

To My Family

FISCAL DECENTRALIZATION AND ITS EFFECTS ON  
MACROECONOMIC PERFORMANCE

The Institute of Economics and Social Sciences  
of  
Bilkent University

by

DERYA YALIM

In Partial Fulfillment of the Requirements for the Degree  
of  
MASTER OF ARTS IN ECONOMICS

in

THE DEPARTMENT OF  
ECONOMICS  
BİLKENT UNIVERSITY  
ANKARA

September 2003

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Economics.

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## **ABSTRACT**

# **FISCAL DECENTRALIZATION AND ITS EFFECTS ON MACROECONOMIC PERFORMANCE**

Yalın, Derya

M.A., Department of Economics

Supervisor: Assist. Prof. Dr. Bilin Neyaptı

September 2003

Decentralization has become an important policy issue in recent years. International organizations allocate more space for fiscal decentralization in their agenda. In the literature, there are vast amount of studies that concentrate on the advantages or disadvantages of fiscal decentralization. The literature suggested that with a good policy design of the fiscal decentralization, especially developing countries might achieve desired outcomes. In contrast, poorly designed fiscal decentralization may lead to a variety of undesirable outcomes, such as macroeconomic imbalances, low growth and corruption. In this study, using a panel data of up to fifty-nine countries and year's range 1972 to 2000, we empirically investigate whether there is any evidence for the effect of fiscal decentralization on inflation, budget deficits and growth. The general conclusion of our empirical work is that developing countries may reduce inflation with enhancement of fiscal decentralization, provided that the size of government expenditures is not large. But our results are not robust for budget deficit and growth. Besides, the association of fiscal decentralization and macroeconomic performance indicators is not statistically significant in developed countries.

Keywords: fiscal decentralization, inflation, budget deficits and growth

## ÖZET

### MALİ YERELLEŞME VE MAKRO İKTİSADİ PERFORMANSA ETKİLERİ

Yalım, Derya

Yüksek Lisans, İktisat Bölümü

Tez Yöneticisi: Yard. Doç. Dr. Bilin Neyaptı

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Son yıllarda, yerelleşme önemli bir sosyal politika haline geldi. Uluslararası kuruluşlar mali yerelleşmeyi gündemlerine daha fazla almaya başladılar. Literatürde, mali yerelleşmenin avantajlarından ya da dezavantajlarından bahseden pek çok çalışma bulunmaktadır. Bu çalışmalar, mali yerelleşme politikasının iyi düzenlenmesi ile özellikle gelişmekte olan ülkelerin istenen sonuçları elde edebileceklerini belirtiyor. Kötü düzenlenen mali yerelleşme ise makro iktisadi dengesizlikler, düşük büyüme ve yolsuzluklar gibi istenmeyen sonuçlara yol açabilir. Elli dokuz ülkenin, 1972'den 2000'e kadar bilgilerini içine alan panel veri kümesi kullanarak, mali yerelleşmenin enflasyon, bütçe açığı ve büyüme üzerindeki etkilerini yakalamaya çalıştık. Çalışmamızın önemli bulguları şunlardır: Gelişmekte olan ülkeler, kamu harcamalarının büyük olmaması halinde, mali yerelleşme ile enflasyonu düşürebilirler. Ancak, mali yerelleşmenin bütçe açığı ve büyüme üzerindeki etkisine ait sonuçlar enflasyondaki kadar kuvvetli değildir. Bunun yanında, gelişmiş ülkeler için, mali yerelleşme ile makro iktisadi performans göstergelerinin ilişkisi istatistiki olarak anlamlı değildir.

Anahtar Kelimeler: mali yerelleşme, enflasyon, bütçe açığı ve büyüme

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# CHAPTER 1

## INTRODUCTION

Since 1970s, trend towards decentralization has not been noteworthy but its implications have continuously been debated. Some countries around the world have embarked on decentralization (Treisman, 2000). Essentially, international organizations recommend decentralization to developing nations in order to dispose of their problems such as the challenge of ethno-geographic diversity, the challenge of transition to market economy, the need for the enhancement of democratisation, and the need to improve delivery of local services. Many countries in Latin America, Africa, East Europe and South Asia have started decentralization programs within the past decade (Litvack et al., 1998). Besides, developed countries, as well, have been in an attempt to find proper level of fiscal balance between central and subnational governments (Bahl, 1995).

Decentralization is the transfer of authority and responsibility for public functions from the central government to intermediate and local governments or quasi-independent government organizations and/or private sector (Litvack and Seddon, 1999). Types of decentralization comprise of fiscal, political, administrative and market decentralization. For performing the decentralized functions of central government, local governments should have an adequate level of revenues and, in

addition, the authority to make assessment about expenditures. Therefore, fiscal decentralization is a core component of decentralization.

In the literature, there are vast amount of studies that concentrate on the benefits of fiscal decentralization. The benefits of decentralization can be based on two primary reasons: efficiency argument and revenue mobilization argument. Efficiency argument depends on, especially, allocative efficiency. Firstly, central governments can only supply goods and services in uniform quantities and qualities over their territory. Decentralization permits non-uniform provisions that better match the preferences of citizens (Oates, 1972). Taking account of local differences in culture, environment, preferences and needs, endowment of natural resources, and economic and social institutions can boost the performance of the public sector. Since local governments are closer to the people, they are generally better informed about the needs and preferences of local population than central government, which has limited capacity to collect information. By shortening the informational distance between the providers and recipients of public goods and services, information costs can be reduced and scarce public resources can be channelled into more productive, externality-generating uses nationwide, thus public sector efficiency in service delivery can be enhanced (Hutter and Shah, 1998; Oates, 1972 and 1999, Inman and Rubinfeld, 1996).

Besides, theoretically, monitoring and control of local agents by local communities is easier. Decentralization can strengthen accountability as it increases the proximity between representatives and the electorate. Central government representatives do not necessarily need to be elected in all subnational jurisdictions,

whereas each local representative has to win the election in his/her own jurisdiction. Subnational governments may therefore be more accountable to their electorate than the central government (Seabright, 1996). The closer association between expenditures and revenue recruitment at the subnational level may lead to better accountability of government actions (Bahl, 1999; Oates, 1999). Elected local governments may generally be responsive to poor people, and better at involving the poor in political processes. Successful decentralization may improve the efficiency and responsiveness of the public sector to the needs of poor. Additionally, competition of the autonomous jurisdictions may lead to a reduction in bribes, and, accordingly, corruption may also be reduced in decentralized governments (Weingast, 1995; Treisman, 2000).

Moreover, decentralization is a means of initiating more participation into the democratic process. By decentralizing the delivery of public services, local residents would have the perception that, through voting, they determine the direction of local service delivery. Local taxpayers also become more keenly aware of the connection between the payment of taxes and the delivery of local services and thus learn fiscal responsibility and will be more willing to pay for public services, given that their preferences will be honoured (Wasylenko, 2001).

Lastly, a decentralized system can reduce mobility and organizational cost, which is required for the achievement of optimal assignment of powers (Breton and Scott, 1978). Organizational costs include the cost of signalling preferences, the cost of moving between jurisdictions, the cost of coordinating intergovernmental affairs, and the cost of administration of governmental bodies. Decentralization, leads to that

outcome, as it supports intergovernmental competition that, in turn, force politicians and public sector bureaucrats to do what is required to make organizational costs as small as possible or, equivalently, to supply goods and services in quantities and in qualities desired by citizens (Breton, 1996).

Decentralization can boost revenue mobilization, as some taxes such as the property tax and other land based tax, are best suited to local government in that their evaluation and collection requires familiarity with the local economy and population (Bahl, 1995). The other reason is that, taxes are perceived as quasi-benefit charges, which finance local services. Generally, however, the central governments are unable to reach all enterprises and taxpayers with value added and income tax. On the other hand, local governments might be able to capture the unused fiscal capacity, originating from income tax excused of small enterprises and workers outside the formal sector.

The recent literature illustrates, however, that decentralization is not a magic potion, particularly in developing and transition economies. First of all, in the absence of a mechanism to transfer resources between districts, an increase in regional disparities is one of the problems that are associated with decentralization since wealthier urban governments will benefit most from greater local taxing powers. In addition, administrative responsibilities may be transferred to local levels without adequate financial resources, making equitable distribution or provision of services more difficult. Centralization allows the national government more discretion in determining regional differences in levels of public service and taxation (Robalino et al., 2001; Bahl, 1995). Secondly, the potential for increased efficiency



in the provision of local public may not be fulfilled, if institutional capacity is weak at the subnational level. It is also arguable that in an environment with proximity of individuals and local government, corruption may be enhanced (Prud'homme, 1995; Tanzi, 1995). Also, weak budget oversight and poor governance may also breed corruption and encourage rent seeking on the part of the local elite and civil service. Moreover, decentralization may not always be efficient, especially for standardized, routine, network based services as it can result in the loss of economies of scale and of control over scarce financial resources by the central government. Weak administrative or technical capacity at local levels may lead to services being delivered less efficiently and effectively in some areas of the country (Litvack and Seddon, 1999). An illustration is that, in transition countries that are undertaking privatization and building a public and industrial infrastructure, the need for coherent investment policy is an argument against fiscal decentralization since capital resources are scarce and economies of scale is important (Bahl, 1995). Moreover, decentralization may impose constraints to the implementation of national policies and creation of coordination channels across regions (Guldner, 1995). Decentralization may allow functions to be captured by local elites and distrust between public and private sectors may weaken cooperation at the local level.

In view of these different opinions, we claim that under a significant but restrictive set of conditions, decentralization can provide powerful incentives for good policy and hence, good macroeconomic performance. In contrast, poorly

designed fiscal decentralization can lead to a variety of undesirable outcomes, such as macroeconomic imbalances, low growth, and corruption.

In this study, using a panel data of up to fifty-nine countries a year's range 1972 to 2000, we empirically investigate whether there is any evidence for the effect of fiscal decentralization on the macroeconomic performance of countries. We first set expenditure based and revenue based fiscal decentralization indicators based on the various sub levels of government and a proxy for vertical imbalances<sup>1</sup>. As a macroeconomic performance indicator, we take inflation, budget balance, and GDP growth of countries. Our main control variable is the share of the expenditure or revenue in the GDP for each analysis. Besides, we study whether developed countries are different than developing countries with regards to the macroeconomic effects of decentralization. Moreover, we consider that social security and defence expenditures is pure public good and perform the analysis accordingly.

Our major findings reveal that there is a negative association between fiscal decentralization and inflation for developing countries. In other words, the greater fiscal decentralization in developing countries, the less is inflation provided that the size of government expenditure is not large. Besides, results show that the effect fiscal decentralization on inflation in developed countries is not significant.

The association between expenditure decentralization and budget deficit is not as clear as the case of inflation. Most of our regressions show a negative association between decentralization and budget deficit. However, our results are consistent that there is a positive association between the size effect of government

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<sup>1</sup> Vertical imbalance is the ratio of intergovernmental transfer to total tax revenue of subnational governments. (De Mello, 2000a)

expenditures and budget deficit for developing countries, whereas the association between the share of government revenues in GDP and budget deficit is negative for developing countries.

Our results also show that the association between both expenditure and revenue decentralization and GDP growth is mixed for developing countries and is not significant for developed countries. Moreover, the size effect of government expenditure on growth is negative and significant but the association between size effects of government revenues and growth is not significant.

Results show that expenditure and revenue based fiscal decentralization indicators have, in general, statistically significant associations with macroeconomic variables. On the other hand, in general, proxy for vertical imbalances is not significantly associated with macroeconomic performance indicators regardless of whether they are used as fiscal decentralization indicators or control variables.

This study is a result of an attempt to fill, in part, the void in the literature on the impact of fiscal decentralization. Our focus is the relationship between fiscal decentralization and macroeconomic performance. The literature suggested that with a good policy design of the fiscal decentralization, especially developing countries might achieve desired outcomes. The general conclusion of our empirical work is also that developing countries may reduce inflation with enhancement of fiscal decentralization, provided that the size of government expenditures is not large. But our results are not robust for budget deficit and growth. Besides, the association of fiscal decentralization and macroeconomic performance indicators is not statistically

significant in developed countries. In addition, in general, the coefficients that proxy for vertical imbalances is not statistically significant.

The outline of the rest of the thesis is as follows. Chapter 2 provides a brief literature survey; Chapter 3 reports data and descriptive statistics. Chapter 4 is the methodology part. Results are presented in Chapter 5. Chapter 6 concludes.

## **CHAPTER 2**

### **LITERATURE REVIEW**

In order to assess the effects of decentralization, it is beneficial to review the traditional and new theories about decentralization; the potential impacts of decentralization on growth, equity, and macroeconomic stability. In what follows, section 2.1 provides a brief account of traditional theories and the new ones. In Section 2.2, we discuss the impacts of decentralization on growth (section 2.2.1), on equity and redistribution (section 2.2.2) and on macroeconomic stability (2.2.3). Next, an important part of decentralization literature, sector studies are analysed briefly in section 2.3 in two parts as section 2.3.1 provides a brief report on the impacts of decentralization on education and section 2.3.2 provides a brief report on the impacts of decentralization on health.

#### **2.1) Traditional and the New Theories**

There are mainly two central theories in the theoretical literature: the traditional and the new one. Traditional theories, which have three branches, emphasize allocative benefits of decentralization for information reasons, as the allocation of scarce resources is the basic problem in this area. The former theory came by the first half of this century. Hayek (1945) emphasized the important

advantages of decentralized decision-making in terms of best utilizing local information. In the context of public finance, local governments have better information than the national government about local conditions and information transmission is costly. Therefore, local governments can make better decisions than the national government in providing local public goods and services.

First branch of the traditional fiscal federalism theory emphasizes the benefits of jurisdictional competition. In a study of inter-jurisdictional competition dimension, Tiebout (1956) studies how, in a system with many jurisdictions, the agents can “vote with their feet” and locate the jurisdiction that has policies that are closer to their preferences. He argued that competition among local governments on public expenditure allocation allows residents to better match their preferences with a particular menu of local public goods. Such a mechanism would be absent if the national government provides the public good uniformly. Federalism also allows local experimentation from which other regions may learn and imitate that which is successful. The costs of failure under decentralization can be reduced by such experimentation (so called "laboratory of federalism"). While Tiebout focuses on horizontal competition<sup>2</sup> among different levels of government, Breton (1996) concentrates on the vertical competition and its benefits. He claims that different levels of government, in any effort to increase their “market share” provide the citizens with the optimal type and quantity of public goods. Brennan and Buchanan (1980) argued that inter-jurisdictional competition approach of Tiebout could limit

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<sup>2</sup> Vertical competition is the competition between governmental units at different levels, whereas, horizontal is between units at the same level.

local governments' behaviour. In some cases, it is better to have interstate collusion to prevent undesirable outcomes (Donahue, 1997).

Optimal division of powers between the central and local governments constitutes the second branch of the traditional theories. Drawing on previous ideas, Musgrave (1959) and Oates (1972) built a theory of fiscal federalism, which stresses the appropriate assignment of taxes and expenditures to the various levels of government to improve welfare. Decentralization theorem, which is the main result in this branch, asserts the conditions under which it is more efficient for the local government to provide Pareto efficient levels of output than for the central government (Oates, 1972). They also suggested that inappropriate decentralization might induce a range of allocative distortions, regional inequality, and fiscal instability.

The third branch of the traditional literature focuses on the role of organization costs (Breton and Scott, 1978). Similar to the above, in answering the assignment decision of the public goods among different levels of government, Breton and Scott concluded that whichever level of government is able to provide a public good most efficiently should be given sovereignty over that policy area. Which level is deemed most efficient will depend on an examination of provision and transaction costs, information limitations, heterogeneity of preferences across regions, externalities and spillovers, ability to raise taxes or utilize inter-governmental transfers, and organization costs. A decentralized system can reduce mobility and signalling costs. However, it is likely that it can also increase administrative and coordination costs.

Building on these views, second generation theories gave importance to other benefits of decentralization by addressing two concerns, which are largely ignored by the traditional theories (Weingast, 1995; Wildasin, 1997; McKinnon, 1997; Qian and Weingast, 1997 and Qian and Roland, 1998). The new theories focus on the incentives of the government. Particularly, these theories discard the traditional approach's assumption that governments are benevolent with full commitment power. A government, which often has a private agenda, does not seek to maximize social welfare or economic efficiency. Even if it tries, it may not be able to make credible commitments. Also, these new theories consider fiscal issues narrowly. They clearly address the general issue of government regulation over economic activities or the state-market relationships. Besides, these theories claim that the government itself is often an obstacle to economic welfare, in particular, for the transition and developing economies. Given the enormous power of the government, it may be more harmful than good for the purpose of the creation and preservation of markets, if government is not restrained with proper incentives. Second generation theories examine how “market-preserving federalism” affects the behaviour of the government.

There exist major differences between the traditional and new theories as the new theories stress government incentives and the state-market relationships. One difference concerns the role of revenue transfers between the central and local governments. Assuming a benevolent government, the traditional theory argues for the benefits of decentralization of expenditure for its informational advantages. However, it also points out that, under some circumstances decentralization leads to



allocative distortions and weakening of fiscal capability of the central government. With large-scale externalities, and more significantly, with decentralized taxation in the presence of inter-jurisdictional competition, expenditure decentralization may cause allocative distortions. Besides, decentralization may restrict the central government's fiscal ability to lessen regional inequality and maintain macroeconomic stability<sup>3</sup>. Because of these concerns, many traditional theories do not consider regional "self-financing" desirable<sup>4</sup>.

On the contrary, theories of market-preserving federalism emphasizes the importance of government's incentives and the potential benefit of linking local government's revenue collection with their expenditure and limiting central government's redistribution among local governments to attract local economic prosperity. The theory suggests that, despite possible well-known allocative distortions, decentralization's beneficial incentive effects for governments are especially valuable for the transition economies.

The traditional theory and new theories also have some similarities, which motivate this study as well. The argument is that both the traditional and new theories' theoretical and empirical contributions all rest on the assumption that the design and implementation of a multi-tier system of government can significantly affect overall resource allocation in the economy and, thus, stabilization, growth, and welfare. However, the casual relationship between decentralization and macroeconomic conditions underlying the different approaches differ, substantially.

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<sup>3</sup> Also stated by, Prud'homme, 1995; Huther and Shah, 1996; Ter-Minisian, 1999

## **2.2) Potential Impacts of Decentralization**

Available studies have mainly considered the impact of decentralization on: efficiency and growth, equity and redistribution, and macroeconomics. The most common theoretical rationale for decentralization is to attain allocative efficiency in the face of different local preferences for local public goods (Tiebout, 1956; Oates, 1972; Musgrave, 1983). Problems may arise with respect to coordination, which is costly (Breton and Scott, 1978) and where inter-jurisdictional spillovers are important, including stabilization (Tanzi, 1995; Wildasin, 1997; Oates, 1999) and distribution (Tresch, 1981). Oates (1999) argued that the traditional theory contends that the central government should have the basic responsibility for macroeconomic stabilization and income redistribution in the form of assistance to the poor. Because, in the absence of the monetary and exchange-rate privileges and with highly open economies that cannot contain much of the expansionary impact of fiscal stimuli, provincial, state, and local governments simply have very limited means for traditional macroeconomic control of their economies. Similarly, in the case of redistribution, with an aggressive local support for the poor, the mobility of economic units leads an influx for the poor to that state and exodus of those with higher income who must bear the tax burden.

### **2.2.1) Fiscal Decentralization and Growth**

Issues, on which there is neither theoretical nor empirical agreement, concern the direction and significance of the relation between decentralization and the size of

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<sup>4</sup> i.e., local governments depend on their own tax revenue collection to finance their expenditure

the public sector, (Oates, 1985; Ehdaie, 1994; Mueller, 1996) and the relation between decentralization and the rate of economic growth (Prud'homme 1995; Tanzi, 1995; Martinez-Vasquez and McNab, 1997; Davoodi and Zou, 1998; Zhang and Zou, 1998; Litvack et al., 1998). The arguments about government size and decentralization are based on the leviathan hypothesis<sup>5</sup> (Brennan and Buchanan, 1980). With the competition among jurisdictions to attract taxpayer into their territory, constraint has been imposed on fiscal appetite of government, under decentralization. Therefore, leviathan hypothesis implies that “total government intrusion into the economy should be smaller, ceteris paribus, the greater extent to which taxes and expenditures are decentralized” (Brennan and Buchanan, 1980,p.15). Ehadie has tested the leviathan hypothesis and has found evidence for the hypothesis. Like Ehadie, Rodden (2002) suggests that governments grow as fast as they fund a greater portion of public expenditures through intergovernmental transfers. However, he cannot find evidence for the leviathan hypothesis, if public spending is funded by autonomous local taxation. Although recent studies support the hypothesis, Oates's (1985) findings do not support the hypothesis.

Informational advantage of local governments, population mobility and competition among local governments guarantee the matching of preferences of local communities and government. Consequently, decentralized provision of public services increase efficiency. Having the theory, one would expect that decentralization of government enhances the prospects for higher growth. However, the role of decentralization as a means to foster growth has recently been questioned

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<sup>5</sup> Brennan and Buchanan (1980) have depicted the government as a Leviathan seeking to maximize

(Prud'homme 1995; Tanzi, 1995). The opponents' strongest argument points out that the efficiency gains from fiscal decentralization may not materialize-especially in developing countries –since revenue collection and expenditure decisions by local governments may be constrained by the central government. In addition, local governments may not be as responsive to the citizen's preference and needs especially with corruption, lack of freedom, poverty and low level of education. Their ideas are supported by Davoodi and Zou (1998), who found that fiscal decentralization does not lead to economic growth in developing countries, but no noticeable effect on growth in developed countries is observed. On the contrary, Lin and Liu (2000) investigated the effect of decentralization in China on the growth rate of per capita GDP and found that the fiscal decentralization has made a significant contribution to economic growth. They noted that as well as fiscal decentralization, other reforms such as housing responsibility system in the rural sector have been conducive to economic growth. However, several methodological problems in these studies discount even these mixed results and much more to be done to ensure that the measured decentralization-growth relationship is robust.

While the general motivation is that decentralization is useful for the implementation of economic development, some studies argue that the growth of the local public sector may be mainly the result of economic development. As Bahl and Linn (1992) note, “decentralization more likely comes with the achievement of a higher stage of economic development”(p. 391) and that the “threshold level of economic development” at which fiscal decentralization becomes attractive “appears

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revenues by exploiting its monopoly power over the tax base.

to be quite high” (p.393). Wasylenko (2001) points that decentralization is also a consequence of economic development. His empirical findings suggest that if decentralization is measured in terms of the extent to which state and local governments make expenditures, then per capita income appears to be an important determinant of decentralization. Besides, Panizza (1999) find some empirical regularity that can be used to explain the cross-country variations in the degree of fiscal centralization. In his findings, land area, GDP per capita and ethnic-fractionalisation are all negatively correlated with fiscal decentralization.

### **2.2.2) Fiscal Decentralization, Equity, and Redistribution**

Equity and distributional concerns is a vital part of the decentralization theory. There are some questions, which are priority policy areas in developed, developing and transition economies, such as “Should governments redistribute people or places?” If they should, which level of government should be responsible for such redistribution, and under what conditions? The impact of decentralization on interpersonal and inter regional equity, mainly depends on the policy design details and institutional arrangements. Public expenditure policy, tax policy and the design of intergovernmental transfers are the main channels through which decentralization affects interpersonal and interregional equity. Local accountability and local political participation by the poor, competition in the delivery of the services and resulting price effects are also important to establish equity.

Some analysts argue that in some circumstances local governments achieve such goals more effectively than central governments (Pauly, 1973). Others argue

that central redistribution is needed both for effectiveness (Oates, 1972; Musgrave, 1983) and to overcome biases of local elites (Wilensky, 1974; Inman and Rubinfeld, 1997). Another view is that resource mobility and the openness of the local economy will frustrate their effort, regardless of what local governments may attempt to do in the way of redistribution (Buchanan and Wagner, 1971). Although debate on this subject continues, the traditional view that central governments have the major role to play in functions of income redistribution still predominates. However, it is possible to observe Swiss<sup>6</sup> and Danish examples, which indicates that the formal assignment of distributional authority to a local government can work. The success of above examples lies behind the design of their decentralization policy. Supporting this argument, Von Braun and Grote (2000) analysed poverty and noted if all three types of decentralization: fiscal, political, and administrative are established, decentralization serves the poor.

### **2.2.3) Fiscal Decentralization and Macroeconomic Stability**

Considering that our major concern in this study is to assess the relationship between fiscal decentralization and macroeconomic performance, it is noteworthy to state that decentralization's potentially destabilizing effect on the macro economy has caused much concern recently (Prud'homme, 1995; Tanzi, 1995, 2000; Ter-Minassian, 1997). It is argued that, in decentralized countries, where the local governments have significant power, macroeconomic stability can be threatened. However, others suggest that destabilizing effects are more likely to reflect

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<sup>6</sup> In Sweden, cantons have control over health, education and welfare services and priority in levying

inappropriate incentives than any problem inherent to decentralization (Spahn, 1997a and 1997b). It is of course not surprising to see a strong association between decentralization and fiscal imbalance at lower levels, in countries that have “decentralized” to offload fiscal imbalances from the centre (Wallich, 1994). World Bank studies (World bank, 1996a; 1996b; Dillinger, 1997) have examined this issue and suggested that destabilization effects arose mainly from design problems, such as soft budget constraint between levels of government (Litvack et al., 1998). The Philippines, Brazil, and Argentina are commonly cited examples. In the Philippines, as half of the revenues is allocated to local governments, the central government is very limited in its ability to adjust to critical situations (Litvack and Seddon, 1999). In Brazil, collection of revenues was decentralized before expenditure responsibilities in the 1990s. Consequently, central government was forced to maintain spending levels with a smaller resource base. Argentina is faced with problems as subnational governments accrued unsustainable debts and had to be bailed out by the central governments. The design of decentralization must ensure a match between expenditure responsibilities and revenues at each level of government and create an institutional mechanism that will enforce a hard budget constraint between levels of government. In other words, decentralization should be undertaken in a way that increases rather than decreases accountability (Litvack et al., 1998).

Considerable amount of the literature on decentralization has been devoted to undesirable outcomes such as corruption poor governance, deficits (see, for

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taxes.

example, De Mello, 2000b). Despite that decentralization and government corruption are closely related on theoretical level, there is much disagreement on what the net relationship between them should be (Fisman and Gatti, 2002). Fisman and Gatti empirically demonstrate that fiscal decentralization in government expenditure is consistently associated with lower measured corruption. Fiscal decentralization is also argued to be related with the quality of government and governance (Hutter and Shah, 1998; Fisman and Gatti, 2002 and Treisman, 2000). De Mello and Barenstein's (2001) empirical work on this subject asserts that, for any level of fiscal decentralization, the higher the share of non-tax revenues and grants and transfers from higher levels of government in total subnational revenue, the stronger the association between decentralization and governance. Therefore, governance is affected not only by fiscal decentralization but also by how subnational expenditures are financed. In contrast, Treisman's (2000) findings support that states which have more tiers of government tend to have higher perceived corruption and may do a worse job of providing public health service. In other words, the quality of government services and decentralization are negatively related. On the other hand, Neyapti (2003) empirically demonstrate that fiscal decentralization is associated with lower deficits.

### **2.3) Sector Studies**

Decentralization is usually carried out as a part of the sector reform (Litvack and Seddon, 1999). The main sectors, which are subject to decentralization, are education, health care, safety nets infrastructure, irrigation, water supply, sanitation



and natural source management. The sector studies are therefore a very important part of the decentralization literature. They question whether the theoretical justifications are applicable to real life.

Health and educational sectors are important as they affect not only national development but also poverty alleviation and general welfare. The general conclusion of sector studies and also experiences is that without proper design, the decentralization process may lead to unintended consequences.

### **2.3.1) Education and Decentralization**

There is an ongoing trend to give schools greater decision-making autonomy in order to improve school performance and accountability, on all around the world (Burki and Perry, 1999). Mainly, there are two different types of decentralization: decentralization of education to lower levels of government, which is a part of broad decentralization process, and to individual schools, which is prompted by poor school performance.

There are two sets of motivations for education decentralization. Firstly, the process of decentralization may lead an improvement in efficiency, transparency, accountability, and responsiveness of service provision. Then this would lead an improvement in quality of schooling and social welfare. The other set highlights the technical efficiency. Some of the fiscal burden of education service provision of the central government can be diminished by education decentralization. There are clear efficiency gains resulting from letting local decision-makers allocate budgets across inputs, as the prices and production processes vary across localities.

There are mixed results on impacts of decentralization on educational services. In Brazil, decentralization increased the overall enrolments, however, regional inequalities in access to schooling, per capita expenditures, and quality remained unchanged (Litvack and Seddon, 1999). The experiences of Chile, New Zealand and Zimbabwe, whose design of decentralized systems has been highly criticized, are, also, similar to Brazil's. The main problem in these countries is the central governments have assigned responsibilities to local governments without supplying targeted support to poorer areas. Quality improvement of education can be seen in the experiences of Nicaragua and El Salvador, where students performs better at tests, with making more of their own decisions about school functions (Litvack and Seddon, 1999).

The emphasis on the effect of fiscal decentralization on education leads many researchers to investigate the issue empirically. De Mello has reported that social capital, defined as trust, norms, and network (Putnam, 1995) that foster beneficial cooperation in cooperation in society, can be enhanced by fiscal decentralization. The findings are suggestive rather than conclusive, of an association between social capital and fiscal decentralization. (De Mello, 2000a)

### **2.3.2) Health and Decentralization**

Within the health sector, decentralization of finances and responsibilities is one of the important topics that have emerged in the agenda of national governments and international organizations (Robalino et al., 2001). Fiscal decentralization may lead more rational and unified health service that caters local preferences. Besides,

greater community financing and involvement of the local communities is another justification for fiscal decentralization in health services. Furthermore, moving streamlined and targeted health programs may lead cost containment. On the other hand, responsiveness to local demands is a benefit of decentralization; nevertheless, it brings two main disadvantages. Firstly, local officials frequently change and may be uninformed about principal national policies. The other is that, local groups may, as well, resist national policies.

Despite all theoretical benefits of decentralization, there is little concrete evidence for confirmation. Experiences that have been documented demonstrate that achieving the benefits of decentralization depends heavily on policy design (Litvack and Seddon, 1999). In Bolivia, designers of the fiscal decentralization have failed to take into account existing level of health facilities that local governments inherited and used new financial mechanism that fall short behind what is needed. Moreover, the policy designers must also consider local conditions and capacities. In Philippines, the discrepancy between the costs of health staff benefits promised under centrally negotiated labour agreements and the capacity of local governments to pay seriously damaged staff morale. In Bolivia, local governments could not execute over half of the investment plans due to lack of capacities (Hartmann, 1999). There are also successful implementations of the decentralization in health sector, such as the Spanish example. The decentralization of health sector increased accountability and equity in Spanish health sector (Burki and Perry, 1999).

There is little empirical evidence of potential benefits of the decentralization of fiscal responsibilities in the health sector. Robalino, Picazzo and Voetberg (2001)

have questioned the issue by quantitative measurement. Using a panel data on infant mortality rates, GDP per capita, and the share of public expenditures managed by local governments, they conclude that higher fiscal decentralization is consistently associated with lower mortality rates. However, they claim that the results do not imply that fiscal decentralization is a magic recipe to improve health outcomes, rather a successful decentralization requires strong leadership from the central government and a high-quality design.

## CHAPTER 3

### DATA and DESCRIPTIVE STATISTICS

In this chapter, we first document the data and the sources in section 3.1. In section 3.2, we provide descriptive statistics.

#### 3.1) Data and Sources

For the empirical part of this study, we utilize time series for each country, on current expenditure and revenues of central, provincial, and local levels of government and on total expenditure and revenues at central, and provincial level. In addition, we use data on gross domestic product and its growth rate, inflation rates, general government deficits, and the amount expenditures on defence and social security programs. As International Monetary Found's (IMF) Government Financial Statistics (GFS) is the main source for internationally comparable data on government finances, we used this data set<sup>7</sup>.

Our data set comprises developed and developing countries covering the period 1972-2000. Unfortunately, however, the data limitations restrict us to work on narrower data set. Although our initial panel consists of a hundred and two

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<sup>7</sup> GFS provides data on local governmental level only for current expenditures and revenues and not for capital expenditures and revenues.

countries<sup>8</sup>, due to missing data problem for some of the countries, the maximum number of the countries used in regressions reduced to fifty-nine. The fiscal decentralization indicators are the most scarce data in our data list. Time span of the fiscal decentralization indicators for each country is available in Appendix 3 (Table 1). In section 3.1.1 detailed information on fiscal decentralization indicators is reported and section 3.1.2 presents information on macroeconomic performance indicators.

### **3.1.1) Fiscal Decentralization Indicators**

There are three different approaches in the literature for measuring fiscal decentralization; expenditure-based, revenue-based and indicators of vertical imbalances<sup>9</sup>. The expenditure based indicator measures the ratio of the sub-national government expenditure to total government expenditure. Alternatively, the revenue based indicator measures the ratio of sub-national government revenue to total government revenue. On the other hand, vertical imbalance in intergovernmental fiscal relations measures the gap between subnational expenditures and own revenues by simply dividing intergovernmental transfers to total tax revenue of subnational governments.

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<sup>8</sup> There is a term “decision decentralization” called by Treisman (2000) to indicate whether scholars consider the state to be federal. Clearly, we do not interested in this classification. However, as a general fact, the federal states included in data set are: Canada, Switzerland, Australia, Germany, Austria, Belgium, the USA, Malaysia, Spain, Argentina, Brazil, Mexico, India, Venezuela, Pakistan, and Comoros

<sup>9</sup> See De Mello, 2000a.

In this study, we used three expenditure-based decentralization indicators and three revenue-based indicators. The data of intergovernmental transfers is very limited in GFS data. Nevertheless, we have formed six other measures to proxy vertical imbalances, three of which are the differences between subnational expenditures and subnational revenues as ratios to subnational expenditures and the rest three are the differences between subnational expenditures and subnational revenues in ratio to subnational revenues.

Expenditure based indicators are as follows. The first measure (EXPs&p/TOT) is the ratio of state or provincial government spending to total government spending, in other words, the share of state or provincial governments in total expenditures<sup>10</sup>. Secondly, the share of state or provincial government current expenditures in total current expenditures is taken as another indicator (EXPs&p/CURR). The third measure is the share of local government current expenditure in total current expenditures (EXPlloc/CURR).

The revenue based indicators are calculated by replacing the corresponding revenue amounts in above formulas. The share of state or provincial governments in total revenue (REVs&p/TOT) is the fourth indicator. The state or provincial government's current revenue share (REVs&p/CURR) is the fifth indicator. The sixth measure is the local government's current revenue share (REVlloc/CURR).

As it is stated above, we also generate new indicators by using subnational expenditures and revenues, which we call VISPEXPT, VISPEXPC, VILOCEXPC, VISPREVT, VISPREVC, and VILOCREVC. VISPEXPT is the ratio of the

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<sup>10</sup> Total spending is the sum of the current and capital spending. Total revenue is the sum of the current revenue and tax revenue.

difference between total expenditures and revenues at state or provincial level to state or provincial total expenditures. The ratio of the difference between current expenditures and revenues at state or provincial level to state or provincial current expenditures is VISPEXPC. VILOCEXPC is the ratio of the difference between current expenditures and revenues at local level to local current expenditures. VISPREVT, VISPREVC and VILOCREVC, replicate the above definitions with the exception of corresponding revenue figures in the denominator<sup>1112</sup>. Vertical imbalance is an important indicator of fiscal decentralization. As the tax bases that are efficient and simple to administer by local government are few (Bird, 1992) and non-tax revenues tend to be limited (De Mello, 2000a), if subnational governments are to be main providers of public services, higher-level jurisdictions must share part of their revenues with subnational governments and, as a result, bridge the gap between spending and revenues mobilized locally. Our proxy uses subnational deficit that is inclusive of borrowing and other types of financing as borrowings of subnational government guaranteed by central government.

### **3.1.2) Macroeconomic Performance Indicators**

In this study, inflation, the ratio of budget deficit to GDP, and GDP growth will be used as macroeconomic performance indicators. As inflation series exhibit a large variance both across the panel sample and within some countries, inflation will be illustrated by depreciation in the real value of money (D)<sup>13</sup>. With this

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<sup>11</sup> Explanations for abbreviations, used in this study, are available at Appendix 1.

<sup>12</sup> Cross-correlations for fiscal decentralization indicators are available at Appendix 2.

<sup>13</sup> D in year t is calculated by the formula:  $D = F/(1+F)$ . F is the average rate of inflation between t and t-1. This variable has been used in Cukierman, Webb, and Neyapti (1992), for similar reasons.



characterization, the influence of outliers will be reduced (Cukierman, Webb and Neyapti, 1992). Inflation will therefore be referred to hereafter as  $D$ . The ratio of budget deficit to GDP is abbreviated as  $DEF_{GDP}$  and GDP growth as  $GDPGR$ .

### 3.2) Descriptive Statistics

Based on fiscal decentralization indicators, we produce functional descriptive statistics. We first examine the cross-country differentials, by simply taking averages of the decentralization measures of the whole period available for each country (Table 2). As we look at the column sorted by  $EXPs\&p/TOT$ , two unexpected countries ranked first and second; correspondingly: the Netherlands Antilles<sup>14</sup> and Turkey<sup>15</sup>. The cross-section average for this variable is 0.20, which suggest that one fifth of total expenditures on the available set of countries are made by states or provinces on average. The indicators used by current expenditures give additional information; especially for  $EXP_{loc}/CURR$  Finland, Denmark and Mongolia are shown as highly decentralized.

Classification of the counties may give additional information. Therefore, we divided the sample countries as developed and developing. For developed countries, yearly cross-section averages are on Table 3. The data suggest, in general, that fiscal decentralization in developed countries has not notably increased since 1970's, with a small fall during the 1980's. Table 4 provides yearly cross-section averages for

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<sup>14</sup> The Netherlands Antilles is part of the Kingdom of the Netherlands and it consists of two groups of islands and each island has its own government. This special condition is the major reason for decentralization.

<sup>15</sup> For Turkey, GFS only present 1974 and 1975 data. Most probably, the expenditures made by Turkish government, after 1974 North Cyprus war, causes a bias in measurement and overrated Turkey

developing countries only. This one also point that the level of fiscal decentralization has not notably change during the 1990's as compared to the 1980's. However, we see that there was a decline in decentralization, particularly, using total amounts for calculation, during the 1980's as compared to the 1970's. The numbers are not perfectly comparable as countries for which data is available change from period to period.

Since social security and defence expenditures are pure public goods, they should not be considered a part of expenditures that can be subject to decentralization (Panizza, 1999). Therefore, we, also, calculated the indicators with excluding the social security and defence expenditures from central government expenditures and form additional descriptive tables (Table 5, 6, 7). When we compare Table 5 with Table 2, we observe that excluding defence and social security expenditures make some differences in the rankings. In Table 6, which illustrates developed country averages in the absence of social security and defence expenditures  $EXPs\&p/TOT$  posits a fall in fiscal decentralization since 1970's. However, the other indicators in Table 6 illustrate either no change or an increase of fiscal decentralization. In the case of developing countries,  $EXPs\&p/TOT$  and  $EXPs\&p/CURR$  exhibit a downward trend in fiscal decentralization in less developed countries. However,  $EXPloc/CURR$  still indicates a small increase in fiscal decentralization level.

## CHAPTER 4

### METHODOLOGY

For our study, panel data has several advantages over cross-section or time-series data sets. The primary advantage of a panel data set over a cross-section is its efficiency in modelling differences in behaviour across individuals. They increase the degree of freedom and reduce the collinearity among explanatory variables, as they provide large number of data points (Hsiao, 1986). Thus, the efficiency of the estimates is improved. Moreover, as panel data makes use of information to examine intertemporal dynamics and individuality of the entities, we are better able to control the effects of missing or unobserved data. Considering the advantages, we claim that, the association between fiscal decentralization and macroeconomic performance can be estimated best by using panel data techniques. The basic equation to be estimated is as follows:

$$E_{it} = \alpha_i + \beta F_{it} + \gamma C_{it} + \varepsilon_{it}, \quad (1)$$

where E denotes a measure of macroeconomic performance indicator, F denotes a measure of fiscal decentralization indicator, C denotes a set of control variables, subscript it stands for country i at time t, and  $\alpha_i$  is the fixed effect per country.

The basic hypothesis to be tested here is whether  $\beta$  is equal to zero, in equation (1). In this study, the set of control variables ( $C_{it}$ ) comprises of government size, the product of developed country dummy (DC) with government size, and the product of DC with fiscal decentralization indicator. We use six government size indicators corresponding to our fiscal decentralization indicator. Our first government size indicator is the ratio of total expenditure at central and state or provincial level to GDP (EXPT/GDP). Our second government size indicator is the ratio of current expenditure at central and state or provincial level to GDP (EXPSP&CC/GDP). The ratio of current expenditure at central and local level to GDP is the third government size indicator (EXPCLC/GDP). We also use corresponding revenue based government size indicators with revenue based fiscal decentralization indicators. The ratio of total revenue at central and state or provincial level to GDP is the fourth indicator (REVT/GDP). Fifth government size indicator is the ratio of current revenues at central and state or provincial level to GDP (REVSP&CC/GDP). Lastly, the ratio of current revenues at central and local level to GDP is the sixth indicator (REVCLC/GDP). When we are using GDP growth as a macroeconomic performance indicator, we take another control variable, DD, a dummy for high inflation<sup>16</sup>. The reason for the use of high inflation dummy is just to control fundamental association between economic growth and inflation. By using developed country dummy, we would like to investigate whether developed countries are different than less developed countries with regards to macroeconomic effects of fiscal decentralization and government size. Additionally, in some of the

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<sup>16</sup> The threshold level for D is taken as 0.2, in this study, corresponding to the inflation rate of 20%

regressions we take VISPEXPT, VISPEXPC, VILOCEXPC and relevant revenue counterparts as a control variable to investigate whether there is any association between these variables and macroeconomic performance indicators, in addition to the other fiscal decentralization indicators.

There are two basic frameworks used to generalize the above model (Greene, 1993). The fixed effect approach behaves  $\alpha_i$  as a group specific constant term in the regression model as it take the assumption that the differences across units can be captured in differences in the constant term. Then, our model is (1)

On the other hand, “In the random effects model, the  $\alpha_i$  are treated as random variables rather than fixed constants ”(Maddala, 1992 p575). Specifically, the random effects approach denotes that  $\alpha_i$  is a group specific disturbance. It is different than  $\varepsilon_i$  in a manner that for each group, a disturbance enters the regression identically in each period. Then the model is:

$$E_{it} = \alpha + \beta F_{it} + \gamma C_{it} + u_i + \varepsilon_{it} \quad (2)$$

Regarding these approaches, the question is that, which model should be used? Both models have their own advantages and limitations. In some regressions, we may doubt that  $u_i$  is correlated with some of the explanatory variables. Besides, having omitted variables that are correlated with observed variables leads to omitted variable bias. The fixed effects model rules out this bias. On the other hand, the random effects may suffer from the inconsistency due to omitted variables as it

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per year.

treats individual effects as uncorrelated with the regressors. The disadvantage of fixed effects model is that heterogeneity is actually a random effect (Maddala, 1992). Fortunately, the Hausman test can be used to decide which one to choose (Greene, 1993). The Hausman test is based on the idea that under the hypothesis of no correlation among individual effects, both OLS and GLS are consistent but OLS is inefficient, while under the alternative hypothesis, GLS is not consistent. Therefore, if we reject the null hypothesis, we will use fixed effects approach. Otherwise, we will use random effects approach. The results of the Hausman Tests are available at Table 8. Test results reveal that for majority of the models that take D as dependent variable it is appropriate to use fixed effects approach. On the other hand, for majority of the models that take GDPGR as dependent variable, it is inappropriate to use fixed effect approach. Nevertheless, for twenty out of twenty-four regressions that take DEFGDP as left-hand side variable, it is appropriate to use fixed effects approach.

## CHAPTER 5

### REGRESSION RESULTS

By using our model, we regress each of the three macroeconomic performance indicators on one measure of fiscal decentralization indicator and the control variables at a time. We summarize these results at Table 9 through Table 16. Section 5.1 provides an analysis of regression results, where inflation is dependent variable. The results about budget deficit are available at section 5.2. Finally, section 5.3 provides the findings on the growth.

#### 5.1) Inflation

Table 9 presents the regression results when the expenditure based fiscal decentralization measures are used. In columns under D, results show that fiscal decentralization's impact on inflation is negative at statistically significant levels for developing countries. However this finding is not supported for developed countries, as the coefficients do not imply any relationship at statistically significant levels (read from the sum of the coefficients for respective decentralization indicator and their interaction with the DC dummy)<sup>17</sup>. Additionally, we observe in the second and

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<sup>17</sup> With Wald Test, we test whether the sum of the coefficients of fiscal decentralization and the product of developed country dummy with fiscal decentralization indicator is equal to zero.

third columns that for less developed countries there is a positive association between government size (EXPSP&CC/GDP, EXPCLC/GDP) and inflation. In the third regression that takes EXPloc/CURR as fiscal decentralization indicator, the number of observations is greatest.

Regressions in Table 10 is different than Table 9 in that instead of expenditure based fiscal decentralization indicators, we used revenue based fiscal decentralization indicators and the relevant control variables. The results under D in Table 10 confirm our initial findings about the impact of fiscal decentralization on inflation for developing countries at statistically significant levels. Again, there is not any significant relationship between fiscal decentralization and inflation for developed countries. However, the results indicate that the greater the government revenues with respect to GDP, the lower is inflation in less developed countries.

Regarding the debate on social security and defence expenditures, we also formed additional nine regressions, which are presented at Table 11. Results on the relationship between fiscal decentralization indicators and inflation confirm our previous findings. The coefficients of the fiscal decentralization indicators indicate a negative relationship between fiscal decentralization and inflation for developing countries. Besides, the size effect of government expenditures on inflation is positive at statistically significant levels in developing countries and it is much more in this set of regressions than the set in Table 9.

In Table 12, we modified regressions in Table 9 by adding VISPEXPT, VISPEXPC, and VILOCEXPC (proxies for vertical imbalances) to regressions respectively. Firstly, the results under D are very similar to Table 9 as they indicate



significant association between fiscal decentralization and inflation for only developing countries. Although the coefficients of the proxies are not statistically significant, modification increased the coefficients of fiscal decentralization and consequently, the effect of fiscal decentralization on inflation. In addition, the size effect of government expenditures, in developing countries remains positive and statistically significant for all regressions.

Regressions in Table 13 contain revenue counterparts of the variables in the regressions of Table 12. Like Table 12, regressions point out that there is a statistically significant negative association between decentralization and inflation for developing countries but there is no significant effect of decentralization on inflation for developed countries. The coefficients of the size of government revenues are statistically significant and negative for the first and second columns only. However, we do not observe any significant effect of government revenues with respect to GDP on inflation in the third regression. In this table, for developing countries, coefficient of our proxy for vertical imbalances implies a significant and negative relationship between inflation and state or provincial budget deficit in ratio to state or provincial revenues, whereas we observe a statistically significant positive association between VILOCREVC and inflation. Though the first finding is an anomaly, the latter result is more reliable due to a much larger data set.

Once more, we perform the same set of regressions by excluding social security and defence expenditures from central government expenditures. The results under D in Table 14 are similar to the results in Table 12 with two exceptions. Size effect of government, in developing countries is significant for the second and third

definitions but not for the first definition. Additionally, for all regressions, the coefficients of subnational deficits in ratio to subnational expenditures are statistically significant and imply a positive relationship between proxy for vertical imbalances and inflation.

Table 15 and 16 present the results using proxies of vertical imbalances only (without the rest of the fiscal decentralization indicators). Our measures in Table 15 are expenditure based and the measures in Table 16 are revenue based. The second column under D in Table 15 implies that there is a negative relationship between the ratio of the difference state or provincial total expenditures and revenues to total state or provincial revenues and inflation. On the other hand, the third column points out that the relationship between proxy for vertical imbalances and inflation is negative, as it should be. The results also show that if the local current budget deficit with respect to the current expenditures of local governments is larger, inflation will be higher. Besides, there is a positive association between government size and inflation, as before. In Table 16, results under column 3 show that there is a positive relationship between local current budget deficit with respect to local current revenues and inflation for developing countries. The other proxies of vertical imbalances do not have any significant coefficients. In addition, first and second column under D indicate that the greater the government revenues with respect to GDP in less developed countries, the lower is inflation<sup>18</sup>.

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<sup>18</sup> We also estimate these models by adopting new control variables instead of EXPT/GDP, EXPSP&CC/GDP, EXPCLC/GDP, REVT/GDP, REVSP&CC/GDP, and REVCLC/GDP. Our new control variables contain corresponding subnational expenditures or revenues in nominator instead of total expenditures or revenues and GDP in denominator. The results show that the contradictory result in expenditure-based regressions is carried to revenue based regression results. The aforementioned new control variables are negatively correlated with inflation.

## 5.2) Deficits

As we come to the results of the regressions where DEFGDP is dependent variable, Table 9 indicates that if the fiscal decentralization is greater in developing countries then there will be less budget deficit in those countries. However our results do not show any relationship between fiscal decentralization and budget deficit for developed countries. Besides, the size effect of government expenditures on budget deficit in developing countries is statistically significant and positive for all three regressions.

The regression results in Table 10 under DEFGDP confirm our previous findings about fiscal decentralization's impact on budget deficit in developing countries in column two and three, though, first column shows a positive correlation with a significant sign. Besides, the third column indicates that there is a positive correlation between fiscal decentralization and budget deficit for developed countries. The results in first and second column also imply that the larger are government revenues with respect to GDP in developing countries, the lower are deficits.

When we exclude social security and defence expenditures, for developing countries, negative association between fiscal decentralization and budget deficit remain for the first two columns in Table 11. However, the coefficient of the third regression is not statistically significant. Like Table 9, the coefficients of the size effect of government expenditures imply a positive association with budget deficit for developing countries.

When we add new control variables to regressions in Table 9, as Table 12 presents, regression results under DEFGDP are similar to our initial finding in Table 9, with regards to the association between fiscal decentralization and budget deficit. All three columns show a statistically significant and positive association between fiscal decentralization and budget deficits for developing countries. In addition, however, the effect of fiscal decentralization is now much greater than the former case. Besides, with this addition, first and second column imply that fiscal decentralization has negative association with budget deficits in developed countries as well. Like previous tables, the size effect is statistically significant and positive under DEFGDP. Moreover, the coefficients of VISPEXPC and VILOCEXPC are statistically significant and positive and indicate that there is a positive association between vertical imbalances and budget deficits, in developing countries.

In Table 13, we observe a negative association between fiscal decentralization and budget deficit at statically significant levels for only the results of the third column and for only developing countries. The third column also presents a significant and positive relationship between fiscal decentralization and budget deficits for developed countries. In addition, third column implies a positive association between VILOCREVC and budget deficits for developing countries. On the other hand, the first and second columns indicate a negative association between the size effect of government revenues and budget deficits, like the set under DEFGDP in Table 10.

The results in Table 14 about the association between fiscal decentralization and budget deficit are similar to Table 11. Results indicate that there is negative

association between fiscal decentralization and budget deficits for developing countries and the size effect of government expenditures are positively correlated with budget deficits at statistically significant levels. All three definitions of fiscal decentralization show statistically significant positive association between fiscal decentralization and budget deficits for developing countries. Besides, for developing countries, the results show a positive association between VISPEXPT and budget deficits at statistically significant levels. However, the results indicate contradictory association between fiscal decentralization and budget deficit, for developed countries at statistically significant levels.

Table 15 and Table 16 do not bring much new information on the association between fiscal decentralization and budget deficit. In Table 15, the association between fiscal decentralization and budget deficit is not at statistically significant levels. Like previous results, the size effect of government expenditures is positively associated with budget deficits in developing countries. In Table 16, the results show a contradictory result for developing countries that the coefficient of fiscal decentralization is statistically significant and negative in the first column under DEFGDP but it is statistically significant and positive in the third column. The results in the third column indicate a positive association between fiscal decentralization and budget deficits at statistically significant levels for developed countries. The first and second columns imply that the greater the government revenues with respect to GDP the less is budget deficits, in developing countries<sup>19</sup>.

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<sup>19</sup> With replacement of control variables in Table 15 with the ratio of subnational counterparts to GDP indicate a negative significant coefficient in the second definition and a positive and significant coefficient in the third definition of fiscal decentralization. The results of the table 16 are similar to previous results.

### **5.3) Growth**

When we regress growth in our model, we have most mixed and unexpected results in the whole study. Regression results under GDPGR in Table 9 present that for developing countries, there is a positive association between fiscal decentralization and growth at statistically significant levels for the first two definitions of fiscal decentralization. However, the effect of fiscal decentralization on growth is not statistically significant and positive for developed countries. In addition, the size effect of government expenditures is significant and negative on growth, for developing countries.

In Table 10 that uses revenue-based fiscal decentralization indicators, we have same results with regards to first and second column under GDPGR but, the results of the third column is different then the results in Table 9 as the coefficient of fiscal decentralization indicator for developing countries indicates a negative relationship between fiscal decentralization and growth, which is unexpected. The coefficients of the size of effect variables of government revenues are not significant in these regressions.

Excluding the social security and defence expenditures from central government expenditures leads to further contradictory results. The first and second columns indicate a positive association between fiscal decentralization and growth. On the other hand, the third definition of expenditure based fiscal decentralization implies a negative association between the variables. Moreover, the third column

points out a significant and negative size effect of government expenditures on growth as in Table 9.

Regressions of growth on fiscal decentralization indicators and the relevant control variables, including the proxies of vertical imbalances do not produce any significant results about the association between decentralization and growth generally. In Table 12, the second definition of fiscal decentralization indicator implies that there is a positive association between fiscal decentralization and growth in developing countries. On the other hand, the first and third columns indicate that the greater government expenditures with respect to GDP, the lower is growth. Besides, in Table 12, there is not any significant association between proxies of fiscal decentralization and growth. In Table 13 that uses revenue based fiscal decentralization indicator, the only statistically significant association is between the third definition of fiscal decentralization and growth, in developing countries and the sign is negative. With regards to the association between fiscal decentralization and growth, specifications reported in Table 14, 15, and 16 consistently do not present any significant coefficients<sup>20</sup>.

To sum up, we reach the most expected results when we regress inflation on fiscal decentralization indicator and the relevant control variables. The results of regressions that take budget deficit as the dependent variable are not as robust as in the case of inflation, though they are not as mixed as the results of the regressions that take growth as the dependent variable. The effects of fiscal decentralization on dependent variables are more robust in the expected directions in developing

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<sup>20</sup> Aforementioned replacement of new control variables in regressions where growth is left-hand side variable, do not lead any significant coefficient of fiscal decentralization indicator.

countries than in developed countries. The reason for this difference can be explained as follows: in developed countries economic system is generally more efficient than developing countries, and therefore, it is difficult to explain the macroeconomic performance with fiscal decentralization only. Results show that expenditure and revenue based fiscal decentralization indicators have statistically significant associations with macroeconomic variables. On the other hand, in general, proxies for vertical imbalances are not significantly associated with macroeconomic performance indicators, regardless of whether they are used as fiscal decentralization indicator or control variables. The only exception is that VILOCREVC is positively associated with macroeconomic performance indicators in developing countries.



## CHAPTER 6

### CONCLUSION

Decentralization has become an important policy issue in recent years. International organizations allocate more space for fiscal decentralization in their agenda. There are vast amount of studies that emphasizes the benefits of decentralization, whereas there are also some studies that attempt to highlight deficiencies of decentralization, especially based on developing country experiences with decentralization. There are, however, examples of successful and unsuccessful implementations of decentralization in developing world.

In view of the opposing arguments and real life examples about fiscal decentralization, we search for empirical evidence on the effects of fiscal decentralization on macroeconomic performance. Hence, our empirical findings contribute to the literature on fiscal decentralization, as there is little explicit empirical analysis on this.

Based on the existing literature, we anticipate that, with a good policy design, fiscal decentralization can provide powerful incentives for good macroeconomic performance such as low inflation, budget balance and persistent growth. In this study, we examine the association between fiscal decentralization indicators and macroeconomic performance by using a panel data on up to fifty-nine

countries and up to twenty-eight years. From the results of the regressions, we observe that for developing countries there is clear negative association between fiscal decentralization, both expenditure and revenue types, and inflation. This means that by introducing fiscal decentralization in developing countries, inflation level may be reduced provided that overall government expenditure size is not large and government revenue size is large. Our regressions do not imply any significant association between fiscal decentralization and inflation for developed countries.

Although not very robust, the association between fiscal decentralization and budget deficit for developing countries is observed to be negative for most of the regressions. There are two unexpected coefficients that show a positive association between two variables. Reasonable explanation for this unexpected result may be the improper design of the decentralization and loss of economies of scale that prevent efficiency gains of decentralization on budget in developing countries. For developed countries, the association between fiscal decentralization and budget deficit is not clear. Also, as expected, the size effect of government expenditures on budget deficit is positive and the size effect of government revenues is negative at statistically significant levels in developing countries.

Our most ambiguous or unexpected empirical results are in regards to the relationship between fiscal decentralization and GDP growth. For developing countries, the results show ambiguous association. The observation of negative relationship between fiscal decentralization and GDP growth can be explained as the loss of economies of scale argument. As stated before, decentralization may not always be efficient, especially for standardized, routine, network based services,

since it can result in the loss of economies of scale and of loss control over scarce financial resources by the central government. Besides, our regressions do not imply any significant association between fiscal decentralization and growth for developed countries. Although the size effect of government revenues on growth is insignificant, the size effect of government expenditures on government revenues is negative and statistically significant for developing countries.

The general conclusion is that fiscal decentralization may lead to desirable macroeconomic effects, especially in developing countries. Nevertheless, as we have reviewed, the design of the fiscal decentralization is important. The possible reasons for the unexpected results may depend on the deficiencies in the design of decentralization.

Finally, we concede that our results are suggestive rather than conclusive due to data inadequacies. Data limitations prevent us from analysing an important fiscal decentralization indicator, vertical imbalances, which is the ratio of intergovernmental transfers to total tax revenue of subnational governments, properly. As the topic is interesting and open to debate, there is more room for further research empirically, especially on the relationship between fiscal decentralization and sectoral issues.

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## **APPENDICES**

## APPENDIX 1: Data Source and Descriptions

<b>Abbreviation</b>	<b>Description</b>	<b>Source</b>
D	Normalized rate of inflation (inflation rate/ (1+inflation rate))	GFS, IMF
DC	Dummy for developed countries	GFS, IMF
DEFGDP	Overall budget deficits / GDP	GFS, IMF
EXPcl/GDP	Current Government Expenditure (Central + Local) / GDP	GFS, IMF
EXPloc/CURR	Current Expenditure by Local Governments/ Current Government Expenditure (Central + Local)	GFS, IMF
EXPs&p/CURR	Current Expenditure by State and Provincial Governments/ Current Government Expenditure (Central + State and Provincial)	GFS, IMF
EXPs&p/TOT	Total Expenditure by State and Provincial Governments/ Total Government Expenditure (Central + State and Provincial)	GFS, IMF
EXPsp&cc/GDP	Current Government Expenditure (Central + State and Provincial) / GDP	GFS, IMF
EXPt/ GDP	Total Government Expenditure (Central + State and Provincial) / GDP	GFS, IMF
GDPgr	Rate of growth in real GDP	GFS, IMF
REVcl/GDP	Current Government Revenue (Central + Local) / GDP	GFS, IMF
REVloc/CURR	Current Revenue by Local Governments/ Current Government Revenue (Central + Local)	GFS, IMF
REVs&p/CURR	Current Revenue by State and Provincial Governments/ Current Government Revenue (Central + State and Provincial)	GFS, IMF
REVs&p/TOT	Total Revenue by State and Provincial Governments/ Total Government Revenue (Central + State and Provincial)	GFS, IMF
REVsp&cc/GDP	Current Government Revenue (Central + State and Provincial) / GDP	GFS, IMF
REVT/ GDP	Total Government Revenue (Central + State and Provincial) / GDP	GFS, IMF
VILOCEXP	(Current Expenditure by Local Governments- Current Revenue by Local Governments) / Current Expenditure by Local Governments	GFS, IMF
VILOCREVC	(Current Expenditure by Local Governments- Current Revenue by Local Governments) / Current Revenue by Local Governments	GFS, IMF
VISPEXP	(Current Expenditure by State and Provincial Governments- Current Revenue by State and Provincial Governments) / Current Expenditure by State and Provincial Governments	GFS, IMF
VISPEXPT	(Total Expenditure by State and Provincial Governments- Total Revenue by State and Provincial Governments) / Total Expenditure by State and Provincial Governments	GFS, IMF
VISPREVC	(Current Expenditure by State and Provincial Governments- Current Revenue by State and Provincial Governments) / Current Revenue by State and Provincial Governments	GFS, IMF
VISPREVT	(Total Expenditure by State and Provincial Governments- Total Revenue by State and Provincial Governments) / Total Revenue by State and Provincial Governments	GFS, IMF

## APPENDIX 2: Correlation Matrix



Correlations among the fiscal decentralization indicators used in the analysis

	EXPs&p/TOT	EXPs&p/CURR	EXPloc/CURR	REVs&p/TOT	REVs&p/CURR	REVloc/CURR	VISPEXPT	VISPEXPC	VILOCEXPC	VISPREVT	VISPREVC	VILOCREVC
<b>EXPs&amp;p/TOT</b>	1											
<b>EXPs&amp;p/CURR</b>	0,99	1										
<b>EXPloc/CURR</b>	0,47	0,52	1									
<b>REVs&amp;p/TOT</b>	0,93	0,89	0,56	1								
<b>REVs&amp;p/CURR</b>	0,90	0,89	0,60	0,99	1							
<b>REVloc/CURR</b>	0,38	0,38	0,91	0,46	0,45	1						
<b>VISPEXPT</b>	-0,32	-0,20	-0,31	-0,60	-0,60	-0,29	1					
<b>VISPEXPC</b>	-0,02	0,07	-0,05	-0,32	-0,32	-0,09	0,85	1				
<b>VILOCEXPC</b>	0,26	0,34	0,29	0,32	0,35	-0,03	-0,18	0,11	1			
<b>VISPREVT</b>	-0,23	-0,18	-0,19	-0,44	-0,48	-0,19	0,70	0,58	-0,05	1		
<b>VISPREVC</b>	-0,17	-0,13	-0,18	-0,44	-0,44	-0,17	0,68	0,58	-0,03	0,99	1	
<b>VILOCREVC</b>	0,13	0,28	0,16	0,21	0,35	-0,18	-0,24	0,01	0,82	-0,11	-0,10	1

## APPENDIX 3: Tables

Table 1: Data Coverage for each Country

	EXPs&p/TOT	EXPs&p/TOT	EXPlOc/TOT	REVs&p/TOT	REVs&p/TOT	REVIoc/TOT
Argentina	1979-1998	1979-1998	na	1979-1998	1979-1998	na
Australia	1972-1999	1972-1998	1980-1999	1972-1999	1980-1999	1980-1999
Austria	1972-1999	1972-1999	1980-1999	1972-1999	1980-1999	1980-1999
Belgium	1986-1989	1986-1989	1980-1998	1986-1989	1986-1989	1980-1989
Bolivia	1986-1998	1986-1998	1985-1998	1985-1998	1985-1998	1985-1998
Brazil*	1972-1978&1980-1998	1980-1998	1980-1998	1980-1998	1980-1998	1980-1998
Burkina Faso	1977	na	na	1977	na	na
Canada	1974-1997	1979-1997	1980-1997	1974-1997	1980-1997	1980-1997
Chile	na	na	1980-1988&1992-2000	na	na	1980-1988&1992-2000
Colombia	1974-1986	1974-1986	1980-1986	1974-1986	1980-1986	1980-1986
Costa Rica	na	na	1980-2000	na	na	1980-2000
Denmark	na	na	1980-2000	na	na	1980-2000
Dominican Republic	na	na	1983-1996	na	na	1980-1996
Ethiopia	na	na	1980-1981	na	na	1980-1988
Finland	na	na	1980-1998	na	na	1980-1998
France	1982-1984	na	1980-1997	na	na	1980-1997
Gambia, The	na	na	1980-1982	na	na	1980-1982
Germany	1973-1998	1974-1998	1980-1998	1973-1998	1980-1998	1980-1998
Greece	na	na	1980-1982	na	na	1980-1982
Guatemala	na	na	1980-1982	na	na	1980-1982
Iceland	na	na	1980-1998	na	na	1980-1998
India	1974-1997	1974-1997	1980-1982	1974-1997	1980-1997	1984-1987
Indonesia	1975-1993	1975-1993	1980-1989&1994-1998	1975-1993	1980-1993	1980-1989&1994-1998
Iran, Islamic Rep.	1972-1990	1972-1990	1980-1989	1972-1990	1980-1990	1980-1989
Ireland	na	na	1980-1997	na	na	1980-1997
Israel	na	na	1980-1996	na	na	1980-1996
Italy	na	na	1985-1989&1995-1999	na	na	1985-1989&1995-1999
Japan	na	na	na	na	na	na
Korea, Rep.	1972-1978	1977-1978	na	1972-1978	na	na
Luxembourg**	na	na	1980-1997	na	na	1980-1997
Madagascar	na	na	1980-1982	n	na	1980-1982
Malaysia	1972-1997	1985-1997	1981-1997	1972-1997	1991-1997	1985
Mauritius	na	na	1987-1999	na	na	1980-1985&1987-1999
Mexico	1972-1998	1972-1998	1980-1998	1972-1998	1980-1998	1980-1998
Mongolia	na	na	1992-1998	na	na	1992-1999
Netherlands	1987-1989	na	1980-1997	1987-1989	na	1980-1997
Netherlands Antilles	1972&1974-1978	na	1980-1995	1972&1974-1978	na	1980-1995
Nicaragua	na	na	1988-1993&1995	na	na	1988-1993&1995
Norway	na	na	1980-1998	na	na	1980-1998
Pakistan	1975-1979	1977-1978	na	1975-1979	na	na
Panama	na	na	1980-1994	na	na	1980-1994
Paraguay	na	na	1980&1984-1993	na	na	1980&1984-1993
Peru	1972-1977&1990-1999	1990-1999	1990-1999	1972-1977&1990-1999	1990-1999	1990-1999
Portugal	1977&1987-1998	1987-1998	1987-1998	1977&1987-1998	1987-1998	1987-1998
South Africa	1973&1977-1999	1977-1999	1980-1999	1973&1977-1999	1980-1999	1980-1999
Spain	1972-1997	1977-1997	1980-1997	1972-1997	1980-1997	1980-1997
Sri Lanka	1973	na	1982-1986	1973	na	1980-1986
Sweden	na	na	1980-1999	na	na	1980-1999
Switzerland	1972-1984&1991-1998	1972-1984&1991-1998	1980-1984&1991-1998	1972-1984&1991-1998	1980-1984&1991-1998	1980-1984&1991-1998
Thailand	1989	na	1980-2000	1989	na	1980-2000
Trinidad and Tobago	na	na	1993-1995	na	na	1981-1982&1993-1995
Tunisia	1974	na	1981-1982	1974	na	1981-1982
Turkey	1974-1975	na	na	1974-1975	na	na
United Kingdom	na	na	1980-1998	na	na	1980-1998
United States	1972-1998	1980-1998	1980-1998	1972-1998	1980-1998	1980-1998
Uruguay	na	na	1989-1997	na	na	na
Venezuela	1972-1985	na	na	1979-1985	na	na
Zambia	na	na	1980	na	na	1980
Zimbabwe	na	na	1980-1991	na	na	1980-1991

\* for the years 1995-1996 data is not available

\*\* for the year 1989 data is not available

Table 2: Rankings of the Countries with respect to Fiscal Decentralization of Government Expenditures (1972-2000)

Sorted by:	<u>EXPs&amp;p/TOT</u>		<u>EXPs&amp;p/CURR</u>		<u>EXPIoc/CURR</u>
Netherlands Antilles	0,65	Canada	0,48	Netherlands Antilles	0,62
Turkey	0,51	India	0,42	Denmark	0,44
Canada	0,49	Australia	0,36	Finland	0,38
India	0,45	Argentina	0,35	Sweden	0,36
Switzerland	0,38	Switzerland	0,35	Mongolia	0,35
Argentina	0,38	United States	0,29	Norway	0,29
Australia	0,38	Pakistan	0,28	Canada	0,28
Germany	0,30	Germany	0,28	Switzerland	0,28
United States	0,30	Colombia	0,25	United States	0,27
Pakistan	0,29	Brazil	0,25	Ireland	0,24
Peru	0,26	Korea, Rep.	0,21	Netherlands	0,23
Brazil	0,25	South Africa	0,18	United Kingdom	0,23
Colombia	0,23	Mexico	0,17	Italy	0,22
Korea, Rep.	0,19	Indonesia	0,16	Zimbabwe	0,20
Mexico	0,19	Austria	0,15	Iceland	0,20
South Africa	0,18	Peru	0,12	Germany	0,19
Malaysia	0,17	Malaysia	0,11	Austria	0,17
Austria	0,16	Spain	0,10	France	0,14
France	0,15	Bolivia	0,10	Spain	0,13
Bolivia	0,15	Portugal	0,02	Brazil	0,12
Indonesia	0,12	Belgium	0,00	Belgium	0,12
Spain	0,10	Iran, Islamic Rep.	0,00	Israel	0,11
Portugal	0,02			Luxembourg	0,10
Belgium	0,00	<b>Average</b>	<b>0,21</b>	Uruguay	0,09
Burkina Faso	0,00			South Africa	0,09
Iran, Islamic Rep.	0,00			Colombia	0,09
Netherlands	0,00			Nicaragua	0,07
Sri Lanka	0,00			Bolivia	0,07
Thailand	0,00			Peru	0,07
Tunisia	0,00			Chile	0,06
Venezuela, RB	0,00			Australia	0,06
				Zambia	0,06
<b>Average</b>	<b>0,20</b>			Portugal	0,06
				Thailand	0,05
				Trinidad and	0,05
				Sri Lanka	0,04
				Mauritius	0,04
				Greece	0,04
				Mexico	0,04
				Iran, Islamic Rep.	0,04
				Gambia, The	0,03
				Madagascar	0,03
				Tunisia	0,03
				Guatemala	0,03
				Dominican Republic	0,03
				Malaysia	0,03
				Costa Rica	0,03
				Indonesia	0,02
				Panama	0,02
				Paraguay	0,02
				Ethiopia	0,01
				India	0,00
				<b>Average</b>	<b>0,13</b>

Note: Time coverages of countries are not uniform. For instance. data on Turkey refers only to years 1974 and 1975.

Table 3 : Country Averages per year, Developed Country Sample Only:

	<u>EXPs&amp;p/TOT</u>	<u>EXPs&amp;p/CURR</u>	<u>EXPlloc/CURR</u>	<u>REVs&amp;p/TOT</u>	<u>REVs&amp;p/CURR</u>	<u>REVloc/CURR</u>
1972	0,25	0,28	na	0,18	na	na
1973	0,27	0,29	na	0,20	na	na
1974	0,30	0,29	na	0,23	na	na
1975	0,29	0,29	na	0,23	na	na
1976	0,29	0,28	na	0,23	na	na
1977	0,29	0,23	na	0,24	na	na
1978	0,29	0,23	na	0,24	na	na
1979	0,29	0,27	na	0,24	na	na
1980	0,29	0,27	0,23	0,23	0,23	0,17
1981	0,29	0,28	0,23	0,23	0,23	0,17
1982	0,27	0,28	0,23	0,23	0,23	0,17
1983	0,27	0,28	0,23	0,24	0,24	0,18
1984	0,27	0,27	0,23	0,24	0,24	0,18
1985	0,28	0,27	0,22	0,23	0,23	0,16
1986	0,24	0,23	0,22	0,20	0,20	0,16
1987	0,22	0,24	0,22	0,17	0,20	0,16
1988	0,30	0,29	0,23	0,24	0,24	0,17
1989	0,22	0,24	0,23	0,18	0,20	0,17
1990	0,30	0,29	0,22	0,24	0,24	0,16
1991	0,31	0,30	0,23	0,25	0,25	0,17
1992	0,32	0,30	0,23	0,25	0,25	0,18
1993	0,32	0,30	0,24	0,25	0,25	0,17
1994	0,32	0,30	0,23	0,25	0,25	0,17
1995	0,32	0,30	0,23	0,26	0,25	0,17
1996	0,32	0,30	0,22	0,25	0,25	0,17
1997	0,33	0,31	0,22	0,26	0,25	0,16
1998	0,31	0,29	0,24	0,25	0,24	0,19
1999	0,30	0,18	0,24	0,20	0,20	0,20
2000	na	na	0,45	na	na	0,34
<b>Ave. of 70's</b>	<b>0,28</b>	<b>0,27</b>	<b>na</b>	<b>0,22</b>	<b>na</b>	<b>na</b>
<b>Ave. of 80's</b>	<b>0,27</b>	<b>0,26</b>	<b>0,23</b>	<b>0,22</b>	<b>0,22</b>	<b>0,17</b>
<b>Ave. of 90's</b>	<b>0,31</b>	<b>0,29</b>	<b>0,23</b>	<b>0,25</b>	<b>0,24</b>	<b>0,18</b>

Note: Country coverages are not the same over time and across different indicators.

Table 4: Country Averages per year, Developing Country Sample Only:

	<u>EXPs&amp;p/TOT</u>	<u>EXPs&amp;p/CURR</u>	<u>EXPIloc/CURR</u>	<u>REVs&amp;p/TOT</u>	<u>REVs&amp;p/CURR</u>	<u>REVIloc/CURR</u>
1972	0,21	0,13	na	0,24	na	na
1973	0,16	0,14	na	0,15	na	na
1974	0,26	0,24	na	0,26	na	na
1975	0,27	0,20	na	0,26	na	na
1976	0,26	0,20	na	0,24	na	na
1977	0,22	0,21	na	0,19	na	na
1978	0,23	0,21	na	0,18	na	na
1979	0,19	0,20	na	0,14	na	na
1980	0,19	0,19	0,08	0,13	0,14	0,07
1981	0,20	0,21	0,07	0,14	0,15	0,07
1982	0,18	0,20	0,08	0,13	0,14	0,07
1983	0,19	0,21	0,10	0,13	0,15	0,08
1984	0,20	0,21	0,10	0,13	0,15	0,08
1985	0,18	0,19	0,09	0,11	0,11	0,08
1986	0,19	0,17	0,10	0,13	0,13	0,09
1987	0,17	0,15	0,09	0,12	0,11	0,08
1988	0,18	0,16	0,09	0,15	0,15	0,08
1989	0,16	0,16	0,09	0,13	0,15	0,09
1990	0,17	0,15	0,09	0,13	0,13	0,08
1991	0,21	0,19	0,09	0,15	0,15	0,09
1992	0,20	0,19	0,11	0,15	0,15	0,11
1993	0,20	0,19	0,10	0,15	0,15	0,09
1994	0,25	0,24	0,11	0,19	0,19	0,09
1995	0,23	0,22	0,11	0,15	0,15	0,10
1996	0,24	0,23	0,08	0,14	0,14	0,07
1997	0,26	0,25	0,09	0,16	0,16	0,08
1998	0,22	0,21	0,10	0,10	0,10	0,08
1999	0,21	0,20	0,10	0,03	0,03	0,09
2000	na	na	0,05	na	na	0,06
<b>Ave.of 70's</b>	<b>0,21</b>	<b>0,17</b>	<b>na</b>	<b>0,22</b>	<b>na</b>	<b>na</b>
<b>Ave.of 80's</b>	<b>0,18</b>	<b>0,17</b>	<b>0,09</b>	<b>0,13</b>	<b>0,13</b>	<b>0,08</b>
<b>Ave.of 90's</b>	<b>0,22</b>	<b>0,21</b>	<b>0,10</b>	<b>0,14</b>	<b>0,14</b>	<b>0,09</b>

Note: Country coverages are not the same over time and across different indicators.

Table 5: Rankings of the Countries, when we exclude Social Security and Defence Expenditures (1972-2000)

Sorted by:	<u>EXPs&amp;p/TOT</u>		<u>EXPs&amp;p/CURR</u>		<u>EXPloc/CURR</u>
Canada	0,65	Canada	0,63	Denmark	0,59
Switzerland	0,60	Switzerland	0,60	Sweden	0,55
Argentina	0,54	Argentina	0,52	Finland	0,53
Australia	0,50	Australia	0,50	Guatemala	0,52
United States	0,47	United States	0,46	Switzerland	0,49
Pakistan	0,38	Pakistan	0,41	Mongolia	0,48
Brazil	0,36	Korea, Rep.	0,35	Norway	0,45
Germany	0,34	Brazil	0,33	United States	0,42
Korea, Rep.	0,27	Germany	0,32	Canada	0,38
France	0,26	Colombia	0,29	Netherlands	0,35
Austria	0,26	Austria	0,26	United Kingdom	0,35
Colombia	0,25	Mexico	0,22	Italy	0,31
Bolivia	0,25	Spain	0,21	Ireland	0,29
Mexico	0,23	Bolivia	0,21	Austria	0,26
Spain	0,22	Malaysia	0,13	Germany	0,25
Malaysia	0,20	Belgium	0,00	Spain	0,24
South Africa	0,19	Iran, Islamic Rep.	0,00	Luxembourg	0,24
Belgium	0,00	<b>Average</b>	<b>0,32</b>	Zimbabwe	0,23
Burkina Faso	0,00			Uruguay	0,22
Iran, Islamic Rep.	0,00			France	0,22
Netherlands	0,00			Iceland	0,21
Sri Lanka	0,00			Israel	0,16
Thailand	0,00			Bolivia	0,16
Tunisia	0,00			Australia	0,16
Venezuela, RB	0,00			Belgium	0,15
<b>Average</b>	<b>0,24</b>			Indonesia	0,14
				Brazil	0,14
				Chile	0,14
				Colombia	0,12
				Thailand	0,09
				South Africa	0,09
				Nicaragua	0,08
				Greece	0,06
				Sri Lanka	0,06
				Mauritius	0,06
				Tunisia	0,06
				Trinidad and Tobago	0,06
				Dominican Republic	0,05
				Mexico	0,05
				Iran, Islamic Rep.	0,05
				Paraguay	0,04
				Malaysia	0,04
				Gambia, The	0,03
				Costa Rica	0,03
				Panama	0,03
				Ethiopia	0,02
				<b>Average</b>	<b>0,21</b>

Note: Time coverages of countries are not uniform.

Table 6: Country Averages per year, Developed Country Sample Only, when we exclude Social Security and Defence Expenditures:

	<u>EXPs&amp;p/TOT EXPs&amp;p</u>	<u>CURR EXPloc/CURR REVloc</u>	<u>EXPs&amp;p/TOT REVs&amp;p</u>	<u>CURR EXPloc/CURR REVloc</u>	<u>EXPs&amp;p/TOT EXPs&amp;p</u>	<u>CURR EXPloc/CURR REVloc</u>
1972	0,49	0,45	na	0,18	na	na
1973	0,55	0,48	na	0,20	na	na
1974	0,49	0,43	na	0,23	na	na
1975	0,48	0,43	na	0,23	na	na
1976	0,47	0,41	na	0,23	na	na
1977	0,47	0,42	na	0,24	na	na
1978	0,47	0,42	na	0,24	na	na
1979	0,47	0,46	na	0,24	na	na
1980	0,40	0,40	0,35	0,23	0,23	0,17
1981	0,41	0,41	0,35	0,23	0,23	0,17
1982	0,40	0,42	0,36	0,23	0,23	0,17
1983	0,40	0,43	0,35	0,24	0,24	0,18
1984	0,39	0,41	0,34	0,24	0,24	0,18
1985	0,38	0,38	0,36	0,23	0,23	0,16
1986	0,37	0,37	0,32	0,20	0,20	0,16
1987	0,39	0,38	0,33	0,17	0,20	0,16
1988	0,39	0,38	0,33	0,24	0,24	0,17
1989	0,40	0,39	0,33	0,18	0,20	0,17
1990	0,49	0,49	0,37	0,24	0,24	0,16
1991	0,45	0,45	0,34	0,25	0,25	0,17
1992	0,44	0,43	0,33	0,25	0,25	0,18
1993	0,44	0,43	0,33	0,25	0,25	0,17
1994	0,44	0,43	0,32	0,25	0,25	0,17
1995	0,45	0,44	0,31	0,26	0,25	0,17
1996	0,45	0,44	0,31	0,25	0,25	0,17
1997	0,40	0,39	0,29	0,26	0,25	0,16
1998	0,36	0,35	0,31	0,25	0,24	0,19
1999	0,53	0,59	0,64	0,20	0,20	0,20
2000	na	na	0,46	na	na	0,34
<b>Ave. of 70's</b>	<b>0,49</b>	<b>0,44</b>	<b>na</b>	<b>0,22</b>	<b>na</b>	<b>na</b>
<b>Ave. of 80's</b>	<b>0,39</b>	<b>0,40</b>	<b>0,34</b>	<b>0,22</b>	<b>0,22</b>	<b>0,17</b>
<b>Ave. of 90's</b>	<b>0,45</b>	<b>0,44</b>	<b>0,36</b>	<b>0,25</b>	<b>0,24</b>	<b>0,18</b>

Note: Country coverages are not the same over time and across different indicators.



Table 7: Country Averages per year, Developing Country Sample Only, when we exclude Social Security and Defence Expenditures:

	<u>EXPs&amp;p/TOT</u>	<u>EXPs&amp;p/CURR</u>	<u>EXPIoc/CURR</u>	<u>REVs&amp;p/TOT</u>	<u>REVs&amp;p/CURR</u>	<u>REVIoc/CURR</u>
1972	0,37	0,36	na	0,24	na	na
1973	0,32	0,39	na	0,15	na	na
1974	0,39	0,36	na	0,26	na	na
1975	0,35	0,27	na	0,26	na	na
1976	0,34	0,27	na	0,24	na	na
1977	0,31	0,29	na	0,19	na	na
1978	0,31	0,29	na	0,18	na	na
1979	0,26	0,24	na	0,14	na	na
1980	0,27	0,25	0,16	0,13	0,14	0,07
1981	0,28	0,29	0,15	0,14	0,15	0,07
1982	0,27	0,28	0,15	0,13	0,14	0,07
1983	0,28	0,29	0,12	0,13	0,15	0,08
1984	0,29	0,30	0,12	0,13	0,15	0,08
1985	0,35	0,34	0,18	0,11	0,11	0,08
1986	0,24	0,22	0,12	0,13	0,13	0,09
1987	0,22	0,19	0,12	0,12	0,11	0,08
1988	0,23	0,21	0,11	0,15	0,15	0,08
1989	0,23	0,21	0,11	0,13	0,15	0,09
1990	0,22	0,19	0,15	0,13	0,13	0,08
1991	0,25	0,23	0,17	0,15	0,15	0,09
1992	0,24	0,23	0,18	0,15	0,15	0,11
1993	0,25	0,24	0,18	0,15	0,15	0,09
1994	0,28	0,27	0,15	0,19	0,19	0,09
1995	0,27	0,26	0,15	0,15	0,15	0,10
1996	0,28	0,28	0,13	0,14	0,14	0,07
1997	0,31	0,31	0,14	0,16	0,16	0,08
1998	0,29	0,28	0,13	0,10	0,10	0,08
1999	0,23	0,23	0,12	0,03	0,03	0,09
2000	na	na	0,05	na	na	0,06
<b>Ave.of 70's</b>	<b>0,33</b>	<b>0,31</b>	<b>na</b>	<b>0,22</b>	<b>na</b>	<b>na</b>
<b>Ave.of 80's</b>	<b>0,27</b>	<b>0,26</b>	<b>0,13</b>	<b>0,13</b>	<b>0,13</b>	<b>0,08</b>
<b>Ave.of 90's</b>	<b>0,26</b>	<b>0,25</b>	<b>0,15</b>	<b>0,14</b>	<b>0,14</b>	<b>0,09</b>

Note: Country coverages are not the same over time and across different indicators.

Table 8: Hausman Tests for Fixed versus Random Effects (Chi-square)

	<u>D</u>			<u>DEFGDP</u>			<u>GDPGR</u>		
	<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>
Expenditure models (in Table 9):	56,99*** (0.000)	33,41*** (0.000)	5,58* (0.061)	7,16** (0.027)	4,08 (0.130)	8,29** (0.016)	0,51 (0.774)	2,29 (0.318)	9,79*** (0.007)
Revenue models (in Table 10):	5,75* (0.056)	32,52*** (0.000)	40,75*** (0.000)	8,84** (0.012)	8,17** (0.017)	28,44*** (0.000)	0,7 (0.704)	1,32 (0.518)	3,55 (0.169)
Expenditure models (in Table 11):	44.32*** (0.000)	35.76*** (0.000)	11,33*** (0.006)	5,22* (0.063)	3,96 (0.154)	9,18** (0.012)	0,49 (0.777)	2.12 (0.396)	10.04*** (0.006)
Expenditure models (in Table 12):	5.57* (0.061)	14.05*** (0.000)	27.11*** (0.000)	14.97*** (0.000)	41.40*** (0.000)	24.22*** (0.000)	1.98 (0.370)	1.00 (0.607)	4.41* (0.094)
Revenue models (in Table 13):	6.35** (0.041)	30.13*** (2.864)	30.89*** (0.000)	5.67* (0.058)	8.90** (0.011)	11.85*** (0.003)	1.56 (0.457)	0.05 (0.976)	4.28 (0.117)
Expenditure models (in Table 14):	39.62*** (0.000)	42.50*** (0.000)	4.78* (0.091)	6.58** (0.037)	2.79 (0.247)	3.89 (0.142)	1.27 (0.528)	1.16 (0.559)	1.49 (0.475)
Expenditure models (in Table 15):	0.56 (0.755)	0.57 (0.751)	2.49 (0.288)	11.68*** (0.002)	6.94** (0.031)	5.79* (0.055)	1.62 (0.444)	2.95 (0.229)	1.30 (0.522)
Revenue models (in Table 16):	6.92** (0.031)	23.19*** 0.000	1.59 (0.450)	5.00* (0.08)	8.07** (0.018)	25.03*** (0.000)	2.40 (0.300)	1.54 (0.463)	3.74 (0.153)

Note: Numbers in the parentheses are the p-values.

\*\*\* Indicates significance at 1% level , \*\* indicates significance at 5% level, and \* indicates significance at 10% level.

Table 9: Expenditure Based Fiscal Decentralization Indicators with Social Security and Defence Expenditures

Dependent Variable:	D			DEFGDP			GDPGR		
	1	2	3	1	2	3	1	2	3
<u>Explanatory variables:</u>									
Constant:					-0,42 (-0.77)		5,57*** (7.70)	5,28*** (7.38)	
EXPs&p/TOT	-0,69*** (-5.28)			-6,81** (-2.41)			3,63** (2.33)		
EXPt/GDP	0,16 (1.03)			25,55*** (7.35)			-5,21** (-2.14)		
EXPs&p/CURR		-1,30*** (-7.37)			0,64 (0.46)			4,79** (2.54)	
EXPs&p/cc/GDP		0,36** (1.99)			17,70*** (9.11)			-7,34*** (-2.81)	
EXPlc/CURR			-1,51*** (-4.83)			-49,56*** (-2.61)			-17,67 (-1.31)
EXPlc/GDP			0,92*** (8.51)			93,94*** (14.41)			-12,43*** (-2.87)
DC*(EXPs&p/TOT)	0,61* (1.87)			-4,89 (-0.67)			-5,29** (-2.22)		
DC*(EXPt/GDP)	-0,54** (-2.08)			-9,01 (-1.55)			-1,17 (-0.58)		
DC*(EXPs&pCURR)		1,09*** (2.64)			-7,86*** (-3.72)			-6,46** (-2.29)	
DC*(EXPs&pcc/GDP)		-0,75** (-2.53)			-2,79 (-1.53)			0,93 (0.38)	
DC*(EXPlc/CURR)			1,62*** (2.97)			34,49 (1.03)			7,55 (0.47)
DC*(EXPlc/GDP)			-1,27*** (-6.38)			-42,90*** (-3.57)			-8,59 (-1.50)
DD							-3,42*** (-6.06)	-3,07*** (-5.20)	-2,07*** (-4.14)
R-bar square	0,06	0,14	0,15	0,13	0,24	0,29	0,12	0,13	0,08
# of observations	431	359	668	416	341	656	429	354	658
F-test for decentralization	0,08	0,31	0,06	0,27	0,58	0,37	1,12	1,23	0,36

Notes:

1) Columns 1 to 3 indicate the use of different decentralization indicators: the share of state or provincial governments in total expenditures, the share of state or provincial governments' current expenditures in total current expenditures and the share of local governments' current expenditure in total current expenditures, respectively.

2) \*, \*\*, \*\*\* represent 10%, 5%, and 1% significance level, respectively.

3) The numbers in brackets are t-statistics.

4) Variable descriptions can be found in the Appendix 1.

Table 10: Revenue Based Fiscal Decentralization Indicators

Dependent Variable:	D			DEFGDP			GDPGR		
	1	2	3	1	2	3	1	2	3
<u>Explanatory variables:</u>									
Constant:							4.33***	3.41***	3.81***
							(6.08)	(3.75)	(8.42)
REVs&p/TOT	-0.38***			7.47**			4.68***		
	(-2.92)			(2.09)			(2.62)		
REVt/GDP	-0.51***			-18.43***			-0,54		
	(-2.61)			(-3.37)			(-0.19)		
REVs&p/CURR		-0.63**			-15.34*			4.72**	
		(-2.03)			(-1.76)			(2.16)	
REVsp&cc/GDP		-3.13***			-34.95***			2,11	
		(-7.42)			(-2.93)			(0.57)	
REVloc/CURR			-3.28***			-146.83***			-8.63***
			(-8.63)			(-6.14)			(-3.56)
REVclc/GDP			-0,16			17,40			3,11
			(-0.80)			(1.29)			(1.60)
DC*(REVs&p/TOT)	-0,11			2,07			-6.10**		
	(-0.21)			(0.14)			(-2.33)		
DC*(REVt/GDP)	-0,04			21.49*			-3.89*		
	(-0.09)			(1.93)			(-1.77)		
DC*(REVs&pCURR)		0,05			24,32			-5.19*	
		(0.06)			(1.08)			(-1.66)	
DC*(REVsp&cc/GDP)		2.50***			6,36			-4.85*	
		(3.28)			(0.29)			(-1.85)	
DC*(REVloc/CURR)			3.51***			187.95***			5.54*
			(6.04)			(4.87)			(1.69)
DC*(REVclc/GDP)			-0.61*			-32,2			-4.76***
			(-1.74)			(-1.35)			(-2.91)
DD							-3.55***	-3.56***	-3.03***
							(-6.22)	(-5.68)	(-6.95)
R-bar square	0,06	0,18	0,10	0,02	0,04	0,06	0,11	0,11	0,09
# of observations	422	289	675	405	278	659	418	284	664
F-test for decentralization	0.98	0.66	0.26	0.49	0.16	9.43***	1.69	0.23	0.71

Notes:

1) Columns 1 to 3 indicate the use of different decentralization indicators: the share of state or provincial governments in total revenues, the share of state or provincial governments' current revenues in total current revenues and the share of local governments' current revenues in total current revenues, respectively.

2) \*, \*\*, \*\*\* represent 10%, 5%, and 1% significance level, respectively.

3) The numbers in brackets are t-statistics.

4) Variable descriptions can be found in the Appendix 1.

Table 11: Expenditure Based Fiscal Decentralization Indicators without Social Security and Defence Expenditures

Dependent Variable:	D			DEFGDP			GDPGR		
	1	2	3	1	2	3	1	2	3
<u>Explanatory variables:</u>									
Constant:					1.83*** (3.09)		3.09*** (3.92)	3.06*** (3.87)	
EXPs&p/TOT	-1.26*** (-7.25)			-20.34*** (-4.58)			5.11*** (2.91)		
EXPt/GDP	0.29 (1.35)			26.72*** (4.96)			3.99 (1.11)		
EXPs&p/CURR		-1.12*** (-7.48)			-5.72*** (-4.33)			3.87** (2.07)	
EXPs&p&cc/GDP		0.62** (2.41)			22.72*** (7.52)			4.78 (1.09)	
EXPlc/CURR			-1.30*** (-4.49)			5.06 (0.23)			-24.18** (-2.41)
EXPlc/GDP			1.13*** (8.30)			119.46*** (11.74)			-15.01*** (-3.22)
DC*(EXPs&p/TOT)	1.24*** (4.63)			17.07** (2.54)			-6.48*** (-2.74)		
DC*(EXPt/GDP)	-0.76** (-2.26)			-13.94* (-1.68)			-3.86 (-1.06)		
DC*(EXPs&pCURR)		1.01*** (3.50)			-1.06 (-0.57)			-6.20** (-2.36)	
DC*(EXPs&p&cc/GDP)		-1.09*** (-2.85)			-4.95 (1.43)			-3.08 (-0.61)	
DC*(EXPlc/CURR)			1.56*** (4.03)			34.31 (1.17)			-3.95 (-0.29)
DC*(EXPlc/GDP)			-1.29*** (-4.66)			-45.84** (2.18)			-17.92* (-1.87)
DD							-4.32*** (-5.89)	-3.97*** (-4.97)	-2.15*** (-5.48)
R-bar square	0,18	0,25	0,25	0,17	0,30	0,27	0,11	0,09	0,09
# of observations	306	248	515	296	236	509	306	246	511
F-test for decentralization	0.01	0.18	1.52	1.14	0.41	0.18	0.09	0.65	0.25

Notes:

1) Columns 1 to 3 indicate the use of different decentralization indicators: the share of state or provincial governments in total expenditures, the share of state or provincial governments' current expenditures in total current expenditures and the share of local governments' current expenditures in total current expenditures, respectively.

2) \*, \*\*, \*\*\* represent 10%, 5%, and 1% significance level, respectively.

3) The numbers in brackets are t-statistics.

4) Variable descriptions can be found in the Appendix 1.

Table 12: Expenditure Based Fiscal Decentralization Indicators with New Control Variables and Social Security and Defence Expenditures  
Dependent Variable:

	D			DEFGDP			GDPGR		
	1	2	3	1	2	3	1	2	3
Explanatory variables:									
Constant:							7.54***	4.81***	
EXPs&p/TOT	-0.79*** (-5.38)			-12.24*** (-4.82)			2.92 (1.04)	(3.90)	
EXPt/GDP	0.34* (1.79)			39.76*** (11.87)			-10.25*** (-2.79)		
VISPEXPT	-0.02 (-0.36)			0.66 (0.69)			-0.71 (-0.62)		
EXPs&p/CURR		-1.49*** (-5.84)			-28.46*** (-7.72)			6.30* (1.77)	
EXPs&cc/GDP		0.61** (2.38)			26.68*** (7.21)			-5.72 (-1.41)	
VISPEXPC		0.04 (0.86)			1.43* (1.94)			-0.70 (-0.86)	
EXPlloc/CURR			-2.66*** (-7.32)			-68.85*** (-2.74)			-20.88 (-1.61)
EXPele/GDP			0.97*** (9.04)			86.67*** (11.73)			-12.13*** (-3.26)
VILOCEXPC			0.03 (0.84)			6.57*** (2.78)			0.41 (0.36)
DC*(EXPs&p/TOT)	0.61 (1.54)			-7.67 (-1.13)			-4.18 (-0.83)		
DC*(EXPt/GDP)	-0.79*** (-2.61)			-27.42*** (-5.20)			1.76 (0.34)		
DC*(VISPEXPT)	0.18 (0.96)			2.49 (0.72)			-2.38 (-0.79)		
DC*(EXPs&pCURR)		1.33** (2.12)			-4.83 (-0.53)			-5.42 (-0.85)	
DC*(EXPs&cc/GDP)		-1.13** (-2.07)			-3.07 (0.38)			-0.39 (-0.06)	
DC*(VISPEXPC)		0.08 (0.40)			-2.92 (-0.92)			-0.27 (-0.09)	
DC*(EXPlloc/CURR)			2.83*** (5.16)			55.64 (1.48)			8.10 (0.43)
DC*(EXPele/GDP)			-1.26*** (-6.45)			-32.79** (-2.47)			-11.08* (-1.67)
DC*(VILOCEXPC)			-0.10 (-1.13)			-9.82 (-1.63)			1.80 (0.60)
DD							-3.32*** (-5.60)	-3.20*** (-4.56)	-2.73*** (-4.67)
R-bar square	0.61	0.64	0.69	0.56	0.60	0.48	0.33	0.28	0.25
# of observations	381	272	624	361	261	607	375	267	609
F-test for decentralization	0.22	0.07	0.17	10.01***	16.07***	0.22	0.08	0.03	0.85

Notes:

1) Columns 1 to 3 indicate the use of different decentralization indicators: the share of state or provincial governments in total expenditures, the share of state or provincial governments' current expenditures in total current expenditures and the share of local governments' current expenditures in total current expenditures, respectively.

2) \* \*\* \*\*\* represent 10%, 5%, and 1% significance level, respectively.

3) The numbers in brackets are t-statistics.

4) Variable descriptions can be found in the Appendix 1.

Table 13: Revenue Based Fiscal Decentralization Indicators with New Control Variables

Dependent Variable:	D			DEFGDP			GDPGR		
	1	2	3	1	2	3	1	2	3
Explanatory variables:									
Constant:							6.23***	3.65**	4.33***
							(4.71)	(2.12)	(5.10)
REVs&p/TOT	-0.46**			6.59			2.72		
	(-2.55)			(1.34)			(0.83)		
REVt/GDP	-1.21***			-24.57***			-7.28		
	(-3.61)			(-2.67)			(-1.37)		
VISPREVT	-0.01**			-0.08			0.06		
	(-2.44)			(-0.89)			(0.73)		
REVs&p/CURR		-0.60*			-11.94			3.63	
		(-1.74)			(-1.35)			(0.86)	
REVsp&cc/GDP		-3.66***			-45.80***			1.48	
		(-6.99)			(-3.39)			(0.22)	
VISPREVC		-0.00			-0.04			0.07	
		(-0.82)			(-0.37)			(0.80)	
REVloc/CURR			-2.79***			-101.33***			-11.70**
			(-7.71)			(-3.90)			(-2.51)
REVcl/GDP			-0.19			5.61			2.61
			(-0.94)			(0.39)			(0.74)
VILOCREVC			0.10***			10.54***			-0.20
			(4.69)			(6.80)			(-0.40)
DC*(REVs&p/TOT)	-0.06			-1.12			-2.69		
	(-0.11)			(-0.07)			(-0.43)		
DC*(REVt/GDP)	0.63			19.19			-3.15		
	(1.20)			(1.32)			(-0.50)		
DC*(VISPREVT)	0.00			0.00			-0.37		
	(0.16)			(0.00)			(-0.68)		
DC*(REVs&pCURR)		-0.05			21.41			-2.44	
		(-0.06)			(0.94)			(-0.35)	
DC*(REVsp&cc/GDP)		3.07***			15.29			-5.62	
		(3.45)			(0.66)			(-0.88)	
DC*(VISPREVC)		-0.00			0.29			-0.36	
		(-0.03)			(0.30)			(-0.54)	
DC*(REVloc/CURR)			2.88***			223.04***			10.07
			(4.44)			(4.80)			(1.53)
DC*(REVcl/GDP)			-0.60*			-6.14			-6.35*
			(-1.74)			(-0.25)			(-1.82)
DC*(VILOCREVC)			-0.11***			-5.69***			0.27
			(-3.72)			(-2.70)			(0.45)
DD							-3.49***	-3.39***	-3.00***
							(-5.95)	(-4.88)	(-5.83)
R-bar square	0.59	0.64	0.65	0.25	0.29	0.34	0.32	0.27	0.20
# of observations	382	273	629	362	262	608	376	268	613
F-test for decentralization	0.89	0.66	0.03	0.12	0.20	10.01***	0.01	0.04	0.12

## Notes:

1) Columns 1 to 3 indicate the use of different decentralization indicators: the share of state or provincial governments in total revenues, the share of state or provincial governments' current revenues in total current revenues and the share of local governments' current revenues in total current revenues, respectively.

2) \*, \*\*, \*\*\* represent 10%, 5%, and 1% significance level, respectively.

3) The numbers in brackets are t-statistics.

4) Variable descriptions can be found in the Appendix 1.

Table14: Expenditure Based Fiscal Decentralization Indicators with New Control Variables but without Social Security and Defence Expenditures

Dependent Variable:	D			DEFGDP			GDPGR			
	1	2	3	1	2	3	1	2	3	
Explanatory variables:										
Constant:					4.26*** (2.73)	1.28 (0.80)		5.71*** (3.19)	3.66** (2.43)	5.85*** (3.13)
EXPs&p/TOT	-1.35*** (-6.49)			-18.79*** (-5.16)				3.50 (0.87)		
EXPt/GDP	0.47 (1.62)			41.54*** (7.75)				-3.43 (-0.59)		
VISPEXPT	0.17** (2.05)			4.50*** (3.16)				-1.50 (-0.82)		
EXPs&p/CURR		-1.39*** (-5.90)			-17.48*** (-5.66)			2.11 (0.66)		
EXPsp&cc/GDP		0.85** (2.33)			29.10*** (5.81)			3.73 (0.64)		
VISPEXPC		0.09* (1.68)			1.39 (1.63)			-0.79 (-0.76)		
EXPlc/CURR			-1.21*** (-3.62)			-24.68*** (-3.26)				-10.09 (-1.02)
EXPelc/GDP			1.88*** (8.42)			36.26*** (6.98)				-4.97 (-0.73)
VILOEXPC			0.13** (2.61)			0.55 (0.44)				1.62 (1.12)
DC*(EXPs&p/TOT)	1.30*** (3.75)			7.54 (1.26)				-3.69 (-0.76)		
DC*(EXPt/GDP)	-1.01** (-2.43)			-32.71*** (-4.45)				-2.14 (-0.26)		
DC*(VISPEXPT)	0.02 (0.11)			-1.26 (-0.34)				-2.56 (-0.68)		
DC*(EXPs&p/CURR)		1.40*** (2.80)			13.18*** (2.70)			-5.04 (-1.05)		
DC*(EXPsp&cc/GDP)		-1.48** (-2.27)			-26.58*** (-2.78)			-0.66 (-0.06)		
DC*(VISPEXPC)		0.07 (0.30)			-1.09 (-0.34)			-1.51 (-0.47)		
DC*(EXPlc/CURR)			1.16 (0.81)			65.39*** (4.05)				8.75 (0.44)
DC*(EXPelc/GDP)			-3.29*** (-6.38)			-42.15*** (-5.45)				-2.96 (-0.33)
DC*(VILoEXPC)			0.02 (0.06)			-1.67 (-0.45)				0.08 (0.02)
DD								-4.06*** (-5.09)	-3.89*** (-4.48)	-3.14*** (-2.79)
R-bar square	0.71	0.73	0.84	0.60	0.54	0.53	0.35	0.21	0.12	
# of observations	257	183	169	244	178	164	255	181	167	
F-test for decentralization	0.04	0.00	0.00	5.62**	0.78	15.11***	0.00	0.39	0.01	

Notes:

- 1) Columns 1 to 3 indicate the use of different decentralization indicators: the share of state or provincial governments in total expenditures, the share of state or provincial governments' current expenditures in total current expenditures and the share of local governments' current expenditures in total current expenditures, respectively.
- 2) \*, \*\*, \*\*\* represent 10%, 5%, and 1% significance level, respectively.
- 3) The numbers in brackets are t-statistics.
- 4) Variable descriptions can be found in the Appendix I.



Table 15: Expenditure Based Proxies of Vertical Imbalances

Dependent Variable:	D			DEFGDP			GDPGR		
	1	2	3	1	2	3	1	2	3
<u>Explanatory variables:</u>									
Constant:	0.08 (1.15)	0.09 (1.10)	0.05 (0.91)				6.42*** (5.02)	3.87*** (3.82)	3.95*** (3.10)
VISPEXPT	-0.04 (-0.50)			2.04 (1.43)			-0.96 (-0.56)		
EXPt/GDP	1.05*** (3.99)			50.69*** (9.41)			-3.22 (-0.58)		
VISPEXPC		-0.10** (-2.08)			-1.23 (-1.50)			-0.56 (-0.62)	
EXPsp&cc/GDP		1.63*** (5.10)			41.34*** (7.03)			5.35 (0.98)	
VILOCEXPC			0.14*** (3.08)			0.96 (0.58)			1.17 (0.84)
EXPcl/GDP			1.93*** (9.52)			43.87*** (7.43)			-2.00 (-0.31)
DC*(VISPEXPT)	0.23 (1.26)			0.67 (0.17)			-3.61 (-1.04)		
DC*(EXPt/GDP)	-1.51*** (-4.51)			-46.24*** (-6.30)			-4.04 (-0.64)		
DC*(VISPEXPC)		0.22 (1.14)			2.74 (0.70)			-1.05 (-0.41)	
DC*(EXPsp&cc/GDP)		-2.04*** (-4.84)			-44.97*** (-4.71)			-8.85* (-1.70)	
DC*(VILOCEXPC)			-0.13 (-0.76)			-9.12 (-1.60)			-0.24 (-0.06)
DC*(EXPcl/GDP)			-2.16*** (-7.18)			-33.83*** (-2.79)			-3.98 (-0.65)
DD							-4.27*** (-5.60)	-3.91*** (-4.59)	-2.80** (-2.57)
R-bar square	0.64	0.67	0.81	0.54	0.49	0.52	0.35	0.20	0.11
# of observations	257	183	169	244	178	164	255	181	167
F-test for decentralization	1.27	0.45	0.00	0.58	0.15	2.24	2.15	0.46	0.06

Notes:

1) Columns 1 to 3 indicate the use of different proxies of vertical imbalances: the ratio of state provincial total deficit to total exp. of state provincial gov., the ratio of state provincial current deficit to current exp. of state provincial gov. and the ratio of local current deficit to current exp. of local gov., respectively.

2) \*, \*\*, \*\*\* represent 10%, 5%, and 1% significance level, respectively.

3) The numbers in brackets are t-statistics.

4) Variable descriptions can be found in the Appendix 1.

Mod. Table16:

Dependent Variable:	D			DEFGDP			GDPGR		
	1	2	3	1	2	3	1	2	3
Explanatory variables:									
Constant:				4.03*** (4.42)	4.75*** (4.55)		4.69*** (6.27)	3.51*** (4.50)	
VISPREVT	-0.01*** (-3.36)			-0.10 (-1.16)			0.06 (0.87)		
VITGDPREV	-3.40*** (-5.89)			5.36 (0.40)			7.17 (0.64)		
VISPREVC		-0.01** (-2.25)			-0.12 (-1.28)			0.08 (0.97)	
VISPCCREV		(-7.33)*** (-5.78)			-19.34 (-0.88)			26.40 (1.65)	
VILOCREVC			0.13*** (6.59)			10.35*** (7.48)			-0.39 (-0.62)
VICLCREV			-4.04*** (-4.95)			-138.50** (-2.42)			-73.70*** (-2.63)
DC*(VISPREVT)	0.00 (0.04)			-0.08 (-0.14)			-0.70 (-1.49)		
DC*(VITGDPREV)	1.47 (1.34)			-14.14 (0.95)			-25.03** (-2.11)		
DC*(VISPREVC)		-0.00 (-0.06)			-0.10 (-0.14)			-0.61 (-1.10)	
DC*(VISPCCREV)		5.24** (2.45)			3.14 (0.15)			-34.59** (-2.32)	
DC*(VILOCREVC)			-0.15*** (-5.50)			-6.66*** (-3.45)			-0.49 (-0.57)
DC*(VICLCREV)			2.06 (1.62)			284.88*** (3.16)			3.75 (0.09)
DD							-3.35*** (-5.74)	-3.28*** (-4.87)	-3.02*** (-5.47)
R-bar square	0.59	0.61	0.62	0.22	0.21	0.31	0.31	0.27	0.22
# of observations	385	275	637	362	263	614	378	269	619
F-test for decentralization	0.14	1.46	1.13	0.10	0.09	7.46***	1.17	0.90	2.26

1) \*, \*\*, \*\*\* represent 10%, 5%, and 1% significance level, respectively.

2) The numbers in brackets are t-statistics.

3) Variable descriptions can be found in the Appendix 1.