square (GLS); Akai, Nishimura and Sakata (2004) opt for Maximum Likelihood (ML) estimation; Desai, Freinkman and Goldberg (2003) use the Three Stage Least Squares (3SLS) estimate to minimize the simultaneity and

Table 6: Analytical Framework - Status Quo of single-country analysis. *Source: Self-elaboration.*

Author	Analytical Framework
Zhang and Zou (1998)	Methodology of Barro (1990), Levine and Renelt (1992) and Davoodi and Zou (1998).
Jin, Quian and Weingast (1999)	The study of Zhang and Zou reexamine (1998) including a variable of volatility
Xie, Zou, Davoodi (1999)	They use the same theoretical model that is elaborated in Davoodi and Zou (1998)
Lin and Liu (2000)	The methodology of Mankiw, Romer and Weil continue (1992) and they specify a model of growth of Solow (1956)
Zhang and Zou (2001)	In accordance with Barro (1990) and Zhang and Zou (1998), they develop a model that connects the diverse public expenditure categories in the different government levels with the economic growth of the regions
Behnisch, Buettner Stegarescu (2003)	They don't make reference to any theoretical pattern
Akai and Sakata (2002)	The same theoretical model that the applied one for Xie, Zou and Davoodi (1999), based on the pattern of Davoodi and Zou (1998)
Desai, Freinkman, Goldberg (2003)	They don't make reference to any theoretical pattern
Feld, Kirchgässner and Schaltrdger (2004)	I Model of neoclassical growth of Maniw, Romer and Weil (1992)
Akai, Nishimura, Sakata (2004)	According to Barro (1990), a theoretical model is given that considers the existent differences in the quality of the public services as a consequence of the capacity of the bureaucrats as well as of the complementarity of the public services given in the jurisdictions
Jin and Zou (2005)	Methodology of Barro (1990) and model of Davoodi and Zou (1998)
Carrion-i-Silvestre, Espasa and Mora (2006)	Model of Xie, Zou and Davoody (1999) based on Davoodi and Zou (1998)
Pérez and Cantarero (2006)	Model of Davoody and Zou (1998)
Solé-Ollé and Esteller-More (2006)	Model elaborated by the authors based on a production function where the output depends, among other factors, on "Ait", wich is a positive and neutral efficiency parameter
Esteban (2006)	Methodology of Barro (1990) and Model of Davoodi and Zou (1998)

endogeneity of some explanatory variables that can be the case of the transfers received by the subcentral governments.

Table 7: Empiric Methodology - Status Quo of studies among countries. *Source: Self-elaboration.*

Author	Empiric methodology
Oates (1995)	No details available
Phillips and Woller (1997)	Panel regressions based on annual, three and five year average. Fixed Effects Model. OLS (Ordinary Least Square) estimation
Davoodi and Zou (1998)	Panel regressions is estimated on dates averaged over five and ten year periods. Fixed Effects Model. OLS estimation
Yilmaz (1999)	Panel regressions based on annual data. Fixed Effects Model. GLS (General Least Square estimation
Thieben (2000)	Cross-sectional growth regressions based on annual average of dates. GLS estimation (with cross section weights)
Thieben (2003)	Cross-sectional growth regressions. GLS estimation (with cross section weights) Pooled cross-sectional regressions. GLS method is applied (with cross section weight) using annual dates
Martínez-Vazquez and McNab (2004)	Panel regressions based on annual data. Fixed Effects Model. GLS estimation
Thieben (2005)	A cross-sectional analysis with only one observation for each country considered. OLS estimator
Imi (2005)	A cross-sectional analysis based on annual average date. The estimation results based on OLS and Instrumental Variables (IV)
Bodman and Ford (2006)	Pooled cross-section regressions and cross-sectional analysis. OLS estimator
Thornton (2007)	Cross-section regressions based on annual average of dates. OLS estimator

More specifically, and among the most recent investigations, Bodman and Ford (2005) 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 Ordinary Least Square 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 Ordinary Least Squares with average data for the period. Whereas the use of Ordinary Least Squares 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 Ordinary Least Square and Instrumental Variable 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 panel serial correlation.

8. Main Results

In theory, it is expected that decentralization leads to efficient provision of local public services and results in rapid economic growth but the empirical evidence 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 (Table 10).

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 conducive 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.

Table 8: Empiric methodology - Status Quo of single-country analysis. *Source: Self-elaboration.*

Autor	Empiric Methodology
Zhang and Zou (1998)	Cross-province estimations based on provincial annual data. Fixed Effect Models. GLS (General Least Square) estimation
Jin, Quian and Weingast (1999)	Empirical methodology of Zhang and Zou (1998) including a variable dummy that grasps the effects of the national macroeconomic fluctuations
Xie, Zou and Davoodi (1999)	Time series analysis. OLS (Ordinary Least Square) estimation.
Lin and Liu (2000)	Empirical analysis based on province-level panel data. Fixed Effect Models. Province and year dummies. (further details are not available)
Zhang and Zou (2001)	Application to China: Empirical estimations based on provincial data. Provincial fixed effects model. Application to India: Regression analysis based on the panel data. Estimations with a five year forward-moving average of real per capita income growth.
Behnisch, Buettner and Stegarescu (2003)	Lineal regressions and time series analysis (further details are not available).
Akai and Sakata (2002)	Cross-section of average growth rates. OLS and Fixed Effects Model, Time Dummies.
Desai, Freinkman and Goldberg (2003)	Regression analysis of regional data and simultaneous equation models based on average data with time specific effects. OLS estimation with panel-corrected standard errors and three-stage least squares (3SLS) estimation
Feld, Kichgässner and Schaltegger (2004)	Pooled cross-section time-series model. OLS and TSLS estimation.
Akai, Nishimura and Sakata (2004)	Panel cross-sectional growth regressions with time and state fixed effects. Maximum likelihood estimation
Jin and Zou (2005)	Panel data set combining time series and cross section. Coefficients estimated with fixed-effects with corrections for panel heteroskedasticity and panel serial correlation.
Carrion-i-Silvestre, Espasa y Mora (2006)	1980-1998: empirical methodology of Xie, Zou and Davoodi (1998) 1991-1996: empirical analysis based on the panel data (further details are not available)
Pérez y Cantarero (2006)	Empirical analysis based on regional-level panel data. Error components model and Instrumental Variables (IV)
Solé-Ollé y Esteller-Moré (2006)	Panel data technique. OLS and GMM (Generalized Method of Moments) estimators
Esteban (2006)	Cross-section of average growth rates. OLS estimator and Instrumental Variables (IV)

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 effect economic growth in mid to high income countries. Thornton (2007) 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 distinction between administrative and substantive decentralization by not recognizing that high sub-national revenue and spending shares do not necessarily indicate high local autonomy”.

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 (Table 9). As Jin y Zou (2005) suggest, the effects of fiscal decentralization in any given case depend critically on the nature of fiscal institutions and the political system in place. 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 y 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 y Zou (1998) reproduce themselves.

Jin, Qian and Weingast (1999), 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 studies consists in the fact that Zhang y Zou (1998) do not use time dummies¹⁰. 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.

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, Kichgässner and Schaltegger (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 in such a way that economic performance of a canton improves.

¹⁰ Jin, Qian and Weingast (1999) use the empirical methodology of Zhang and Zou (1998) including a variable dummy that grasps the effects of the national macroeconomic fluctuations.

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 (2001) 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, Nishimura and Sakata (2004) 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, Bh-nisch et al. (2003) report a statistically significant positive effect of overall centralization on the German growth of productivity.

In turn, in the case of the Spanish economy, Carrion-i-Silvestre, Espasa and Mora (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-Ollé and Esteller-Moré (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-Ollé and Esteller-Moré (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.

Table 9: Main results- Status Quo of single-country analysis. *Source: Self-elaboration.*

Author	Main results
Zhang and Zou (1998)	They find a negative and significant impact of the fiscal decentralization on the economic growth of Chinese provinces.
Jin, Quian and Weingast (1999)	The fiscal decentralization promotes the economic growth of Chinese provinces.
Xie, Zou and Davoodi (1999)	Existing spending shares for local and state governments in USA are consistent with the objective of maximizing the growth of the economy.
Lin and Liu (2000)	The fiscal decentralization contributes significantly to economic growth in China, which is consistent with the hypothesis that fiscal decentralization can increase economic efficiency.
Zhang y Zou (2001)	As in Zhang and Zou (1998), they find a negative and significant association between fiscal decentralization and provincial economic growth in China. However, they found that fiscal decentralization is positively and significantly associated with state economic growth in India. The state allocation of public spending in various sectors is broadly consistent with growth maximizing
Behnisch, Buettner y Stegarescu (2003)	The analysis shows a negative significance of state government expenditure, and therefore, indicates that the coordination of policies among state level governments as part of the cooperative federalism is not efficient with regard to productivity growth.
Akai y Sakata (2002)	The estimated coefficient on fiscal decentralization is positive and statistically significant. They suggest that recent moves toward fiscal decentralization by developed countries may stimulate their economic growth.
Desai, Freinkman y Goldberg (2003)	Tax retention, as a proxy for sub-national fiscal autonomy, has a positive effect on the cumulative output recovery of regions since the break-up of the Soviet Union. They also find, however, that this effect decreases as rentable income streams to regions increase
Feld, Kichgässner y Schaltegger (2004)	The results 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 Cantons to allocate public funds more efficiently in such a way that economic performance of a canton is improved.
Akai, Nishimura and Sakata (2004)	They observe a “hump-shaped” relationship between fiscal decentralization an economic growth in United States. They also detect that an optimum degree of decentralization, consistent with the objective of growth maximization is superior to that existent in the United States
Jin and Zou (2005)	For the time period of 1979 to 1993, the results suggest that expenditure and revenue decentralization levels should further diverge to benefit provincial growth. This explanation supports the notion that revenue decentralization stimulates revenue mobilization from local sources, it is suggests that expenditure centralization promotes growth because the central government spends more efficiently than the provinces. For the time period of 1994 to 1999, the regression results suggest that at a given level of expenditure decentralization, more revenue centralization contributes to growth in China. This finding supports the view that the Center is in a better position to allocate budgetary resources for horizontal balance, macroeconomic stability and investment in projects of national significance
Carrion-i-Silvestre, Espasa y Mora (2006)	the Spanish decentralization process has had a positive effect on both global and regional economic growth
Pérez y Cantarero (2006)	Positive and significant relationship between the fiscal decentralization and the economic growth in Spain
Solé-Ollé y Esteller-More (2006)	The investment in education and road carried out by the sub-central governments is more sensitive to variations in the regional output that the one made by the central government. The results indirectly suggest that in the centralized regimen the composition of the capital stock differs from the growth-maximizing one, and so economic growth is enhanced by means of decentralization
Esteban (2006)	The process of fiscal decentralization in Spain has had a positive effect on regional economic growth.

Table 10: Main results - Status Quo of studies among countries. *Source: Self-elaboration.*

Author	Main results
Oates (1995)	He detects a positive and significant correlation between fiscal decentralization and the rate of growth per capita
Philipps and Woller (1997)	For less developed countries, they fail in the intent of determining a significant relationship between both processes. They are only able to find a weak inverse relationship between level of tributary decentralization and the rate of economic growth in the countries of more development level
Davoodi y Zou (1998)	For developing countries they obtain a negative relationship, but not a significant one between the decentralization and the growth and they are not able to determine the relationship that exists in countries of more economic development
Yilmaz (1999)	He finds a positive and significant impact of the fiscal decentralization in the per capita growth in the unitary countries. While in the case of federal countries the results are not conclusive.
Thieben (2002)	For the countries of high-income, the analysis suggests that a “hump-shaped” relation exists between the economic growth and the capital formation, as between the economic growth and the fiscal decentralization. By the same token, the empiric evidence suggests that the capital formation is positively related to the increments of the governments sub-centrales’ self-reliance.
Thieben (2003)	It is observed that the convergence of the countries of high-income of the OECD toward a medium degree of fiscal decentralization of expenditures to promote the economic growth
Martínez-Vázquez y McNab (2004)	They do not detect a direct relationship between fiscal decentralization and economic growth, although they are able to establish an indirect relationship through their favorable impact in price stability.
Thieben (2005)	The hypothesis that fiscal decentralization can promote growth to a limited extent was confirmed. 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.
Imi (2005)	This paper finds that fiscal decentralization has a significant positive impact on per capita GDP growth
Bodman and Ford (2006)	There is little or no stadistical evidence of a direct relationship between fiscal decentralization and economic growth for the sample of OECD countries examined, given the data and methods used. However, when the components of the growth equation are analyzed, there is some evidence that a medium degree of decentralization is best for the growth in both physical and human capital
Thornton (2007)	When revenue decentralization is measured only by those own-revenues upon which sub-national governments have full discretion, fiscal decentralization does not appear to effect economic growth in mid to high income countries

9. Conclusions

In theory, it is expected that decentralization will lead to efficient provision of local public services and will result in 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 then so promotes economic growth. But there seem to be to 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 repercussions. 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 produce 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 in 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 different results. Among the factors that can cause these ambiguous and different 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 governments as of that of total government expenditure/revenue. 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 subnational autonomy. In equal manner, it would be advisable that those publicly responsible 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.

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