FISCAL DECENTRALIZATION AND ECONOMIC GROWTH. EMPIRIC EVIDENCE FROM A REGIONAL PERSPECTIVE

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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 regional 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 Federalism, only emphasizes the largest gains of efficiency that derive from the processes of decentralization of the

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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.

In spite of the extended recognition on the contribution of the fiscal decentralization to the economic growth, the available empiric evidence offers us controversial results. More concretely, in studies among countries is where a bigger ambiguity is appreciated[1]. Since these studies usually fail in verifying the positive influence of the fiscal decentralization in the economic growth, the data chosen by these studies can be inappropriate. The consideration of this last issue could allow us to determine the real effect of the fiscal decentralization in the economic growth. If we suppose that the relationship between both processes change according to the history, culture and the degree of development of a country it is necessary to use the appropriate analysis units to minimize the differences before mentioned. In certain way, the nature of the data set used in the single-countries analysis can explain that these results are consistent whith the predicted in the Fiscal Federalism Theory. When the analysis units (single country) are those in which differences relating to history, culture and the degree of economic development are minimal, the available empiric evidence indicates us that these dates may be useful for estimating the real effect of fiscal decentralization on economic growth. In general terms, this distortion-free data set reveal, the true positive effect of decentralization.

[1] To see, among others, the Phillips and Woler (1997), Davoodi and Zou (1998) y Martinez-Vazquez and Mcnabc (2003) studies.

On these antecedents, the objective of this article is to offer a summary of the single country analysis that allows to understand the relationship cause-effect that underlies between the fiscal decentralization and the economic growth in those analysis units where the socioeconomic differences can, in certain way, to be minimum. In this way, 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 has 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.

Nevertheless, the existence of several government levels acting on the same territory suggests in an immediate way 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 the quality of the citizens life 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; Boadway, 2001) or discrepancies among the objectives wanted by subcentral and central government levels (Oates, 1998).

Although the objective looked for in this article is not to approach the different doctrinal postures about the tradde-off between efficiency and redistribution, we believe convenient to expose, although succinctly, the advantages and inconveniences of fiscal decentralization that are more outstanding , in connection with the social 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 like 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 conditions that are not within reach of 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).

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 Vázquez and NcNab, 2001). 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; Strumpf, 1999)

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 owing to the fact that minimizes the political uncertainty and 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 with regard to their relation with the social welfare.

However, 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 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.

3. 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. In this sense, as it is shown in table 1 , there is a group of studies that picks up in quantitative terms the existent relationship between the fiscal decentralization and the economic growth of a certain country:

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.

Table 1 – Data coverage- Status Quo of the single country analysis-.

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 (2007)	15 Autonomous Communities	1997-2001

Source: Self-elaboration.

Moreover, in table 2 it is shown a first approximation of results derived from the analysis carried out in this article. As we will have a good opportunity to define in the following sections, the most utilized indicator to reflect the degree of fiscal decentralization of different countries is "share of sub-national government expenditures in total consolidated government expenditures" or "share of sub-national government revenues-own in total revenues".

Table 2 -Level of income per capita, real growth, revenue measure of fiscal decentralization(FD rev) and expenditure measure of fiscal decentralization (FD exp)-.

	Level of income per capita ($) Average	Real Growth (%) Ave rage	FD Rev (%) 1983	FD rev (%) 2003	FD rev (%) Ave rage	FD exp (%) 1983	FD exp (%) 2003	FDexp (%) Ave rage
USA	29.752	3.33	39	45	41,60	42	52	**46,41**
Switz	35.115	1.62	37	50	45,23	52	56	**49.38**
Germany	23.470	2,16	36	33	34,39	39	37	**37,94**
Spain	15.677	3,21	16	31	17,33	16	47	**30,89**
Russian	33.868,	0,05	41*	32	41,67	41*	40	**40,00**
India	668,24	5,65	32	31	32,93	61	59	**60,57**
China	**414,70**	**10,05**	**72**	**42****	**54,00**	**57****	**57**	**59,00**

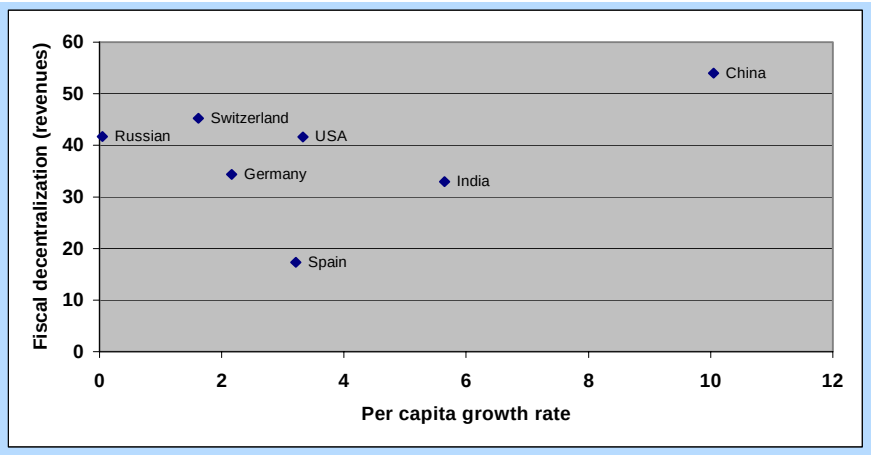
Source: "International Monetary Fund´s International Finances, Statistic and Government Finances Statistics" and self-elaboration.
*Data correspondent for 1993; **Data correspondent for 1992

All the macroeconomic data are available from the "International Monetary Fund´s International Finances, Statistic and Government Finances Statistics". In all case, data are from the period 1983-2003, with the exception of the Russian Federation (1993-2003) and China (1983-1992).
By international comparison, especially among developing countries, India is quite decentralizad by the conventional expenditure measure of fiscal decentralization. According to International Monetary Fund´s Governement Finnaces Statistic (IMF´s GFS), from 1974 to

1993, this ratio was between 60% and 64% and remained stable. On the revenue side, and according to the IMF´s GFS, the share of subnational government revenues-own in total revenues ranged from 31% to 36% from 1974 to 1993. Therefore, the revenue measure of fiscal decentralization is relatively low compared to the corresponding expenditure measure.Whereas in China the opposite situation takes place, the expenditure measure of fiscal decentralization is relatively low compared to the corresponding revenue measure. Moreover, fiscal federalism in tne Russian Federation is characterized by a high level of *de jure* centralization, but a high level of *de facto* decentralization. Overall, sub-national tax autonomy in Russia is much more limited than in such federations as China. Meanwhile, sub-national expenditures are subjet to rigid central regulations with respect to both size and specific breakdown of particular spending items.

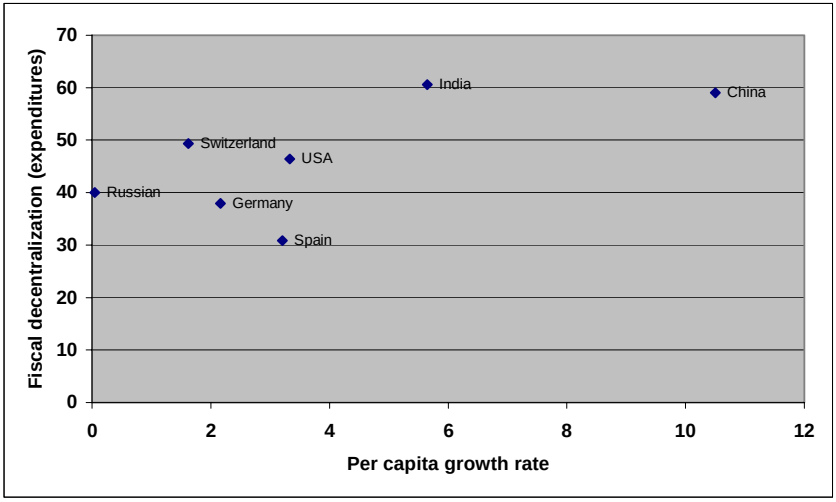
Finally, the figures 1 and 2 show the relation between per capita growth rate and the degree of fiscal decentralization for the period 1983 to 2003.

Figure 1- Per capita growth and revenue measure of fiscal decentralization (average annual percentages 1983 to 2003



Source: “International Monetary Fund´s International Finances, Statistic and Government Finances Statistics” and self-elaboration.

Figure 2- Per capita growth and expenditure measure of fiscal decentralization (average annual percentages 1983 to 2003



Source: "International Monetary Fund´s International Finances, Statistic and Government Finances Statistics" and self-elaboration.

Obviously, as we set out in detail in the following sections of the article**,** high income countries tend to have a higher degree of maturity in devolution and governance than low income countries. Moreover, while the growth rate in developed contries is likely to be relatively moderate, developing countries frequently attain marked economic growth, regardless of fiscal decentralization.

2.1. Chosen variables

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

Dependent variable: As it is shown in table 3 the dependent variable used in the majority of the singel countries studies is the growth rate

of real province (state) income (GYPREG) that comes from the Official Institutes of Statistic of the considered country. Nevertheless, Behnisch, Büttner and Stegarescu (2003) opt to use "the rate of total factor productivity growth" (TFPG); Desai, Freinkman and Goldberg (2003) select "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}).

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 (table 3). In this sense, in the single-country 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 (FD-EXP; FD-REV) as in values per capita, or their derivations (FD-EXP_{EB}; FD-EXP_{B+EB}; FD-EXP_{PC}; FD-REV_{PC})[2] . 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.

[2] FD-EXP_{EB}: ratio of provincial extrabudgetary to centralextra-budgetary spending (per capita terms).
FD-EXP_{B+EB}: ratio of consolidated (budgetary + extrabudgetary) provincial spending to consolidated central spending (per capita terms).
FD-EXP_{PC}: ratio of per capita spending in each state per capita central spending.
FD-REV_{PC}: ratio of per capita revenue collection in each state to per capita central revenues.

Table 3. – Chosen Variables - Status Quo of single-country analysis-.

Author	Dependent variable	*Explanatory variable of the fiscal decentralization*
Zhang and Zou (1998)	GYP_{REG}	*FD-EXP*, $FD\text{-}EXP_{EB}$, $FD\text{-}EXP_{B+EB}$
Jin, Quian and Weingast (1999)	GYP_{REG}	*FD-EXP*, $FD\text{-}EXP_{EB}$, $FD\text{-}EXP_{B+EB}$
Xie, Zou and Davoodi (1999)		*FD-EXP*
Lin and Liu (2000)	GYP_{REG}	*MRR-REV*
Zhang and Zou (2001)	$GYP_{REG\ CHINA}$	*FD-EXP*
	$GYP_{REG\ INDIA}$	*FD-EXP*, $FD\text{-}EXP_{pc}$, *FD-REV*, $FD\text{-}REV_{PC}$
Behnisch, Buettner and Stegarescu (2003)	TFPG	*CEN-EXP*, $CEN\text{-}EXP_{EP\&SC}$
Akai and Sakata (2002)	GYP_{EST}	*FD-EXP*, *FD-REV*, AI_I, AI_{II}, *PRI*
Desai, Freinkman and Goldberg (2003)	Y_t/Y_{1990}	*RR-TAXREV*
Feld, Kirchgässner and Schaltrdger (2004)	GYP_{REG}	*FD-EXP*, *FD-RVE*, *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*, $FD\text{-}EXP_{pc}$, *FD-REV*, $FD\text{-}REV_{PC}$
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} I_{it}^{e} / E_{it-1}	$decr_{it}$ $dece_{it}$
Esteban (2006)	GYP_{REG}	*DESCgasto*

Source: Self-elaboration.

"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 retention 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 that 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).

2.2. 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)[3]; Akai and Sakata (2002), Akai, Nishimura

[3] 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.

and Sakata (2004)[4]; 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 governments[5].

On the other hand, the studies of Lin and Liu (2000) and Feld, Kirchgässner and Schaltradger (2004) 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

[4] 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.

[5] 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 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.

non-bservable 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).

Table 4. - Analytical Framework - Status Quo of single-country analysis-

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 it Lives (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 I Esteller-lived (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)*

Source: Self-elaboration.

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 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 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

table 4, 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.

2.3. 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.

The pros and cons 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 estimador of Ordinary Least Square (OLS) is the one that prevails in most of studies. Nevertheless, the exceptions of this estimator appear depicted in table 4. For example, Zhang and Zou (1998), 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 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, 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. Equally, in Esteban (2006), 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 variables is exogenous, which may be problematic, the relatively small sample prevents the use of an alternative Instrumental Variable (IV) method. On the other hand, Pérez and Cantarero (2006) use empirical analysis based on regional-level panel data with error components model and Instrumental Variables (IV).

Table 5- Empiric methodology - Status Quo of single-country analysis -.

Autor	Empiric Methodology
Zhang and Zou (1998)	Cross-province estimations based on provincial annual data. Fixed Effect Models. GLS 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 an Davoodi (1999)	Time series analysis. OLS 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 Davoody (1998) 1991-1996: empirical analysis based on the panel data (further details are not avaible)
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. MCO and GMM (Generalizad Method of Moments) estimators
Esteban (2006)	Cross-section of average growth rates. MCO estimator

Source: Self-elaboration.

2.4. 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 groth is ambiguous (table 6).

More concretely, Jin y Zou (2005) comment that 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 decentralizaton 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 dummies[6]. Lin and Liu (2000) corroborate the result of a positive impact of decentralizaton 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.

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

[6] 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

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, Bhnisch et al. (2003) report a statistically significant positive effect of overall centralization on the German growth of productivity

Table 6.-Main results- Status Quo of single-country análisis-.

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.
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.*
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.*
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.*
Akai, Nishimura and Sakata (2004)	*They observe a "hump-shaped" relationship between fiscal decentralization an economic growtn in United States.*
Jin and Zou (2005)	*For the time period of 1979 to 1993, the results suggest 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.*
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.*

Source: Self-elaboration.

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 investiments made by sub-central governments in Spain is much more sensitive to changes in output than the investiment 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.

3. 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 the case of the Chinese economy is where bigger divergences are detected. The idiosyncrasy of the pattern of growth of the economy China, together with the peculiarities of its process of decentralization, conditions the hypothesis that the fiscal decentralization promotes the economic growth of a country. Only, when variable dummies is included to capture the economic fluctuations that the economy experiences, we can detect a certain positive influence of the fiscal decentralization in the growth of the economy China.

Whereas, the other single country studies, 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, the studies that reflect the influence of fiscal decentralizaton on economic growth of a single-country or region 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 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 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.

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