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FISCAL DECENTRALISATION AND DEFICITS: INTERNATIONAL EVIDENCE

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Fiscal Decentralisation and Deficits: International Evidence

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JEL Classifications: E62, H62, H71, H72
Key Words: Fiscal Decentralization, Budget Deficits.

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Abstract:

The literature on socio economic implications of fiscal decentralization (FD) has recently been expanding, though only very few studies to day have looked at its macroeconomic effects. This paper investigates the relationship between FD and budget deficits. Using various measures of both expenditure and revenue decentralization in a large panel data set, we show that FD is significantly and negatively related to budget deficits. Moreover, among the many possible factors that may reinforce this relationship, country size is the most relevant one. The paper also presents significant evidence that, the larger the country size, both good governance and local accountability accentuates the relationship between FD and budget deficits.

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I. Introduction

Decentralisation, defined as the "devolution of power and authority to local administrations", has economic, fiscal, political and administrative aspects (see, Litvack, 1999). Fiscal decentralization, the subject matter of this paper, can be defined as the devolution of policy responsibilities from central government towards local governments with regards to spending and revenue collection decisions.

Within the context of federal systems, fiscal decentralization is often referred to as "economic federalism". Inman and Rubinfield (1997) argue that "economic federalism prefers the most decentralised structure of the government capable of internalizing all economic externalities, subject to the constitutional constraint that all central government policies be decided by an elected or appointed central planner". The authors also argue that the most complete description of fiscal federalism is due to Oates (1972): "The central government is assigned responsibility for those public activities distinguished by significant externalities involving spatially dispersed populations, while local governments have responsibility for those public activities for which such spillovers are limited or absent".

Decentralisation has been viewed to be an appealing feature of economic reform programs based on the following arguments: i) decentralization of spending increases economic efficiency since local governments have better information about local preferences, and hence it permits non-uniform provisions that better match with the preferences of citizens[1] (see, for example, Samuelson [1954], Oates, [1972] and [2001]). ii) Decentralisation is expected to boost accountability and transparency in

[1] The public goods considered to be more efficient if provided in a decentralised manner are not pure public goods with wide spill-over effects, but local public goods.

service delivery (de Mello, 2000a). iii) In addition, if local accountability exists, tax-payers may also better cooperate with local governments (Wasylenko [2001]).[2]

Tanzi (2000) suggests, however, that effectiveness of fiscal decentralisation in improving allocative efficiency depends on factors such as the size of country, the extent of privatization in the economy[3]; ability of local governments to raise revenue; transparency and; local administrative and institutional capacity. Empirical evidence in support of these arguments can be found in Panizza (1999), who shows that the larger the country the greater the information advantage of local government, and Von Braun and Grote (2000), who empirically demonstrate that fiscal decentralization helps to eliminate poverty only in the presence of political decentralization that makes local governments accountable.

While decentralising budgetary spending, granted the above modifications, may be efficiency-enhancing, decentralising revenue-collection may not be so, however. Among the major possible reasons for this are that local governments either have limited tax-bases available to them or they fail to fully exploit the existing ones (possibly due to due to tax exportation) and; local debt issuance and management capacity is limited. For these reasons, vertical and horizontal revenue sharing is generally necessary (see De Mello [2000a], De Mello and Barenstein [2001]).[4] De Mello and Barenstein (2001), for example, show that, unlike expenditure decentralisation, the lower is revenue decentralisation, the better is governance.

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[2] Panizza (1999) provides an overview of the theoretical literature on fiscal decentralization. He groups the existing literature as the studies on: i) optimal division of powers (decentralization theorem); ii) the role of organization costs and; iii) competition among jurisdictions.

[3] privatization can be considered as substitute for local government in the provision of local public goods and services

[4] In a study of US federalism, Inman and Rubinfield (1991) argue that the provision of local public good, rather than pure public good, requires 100% local taxation for it to be efficient.

Limited revenue autonomy of local governments implies, however, that their expenditure autonomy is also possibly limited and thus local governments may turn out to be mere spending units of the central governments. This, in turn, limits the ability of local governments to perform counter macroeconomic cycles at local levels (De Mello, 2000b).

There are also various arguments against expenditure decentralization. First, local governments may suffer from lack of economies of scale in the provision of public goods; particularly, information and coordination costs may be higher for local governments than for the central government. Secondly, if local vested interests are powerful, in the absence of local accountability, decentralization increases corruption and social fragmentation (see, for example, Blanchard and Shleifer [2000] and Bradhan and Mookherjee [1998]). Thirdly, decentralization may increase the competition and political tensions among local governments. Fourthly, lack of institutional and administrative capacity of local governments may prevent the benefits of decentralization from being realized. Fifthly, coordination problems across different tiers of government may hinder fiscal reforms and implementation of macroeconomic adjustment.

To summarize, the literature suggest evidence both favor and disfavor fiscal decentralization. While the empirical literature on issues related to fiscal decentralization has markedly grown in the recent years, however, evidence on the macroeconomic effects fiscal decentralization has been rahter scant. A couple of recent exceptions are Jin and Zou (2002), who demonstrate that while expenditure decentralization increases the size of aggregate governments, revenue decentralization has a reverse impact, and King and Ma (2001), who find a negative at the relationship between revenue decentralization and inflation.

This paper investigates the nature of the relationship between fiscal decentralization and budget deficits. We hypothesize that if fiscal decentralization increases public sector efficiency, lower budget deficits would result -- provided that appropriate structural, administrative and institutional characteristics are in place. Using a large set of panel data on both expenditure and revenue types of fiscal decentralisation, we empirically test whether decentralizing fiscal activities is conducive to lower budget deficits after controlling for the various factors that both theoretical and empirical literature suggests to affect this relationship, such as governance, size of the country and the extent of ethnolinguistic fractionalization.

The findings of the paper largely lend support for the hypothesis that expenditure decentralisation has significant relation with deficits. In addition, the evidence indicates that the larger the size of the country the more pronounced is this relationship. The evidence also suggests that good governance reinforces these relationships, especially in larger countries. Furthermore, the findings indicate that, the larger the country, the effect of revenue decentralization in reducing deficits is only realized in case of good governance, local accountability and high levels of ethnolinguistic fractionalization.

The structure of the rest of the paper is as follows. In Section 2, we summarize the empirical literature on fiscal decentralization. Section 3 presents the data and methodology of the paper. Section 4 summarizes the findings of the regression analysis and Section 5 concludes.

2. Review of Empirical Studies on Fiscal Decentralisation

A number of cross-sectional studies have investigated the association of fiscal with various social indicators. De Mello (2000a) shows that higher *social capital*,

defined as confidence in government, civic cooperation and associational activity, is positively related with fiscal decentralization.[5] De Mello (2001) also finds evidence that good *governance* is positively related with subnational spending levels and the higher the nontax revenues (i.e. grants and transfers from higher levels of government) the stronger this relationship. In addition, Fisman and Gatti (2002) find a strong negative relationship between expenditure decentralisation and *corruption*, while Treisman (2000) observes no significant relationship between the two variables, due possibly to different measures of corruption and inclusion of more control variables.[6]

In a study of the determinants of fiscal decentralization, Panizza (1999) finds evidence that country size, income per capita, the level of democracy, and, though weakly, ethnic fractionalization[7] all have positive impact on the level of fiscal decentralization. De Mello (2000a) also argues that ethno-linguistic fractionalization affects fiscal decentralization.

Reviewing the empirical literature that yield conflicting evidence on the relationship between government size and fiscal decentralization, Jin and Zou (2002) provide panel evidence that while expenditure decentralization increases the size of aggregate governments, revenue decentralization has a reverse impact. In addition, King and Ma (2001) claims that revenue decentralization has a negative impact on average inflation in only developed countries.

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[5] Excluding the case where fiscal decentralization is measured by vertical imbalances, which are defined as the ratio of inter-governmental transfers to total tax revenue of subnational governments (De Mello, 2000a).

[6] Treisman finds evidence of a strong positive relationship between decentralization and corruption using "structural" aspect of decentralization, which refers to mainly political decentralization accounted for by a dummy that takes the value of 1 if federal system and 0 otherwise.

[7] which is used as a measure of heterogeneous preferences

Several other studies also investigate the individual country experiences with fiscal decentralisation. According to Eaton (2001), for example, political parties in Argentina and Philippines have used the reform aspect of decentralization as a tool of manipulating the party control over revenues and expenditures. The author also points at the dangers of decentralization due to a compromise between the complexity in the intergovernmental relations, on the one hand, and transparency and accountability, on the other. Barrett, (2000) argues that, in Japan, mere transfer of authority to local governments, without local autonomy, has promoted a yet more powerful central government. Inspecting the cases of Russia, Ukraine and Kazakhstan, Norris et al. (2000) also point out that greater autonomy and accountability assigned to local governments and transparency with regards to spending and revenue collection arrangements are all necessary for obtaining the benefits of decentralization. Feltenstein and Iwata (2002) argue that fiscal decentralization has had adverse effects on inflation in China.

In contrast to the above studies that point out the adverse effects of fiscal decentralization, Hope (2000) suggests that decentralisation in Botswana has promoted greater local autonomy and accountability. Various studies[8] also argue that decentralization has also contributed to economic growth in China via better monitoring and management of local enterprises, better utilization of local revenue sources and greater efficiency in resource allocation. Neyapti (2002) shows that, in Turkey, the more decentralized the expenditures the lower are volatility of private investment, central expenditures and transfers[9], and the higher are both the level and the growth rate of income per capita across provinces. Also the higher is revenue decentralization, the greater is agricultural value added and income, and the lower is

[8]Dethier (based on Yilmaz, 2000), Lin and Liu (2000) and Feltenstein and Iwata (2002).

the volatility of transfers. Education and health, however, do not appear to be significantly related with fiscal decentralization in Turkey.

The review of the literature shows that the evidence on the benefits of decentralization is rather mixed. Moreover, the impact of fiscal decentralization on budget performance remains to be an important issue yet to be investigated. This paper contributes to the literature in this respect.

3. Data and Methodology

In this section, we first discuss the variables used in our empirical analysis (Section 3.1), then provide a brief descriptive report of the basic trends in decentralization across both developed and less-developed countries and over time (Section 3.2) and finally define the methodology employed for the regression analysis (Section 3.3).

3.1 Variables used in the estimation:

We construct three measures of expenditure decentralization: 1. the share of total spending by the state and provincial governments in total spending of the state, provincial and central governments combined (EXPs&p/TOT); 2. the share of current spending by the state and provincial governments in the total *current* spending of the state, provincial and central governments combined (EXPs&p/CURR) and; 3. the share of total spending by the local governments in the total *current* spending by both the central and local governments combined (EXPloc/CURR)[10]. We use state and provincial governments, on the one hand, and local governments, on the other, as two alternatives for sub-governments since the categorization of the sub-governmental

[9] controlling for the level and volatility of GDP, emergency state and priority regions.

level of activities is not uniform across countries.[11] We also generate the revenue counterparts of all these three variables, which we call REVs&p/TOT, REVs&p/CURR and REVloc/CURR, respectively.

Considering that social security spending is fairly larger in developed countries than in less developed countries, our analysis excludes this component from the central government spending definition to avoid a bias in our results.[12] In addition, we exclude defense spending from the central government spending. As Panizza (1999) points out, these exclusions lead us to focus on the "decentralizable" part of fiscal spending, which is appropriate for the current analysis.[13]

Appendix 1 provides the data used in this study along with their sources. Data used in this study covers up to 30 years of observation for 23 countries for s&p/TOT, 19 to countries for s&p/CURR and 48 countries for loc/CURR measures of both expenditure and revenue decentralization. The panel is unbalanced and the actual number of available observations ranges between 189 to 484, depending on the measure of FD used.

3.2 An Overview of the Trends in Decentralization:

For all types of decentralization measures, we observe that developed countries have by far higher decentralization than less developed countries, as a group (see Figure 1). Interestingly, Figure 1 also shows that since 1970s there has been no

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[10] "Local " definition of government spending is only available for current expenditures and not for total expenditures.

[11] An alternative measure that could be obtained adding up the two (s&p and loc). However, this is an artificially created variable since in many countries subgovernmental level activity is reported under either one and not both, and also this aggregation yields a smaller data size than the smallest of the other definitions of FD (i.e. the current spending or revenues at state and provincial level).

[12] For instance, social security spending in Sweden and Luxembourg has been more than 20% of GDP, and more than 15% of GDP in Finland and Netherlands during the 1990s.

notable trend towards a greater degree of decentralization either in developed (DCs) or in less developed countries (LDCs). While both spending and revenues in the LDCs have remained more centralized than in the DCs as of the end of the 1990s, there has been little change with regards especially to revenue decentralization both in developed and less developed countries since 1970s. Since decade averages refer to different cross section coverages, however, one should observe these observations with some caution.

In addition, Appendix 2 shows that, from 1970s to the end of 1990s, Canada, Switzerland, Australia and United States, in that order, rank among the most decentralized (with respect to fiscal expenditures) countries, followed by Argentina India, Pakistan and Brazil from the less developed group of countries. It is also possible to observe a few noticeable country-specific trends.[14] Among the developed countries, Austria, Switzerland, USA have had less decentralized spending since the 1970s with respect to the first measure of expenditure decentralization, whereas Spain and Germany have had more decentralized spending (according to the second and third definitions) during the last decade. Among the less developed countries, Argentina has also gone through a notable expenditure decentralization since the 1970s, while Bolivia, Malaysia and Peru have had the reverse tendency.

3.3. Methodology:

Using the data described above, we initially estimate the following models:

$$Y_{it} = \beta_{0\,i} + \beta_1 (EXP_{kj} / EXP_j)_{it} + \beta_2 (REV_{kj} / REV_j)_{it} \ldots (1)$$

$$Y_{it} = \alpha_{0i} + \alpha_1 (EXP_{kj} / EXP_j)_{it} + \alpha_2 (REV_{kj} / REV_j)_{it} +$$

[13] Indeed, once the social security and defence component of government spending is taken out, indicators of expenditure decentralization appear much higher in developed countries than in less developed countries.

$$\alpha_3 [DC_i*(EXP_{kj} /EXP_j)_{it}] + \alpha_4 [DC_i*(REV_{kj} /REV_j)_{it}] \ldots\ldots \quad (1')$$

where Y stands for overall budget deficits in percentage of GDP. Subscript *it* stands for country *i* at time *t*; *k* stands for *state and provincial* or the *local* definitions of the government; and *j* stands for total (current and capital) or current only.[15] We use both expenditure and revenue decentralization variables as the right hand side variables to find out which one performs better. In Model (1'), where DC stands for a dummy that takes the value of 1 for developed countries and zero otherwise, we investigate the possible differences in the responsiveness of macroeconomic variables to FD between developed countries and less developed countries. In Section 4, we first report the findings of this basic model, followed by various modifications based on the introduction of various control variables.

To identify whether the models have to be specified by random or fixed effects, both of which are more efficient than the OLS estimation with a common constant term for panels with a large cross-country component, we employ the Haussman specification test (Chi-square)[16]. The test of the hypothesis that fixed effects specification is inconsistent indicates that fixed effects procedure is appropriate for the estimation of deficits in the third sample in case of both models. Since it is more efficient to use fixed effects in the largest sample (using the third

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[14] This observation is based on time series of individual countries.

[15] Using the measure obtained by summing up the local and state and provincial definitions of of spending (or revenues) for the estimation of models (1) and (1') leads to very similar results (not reported) to those reported below.

[16] The null hypothesis of the Haussman (1979) test is that, assuming that both OLS and GLS are consistent, OLS is inefficient, the alternative being OLS is consistent but GLS is not. In other words, the Haussman statistic tests for the correlation between the individual effects and explanatory variables. Rejection of the null hypothesis thus leads to the adoption of fixed effects model against the random effects model (see Hsiao [1986], Greene [1993] or Baltagi [1995]).

definition of FD), we use the fixed effects method in all the estimations reported below to keep a standard estimation method.[17]

Table 1: Haussman test (χ^2) results for Fixed versus Random effects
(Columns 1 to 3 indicate models based on the three decentralization measures) :

Dependent Variable:	Deficit/GDP		
Models:	1	2	3
(1)	0.88	3.58	14.01***
	(0.64)	(0.17)	(0.00)
(1')	15.84***	5.07	27.98***
	(0.00)	(0.28)	(0.00)

Note: Numbers in parentheses are the p-values.
*** indicates significance at 1% level.

4. Regression Analysis

In this section, we test the hypothesis that fiscal decentralization, measured by both expenditure and revenue decentralization, has significant relationship with budget deficits. Hence, our main hypothesis is that β_1 and β_2 terms in Model (1) are significantly different from zero. In addition, by looking at the coefficients of the interaction terms with the DC dummy in Model (1'), we investigate whether fiscal decentralization has different impacts in developed and less developed countries. Section 4.1 as well as Table 2.a report the results of the estimation of Models (1) and (1').

In Section 4.2, we introduce several modifications to Model (1). Section 4.2.1 modifies Model (1) by introducing size of the government and rate of growth of GDP, as a proxy for business cycles, as additional control variables. In Section 4.2.2, we further investigate whether various governance indicators, political instability, the size

[17] We nevertheless also estimated the random effects model as an alternative method for case of the first two definitions of FD. The regression results (not reported, but available from the

of the country and ethnolinguistic fractionalization (as a measure of diversity in preferences) matter for the relationship between fiscal decentralization and the macroeconomic variables of interest. In Section 4.4, we use weighted least squares estimation technique as an alternative method to analyze the influence of these various institutional and structural variables on the effectiveness of FD. In all estimations below, coefficients of the fixed effects are not reported to save place.

4.1. Estimation of Models (1) and (1′):

The hypothesis we test is that if fiscal decentralization improves efficiency in fiscal administration, its impact on deficits should be negative. We find that all three measures of expenditure decentralization (ED), reported in the first three columns in Table 2.a, support this claim at statistically significant levels. As for revenue decentralisation (RD), however, only the 3rd definition is significantly negative.[18]

Including the interaction terms of FD with developed country dummy, DC, we obtain the following results, reported in columns 4 to 6 in Table 2.a. While the fit of the regressions that use interactions with DC only slightly improve as compared to Model 1 (columns 1 to 3), we observe that both the size and the significance of ED measures improve substantially for the set of less developed countries. However, in Model (1′) we again observe that only the third definition of RD, which coincides with a much larger sample size than others, shows statistically significant and negative

author upon request) remain virtually the same as the ones reported in Section 4 below.

[18] The results are likely to be affected by multicollinearity between expenditure and revenue decentralization measures (see Appendix 3). When expenditure and revenue decentralization measures are used alone on the right hand side along with the fixed effects, we observe that RD as well are always negatively significant, though not as highly as ED measures. In addition, only the first definition of RD is significant.

relationship with deficits. Estimation of Models (1) and (1') using the first two definitions of FD reveals virtually the same results.[19]

Decomposition of these effects into developed and less developed countries reveals that, evidence on the significance of both expenditure and revenue decentralisation measures is rather weak for developed countries: only the 3rd definition of RD is significant, but that with a positive sign.[20] The coefficients of the rest of the terms are insignificant for the subsample of developed countries.

Hence, the evidence is quite robust for the negative significant relationship between deficits and especially expenditure decentralization in less developed countries. While the evidence with regards to the negative relationship between revenue decentralization and deficits is weaker, the evidence regarding the relationship between both types (expenditure and revenue) of FD and deficits is much weaker for the developed countries sample. In all the foregoing estimations, the hypothesis that fixed effects are jointly zero is rejected at 1 percent level.

4.2. Extensions:

In this section, we first introduce additional control variables: the ratio of government spending in GDP, as a measure of the *size of the government*, (G) and the rate of growth in real GDP (GDPgr), as a proxy for *business cycles*. Section 4.2.1. reports the results of the estimation of Model (1) with the addition of these control variables. Section 4.2.2. reports the results of the regressions where, in addition, we introduce various institutional and structural variables, as further control variables, in interaction with FD.

[19] Those results are available upon request.
[20] The coefficients for developed countries can be read as the sum of the coefficients β_1 and β_3 in columns 4 to 6 in Table 2.a.

4.2.1. Controlling for the size of the government and Business Cycles

Reestimating Model (1) by controlling for the *size of the government* (G), we confirms the robustness of expenditure decentralization (ED), while the size variable itself also appears positive and significant for all definitions of ED. We next repeat the estimation after controlling for both G and GDPgr. Using this model, whose results are reported in Table 2.b, we observe that while earlier results regarding the coefficients of FD remain, G is also highly significant and positive in all regressions while GDPgr is significantly negative only in case of the first definition of FD.

4.2.2. Controlling for Additional Institutional and Structural Variables:

In this section, we estimate deficits with one of the FD terms at a time, in addition to its interaction with the variables that the literature suggests to be related with decentralization: namely, *governance indicators*, *country size* (measured both as population and area), *ethnolinguistic fractionalization,* and *dummy for the presence of local elections*.[21] As measures of governance, we use the indices of: *control of corruption, rule of law, political instability, governmental efficiency, voice and accountability* and *regulatory quality* (Kaufman et al, 2002).[22] The total number of related variables and thus the interaction terms (used in separate regressions) are 10. In addition, as in Section 4.21, we control for the size of the government (G) and business cycles (GDPgr).

Hence we estimate the following models:

$$Y_{it} = \phi_i + \gamma_1 (EXP_{kj} / EXP_j)_{it} + \gamma_{2s} (X_s)_{it} (EXP_{kj} / EXP_j)_{it} + \gamma_3 G + \gamma_4 \, GDPgr \quad \ldots(2)$$

and:

[21] *Area* and *ethnolingusitic fractionalization* figures have been compiled by William Easterly. Local elections dummy is also based on the Easterly data set and evaluated to be 1 for wherever there are either municipality or state elections, and zero otherwise.

$$Y_{it} = \phi'_i + \gamma'_1 (REV_{kj} / REV_j)_{it} + \gamma'_{2s} (X_s)_{it} (REV_{kj} / REV_j)it + \gamma'_3 G + \gamma'_4 GDPgr \quad ...(2')$$

where X_s (s =1, 2…10) stands for any of the 10 control variables that we hypothesize to be relevant for the effectiveness of fiscal decentralization. Having normalized[23] all the X_s variables between 0 and 1, we use them in interaction with either expenditure or revenue decentralization measures at a time (Models 2 and 2', respectively).[24] To reduce the possible biases that could arise from multicollinearity, in each model, we use only one FD measure by itself and in interaction with one of the 10 variables at a time.[25]

Using the normalized variables in interaction with the fiscal decentralization measures amounts to assigning higher weights to fiscal decentralization under the cases of what we may group as better governance indicators (i.e. lower political instability; higher values of government efficiency, voice and accountability, regulation quality, control of corruption, rule of law and the presence of local elections, which proxies accountability of local administrations) and in cases of larger country size (measured by population and geographical area) as well as greater ethno-linguistic fractionalization. In these estimations, we refrain from also using the interactions with the DC dummy since they are also highly correlated at least with the interaction variables that involve governance indicators.

The main hypothesis tested with the estimation of models (2) and (2') is therefore that if X_s contributes to the effectiveness of FD, the interactive terms would be

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[22] The estimates for each of all the six governance variables are based on an analysis of wide-ranging data sources -- comprised of both polls and surveys conducted in individual countries (see, Kauffman 2002).

[23] The values of all these variables, except for the dummy for local elections, are converted into a range between 0 to 1 where greater values indicate better governance, lower political instability, but larger size of the country and greater degree of ehtnolinguistic fractionalization.

[24] since using both types of interactions together would lead to a lot of multicollenearity as X_s (EXP_{ij} / EXP_j) and X_s (REV_{ij} / REV_j) are highly correlated with each other for a given ij.

significantly negative. Since we have 10 such interaction terms and 6 measures of fiscal decentralization (3 measures each for expenditure and revenue decentralization), this amounts to 60 regressions. For tractability, we therefore only report the signs of the interactive terms -- whenever significant -- in Table 3.[26] Below, we discuss these results in detail.

4.2.2.1. Estimation using Interactive Terms for Expenditure Decentralization:

Estimation of Model (2) generally yields negative coefficients for expenditure decentralization (ED), where significant (not reported).[27] In addition, the size of government is always positive and significant, while GDP growth is negatively significant, except in the 3rd sample (not reported).

Looking at the interactive terms, whose signs are reported in Table 3 where significant, we observe that (the first two measures of) ED's negative effect on deficits increases in cases of large *country size*, measured both by population and area as kilometer-square. This evidence supports the proposition of Tanzi (2000) and complements the findings of Panizza (1999) in that, besides impacting on the extent of FD, the size of a country renders FD more effective.

In addition, however, we observe a positive and significant relationship between expenditure decentralization and deficits in cases of better governance and greater degree of ethnolinguistic fractionalization. The finding that ethnolinguistic fractionalization may reduce the effectiveness of fiscal decentralization is plausible. In fact, this is a complementary evidence to the literature, which suggests that ethnolinguistic fractionalization, representing diversity of preferences, has a positive

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[25] Using a single factor (principle component) instead to represent all the measures of governance does not add much to the findings.
[26] Regressions are available from the author upon request.
[27] Expenditure decentralization itself is significant in cases of the inclusion of its interactions with political stability (first two definitions), government efficiency, rule of law,

impact on FD[28], in that they together may lead to higher deficits due to budgetary pressures stemming from diverse preferences.

The lack of evidence on the efficiency enhancing effect of good governance on FD (negative coefficient of the interactive terms), however, is not expected. Considering that none of the interaction terms that involve governance indicators (i.e., control of corruption, government efficiency, regulation quality, rule of law and voice and accountability and political instability) yields any negative coefficient renders an explanation involving a measurement problem inadequate. We therefore resort to the only obvious explanation that there is no impact of good governance on the relationship between FD and deficits; that is, panel evidence indicates that FD reduces deficits regardless of the quality of governance across countries. Truncating the sample into developed and less developed samples also does not yield any major improvement over this finding. Hence, we anticipate that, the high correlation between FD and the various governance indicators (more than 60 % for all measures of FD) may be the reason why the interaction variables between the two do not convey any further useful information.

Finally, the positively significant coefficient of the interaction between the third definition of ED and the local election dummy may reflect that local administrators who are locally elected may tend to spend more the more decentralized the spending in order to fulfill the demands of their constituencies and thus fiscal prudence may decline.

4.2.2.2. Estimation using Interactive Terms for Revenue Decentralization:

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ethnolinguistic fractionalization (first two definitions), local elections and area (first two definitions).

[28] see, for example, Panizza (1999) and De Mello (2000a).

Using interactions with revenue decentralization (RD), Model (2') also yields significant positive coefficients for all the interaction terms that involve governance variables, though only in the third sample (see Table 3). An exception is the insignificant coefficient of the interaction of FD with political instability in the 3rd sample. In addition, we observe that the interaction of RD with the local election dummy is negatively significant only in the first sample. We also observe that interactions of RD with the country size are not always negative and significant; it has a negatively significant coefficient only when used in interaction with population in the first two samples.

Finally, we note that revenue decentralization itself is negative wherever it is significant (not reported).[29] The coefficients of G and GDPgr are also significant, positively and negatively, respectively, with the same exceptions reported for the case of the estimation of Model 2 (not reported).

4.3. Estimation with the Weighted Least Squares Method (WLS):

Estimation of Models (2) and (2') reported above indicates that the size of a country, measured either by population or by area, appears to reinforce the effectiveness of, especially, expenditure decentralization in reducing deficits. Interaction terms that involve governance indicators, however, yield unintuitive results. In order to further explore the interaction of FD with governance variables and to increase the efficiency of the estimation to some extent, we estimate a version of Model (2) and of Model (2'), where we now use population as the weight in a

[29] More specifically, RD itself is significant when both population and area are used as interaction variables in the first two samples and when government efficiency, rule of law and local elections are used as the interaction variables in the third sample.

weighted least squares (WLS) estimation[30] (Models 3' and 3", respectively). To avoid multicollinearity, we again use only one of the remaining 9 interactive terms[31] at a time to estimate the following alternative models:

$$w_i Y_{it} = \beta'_{0\,i} + \beta'_1\, w_i(EXP_{kj}/EXP_j)_{it} + \beta'_2\, w_i(REV_{kj}/REV_j)_{it} + \beta'_3 G + \beta'_4\, GDPgr \;\ldots\ldots\; (3)$$

$$w_i Y_{it} = \delta_i + \theta_1\, w_i(EXP_{kj}/EXP_j)_{it} + \theta_2\, [(X_s)_{it} * w_i(EXP_{kj}/EXP_j)_{it}] + \theta_3 G + \theta_4\, GDPgr \;..(3')$$

$$w_i Y_{it} = \delta'_i + \theta'_1\, w_i(REV_{kj}/REV_j)_{it} + \theta'_2\, [(X_s)_{it} * w_i(EXP_{kj}/EXP_j)_{it}] + \theta'_3 G + \theta'_4\, GDPgr \ldots\ldots\ldots\; (3'')$$

where w_{it} stand for the normalized *population* figures[32], which we may as well denote simply as w_i, since population varies only slightly within a country, as opposed to across countries.

To compare the WLS results with the OLS results of Model (1) as modified in Section 4.2.2.1 (reported in Table 2.b), we first estimate Model (3). The estimation results reported in Table 4 can be summarized as follows. Estimation of Model (3) yields notably more significant coefficients for expenditure decentralization than those reported in Table 2.b. In addition, the goodness of fit[33] in each case improves notably.[34] We also observe that while the size effect (G) is positively significant across all measurements of FD as before, GDPgr is now only barely significant in the third sample. In this model, however, the coefficient for revenue decentralization

[30] see Appendix 4 for an explanation of WLS.

[31] The six governance indicators, namely government efficiency, rule of law, regulation quality, voice and accountability, control of corruption and political instability are especially highly correlated.

[32] Drawing on the results reported in Table 3, one may think of using the dummy for local elections as an alternative weighting factor. We also tried this but the results are much less significant.

[33] Since the R-bar squares of the weighted regression is a meaningless concept, rather than comparing that between the weighted and unweighted regressions, we compare the squared correlation between the fitted and actual values of the dependent variables. I owe thanks to Christopher Baum for raising this point.

[34] Using one of the governance indicators or local elections as an alternative weight (w_i), on the other hand, does not yield such improved results.

loses its significance in the third sample, while it becomes significant and negative in the first sample.

These results indicate that, while decentralizing expenditures is more effective in reducing deficits in case of highly populated countries, decentralizing revenues is not. This implies that collection of revenues dominated by local governments in largely populated countries is possibly less efficient due to various factors that the literature points out, such as administrative and capacity constraints.

To account for the rest of the variables (X_s), we also estimate Models (3') and (3"), which lead to the following observations, reported in Table 5. All interactions with the governance variables, except for voice and accountability index in the first sample, and with ethnolinguistic fractionalization are negatively significant across all measures of ED. In addition, interactions with area are significant in the first two samples. Expenditure decentralization term itself remains negative and significant across all samples in regressions involving interactions with ethnolinguistic fractionalization, area and local elections and with government efficiency in the first sample only. These observations lead to the important finding that good governance reinforces the effect of expenditure decentralization in reducing deficits. The coefficients of government size remain robustly significant across the regressions, while GDPgr is insignificant in the 1st and the 2nd samples.

Estimation of Model (3"), on the other hand, leads to negatively significant coefficients for all interactive terms across the three definitions of RD. RD terms themselves, however, lose their significance. We also observe that he robustness of both GDPgr and G turn insignificant in the first two samples. We thus conclude that, the larger the country, good governance significantly contributes to the impact of revenue decentralization on deficits.

In conclusion, our empirical analysis (based on the estimation of equations 1 thru 3"), indicates that expenditure decentralization, regardless of structural or institutional factors, is robustly significant for deficits, while revenue decentralization is not. In addition, the evidence indicates that the size of the country reinforces this effect. The evidence further indicates, however, that --the larger the country size-- both good governance and high ethnolinguistic fractionalization contributes to the effectiveness of expenditure decentralization in reducing deficits. Moreover, the efficiency of revenue decentralization in reducing deficits recovers only after controlling for both the country size or the quality of governance.

5. Conclusions

There is a remarkable volume of recent research focusing on the relationship between socio-economic variables and fiscal decentralization. In this paper, we investigate the benefits of fiscal decentralization from the perspective of its possible association with a key macroeconomic indicator: budget deficits. We test the hypothesis that the greater fiscal decentralization the lower are budget deficits.

The evidence in this paper suggests a significant relationship between fiscal decentralization and deficits. However, the findings of this paper call for a caution about an immediate policy recommendation towards higher fiscal decentralization; along the lines of the literature, the evidence in this paper indicates that country characteristics and institutional features are closely related with the effectiveness of fiscal decentralisation in terms of leading to lower deficits. More specifically, our empirical analysis reveals that the size of the country influences the effectiveness of expenditure decentralization more robustly than any other factor that the literature proposes to enhance the benefits of fiscal decentralization.

The evidence further indicates, that, the larger the country, both good governance, and high ethnolinguistic fractionalization contribute to the effectiveness of expenditure decentralization in reducing deficits. Thus, it is possible to argue that, having controlled for the country size, the relationship between FD and deficits is largely influenced by the quality of governance. Finally, we observe that revenue decentralization becomes effective in reducing deficits only in case of larger country size, higher quality of governance and the presence of local elections.

APPENDIX 1: **Variable Definitions/Abbreviations and Sources**:

DC	**:** Dummy for industrialized countries (21)
Deficits	:Overall (consolidated) budget deficits / GDP (IMF-IFS, line 80)
ED:	Expenditure decentalization
EXPs&p/TOT	**:** Total spending by State and Provincial Governments/ Total Government Spending (Central + State and Provincial) (IMF-GFS: [82, JZG]/[82+82,JZG])
EXPs&p/CURR	**:** Current spending by State and Provincial Governments/ Current Government Spending (Central + State and Provincial) (IMF-GFS: [82R, JZG]/[82R+82R,JZG])
EXPloc/CURR	**:** Current spending by Local Governments/ Current Government Spending (Central + Local) (IMF-GFS: [82R, LZG]/[82R+82R,LZG])
G	**:** Consolidated government spending/GDP (IMF-IFS)
GDPgr	: Rate of growth in real GDP. (IMF-IFS)
RD	: Revenue decentralization
REVs&p/TOT	**:** Total Revenue by State and Provincial Governments/ Total Government Revenue (Central + State and Provincial) (IMF-GFS: [81Y, JZG]/[81Y+81Y,JZG])
REVs&p/CURR	**:** Current Revenue by State and Provincial Governments/ Current Government Revenue (Central + State and Provincial) (IMF-GFS: [81YD, JZG]/[81YD+81YD,JZG])
REVloc/CURR	**:** Current Revenue by Local Governments/ Current Government Revenue (Central + Local) (IMF-GFS: [81YD, LZG]/[81YD+81YD,LZG])

APPENDIX 2: Rankings of Countries with respect to Expenditure Decentralization.

Sorted by:	**EXPs&p/TOT**		**EXPs&p/CURR**		**EXPloc/CURR**
Netherlands Antilles	0,65	Canada	0,63	Denmark	0,59
Canada	0,65	Switzerland	0,60	Netherlands Antilles	0,58
Switzerland	0,60	Argentina	0,52	Sweden	0,55
Argentina	0,54	Australia	0,50	Finland	0,53
Turkey	0,51	United States	0,46	Guatemala	0,52
Australia	0,50	India	0,42	Switzerland	0,49
United States	0,47	Pakistan	0,41	Mongolia	0,48
India	0,45	Korea, Rep.	0,35	Norway	0,45
Pakistan	0,38	Brazil	0,33	United States	0,42
Brazil	0,36	Germany	0,32	Canada	0,38
Germany	0,34	Colombia	0,29	Netherlands	0,35
Korea, Rep.	0,27	Austria	0,26	United Kingdom	0,35
France	0,26	Mexico	0,22	Italy	0,31
Peru	0,26	Spain	0,21	Ireland	0,29
Austria	0,26	Bolivya	0,21	Austria	0,26
Colombia	0,25	South Africa	0,18	Germany	0,25
Bolivya	0,25	Indonesia	0,16	Spain	0,24
Mexico	0,23	Malaysia	0,13	Luxembourg	0,24
Spain	0,22	Peru	0,12	Zimbabwe	0,23
Malaysia	0,20	Portugal	0,02	Uruguay	0,22
South Africa	0,19	Portugal	0,02	France	0,22
Indonesia	0,12	Belgium	0,00	Iceland	0,21
Portugal	0,02	Iran, Islamic Rep.	0,00	Israel	0,16
Belgium	0,00			Bolivya	0,16
Burkina Faso	0,00	**Average**	**0,28**	Australia	0,16
Iran, Islamic Rep.	0,00			Belgium	0,15
Netherlands	0,00			Indonesia	0,14
Sri Lanka	0,00			Brazil	0,14
Thailand	0,00			Chile	0,14
Tunisia	0,00			Colombia	0,12
Venezuela, RB	0,00			South Africa	0,09
				Thailand	0,09
Average	**0,26**			Nicaragua	0,08
				Peru	0,07
				Greece	0,06
				Sri Lanka	0,06
				Mauritius	0,06
				Tunisia	0,06
				Trinidad and Tobago	0,06
				Portugal	0,06
				Dominican Republic	0,05
				Mexico	0,05
				Iran, Islamic Rep.	0,05
				Zambia	0,05
				Paraguay	0,04
				Malaysia	0,04
				Gambia, The	0,03
				Costa Rica	0,03
				Panama	0,03
				Ethiopia	0,02
				India	0,00
				Average	**0,20**

APPENDIX 3: Correlations among the major variables used in the analysis.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EXPs&p/TOT	(1)	1,00	0,99	0,64	0,89	0,89	0,56	0,71	0,60
EXPs&p/CURR	(2)	0,99	1,00	0,67	0,88	0,87	0,58	0,73	0,60
EXPloc/CURR	(3)	0,64	0,67	1,00	0,57	0,57	0,93	0,72	0,59
REVs&p/TOT	(4)	0,89	0,88	0,57	1,00	1,00	0,50	0,54	0,45
REVs&p/CURR	(5)	0,89	0,87	0,57	1,00	1,00	0,50	0,53	0,44
REVloc/CURR	(6)	0,56	0,58	0,93	0,50	0,50	1,00	0,64	0,59
Control of corruption	(7)	0,71	0,73	0,72	0,54	0,53	0,64	1,00	0,78
Regulation quality	(8)	0,60	0,60	0,59	0,45	0,44	0,59	0,78	1,00
Voice and account.	(9)	0,68	0,68	0,63	0,47	0,46	0,59	0,94	0,83
Government effic.	(10)	0,62	0,65	0,72	0,46	0,44	0,66	0,97	0,80
Rule of law	(11)	0,65	0,68	0,74	0,48	0,47	0,70	0,97	0,79
Political Stability	(12)	0,60	0,61	0,66	0,46	0,45	0,57	0,92	0,67
Population	(13)	0,11	0,11	0,24	0,21	0,23	0,11	-0,06	-0,02
Area	(14)	0,62	0,61	0,23	0,72	0,73	0,08	0,31	0,15
Ethnoling. Frac.	(15)	0,09	0,07	0,21	0,18	0,17	0,31	0,06	-0,08
Local Elections	(16)	0,54	0,52	0,34	0,43	0,43	0,31	0,38	0,67

		(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
EXPs&p/TOT	(1)	0,68	0,62	0,65	0,60	0,11	0,62	0,09	0,54
EXPs&p/CURR	(2)	0,68	0,65	0,68	0,61	0,11	0,61	0,07	0,52
EXPloc/CURR	(3)	0,63	0,72	0,74	0,66	0,24	0,23	0,21	0,34
REVs&p/TOT	(4)	0,47	0,46	0,48	0,46	0,21	0,72	0,18	0,43
REVs&p/CURR	(5)	0,46	0,44	0,47	0,45	0,23	0,73	0,17	0,43
REVloc/CURR	(6)	0,59	0,66	0,70	0,57	0,11	0,08	0,31	0,31
Control of corruption	(7)	0,94	0,97	0,97	0,92	-0,06	0,31	0,06	0,38
Regulation quality	(8)	0,83	0,80	0,79	0,67	-0,02	0,15	-0,08	0,67
Voice and account.	(9)	1,00	0,89	0,93	0,90	-0,08	0,27	-0,02	0,43
Government effic.	(10)	0,89	1,00	0,96	0,90	-0,03	0,19	0,10	0,35
Rule of law	(11)	0,93	0,96	1,00	0,92	-0,05	0,25	0,07	0,32
Political Stability	(12)	0,90	0,90	0,92	1,00	0,06	0,30	-0,02	0,25
Population	(13)	-0,08	-0,03	-0,05	0,06	1,00	0,54	-0,11	0,12
Area	(14)	0,27	0,19	0,25	0,30	0,54	1,00	0,13	0,22
Ethnoling. Frac.	(15)	-0,02	0,10	0,07	-0,02	-0,11	0,13	1,00	-0,29
Local Elections	(16)	0,43	0,35	0,32	0,25	0,12	0,22	-0,29	1,00

APPENDIX 4: Weigted Least Squares (WLS)

Greene (1993) defines the WLS estimator as:

$\hat{b} = \left[\sum_i w_i x_i x'_i \right]^{-1} \sum_i w_i x_i y_i$, which is consistent regardless of the weights used as long as weights are uncorrelated with the error terms.

References

Baltagi, B., (1995), Econometric Analysis of Panel Data, John Wiley and Sons Ltd.

Barrett, B.F.D., (2000), "Decentralization in Japan: Negotiating the Transfer Authority", *Japanese Studies*, Vol. 20, No.1.

Blanchard, O. and Shleifer, A. (2000), "Federalism with and without Political Centralization: China versus Russia" National Bureau Of Economic Research. Working Paper Series (U.S.); No. 7616:1-14, March.

Bradhan, P., and D. Mookherjee, (1998),"Expenditure Decentralization and the Delivery of Public Services in Developing Countries," CIDER Working Paper No. C98-104 (Berkeley, California: Center for International and Development Economics Research).

Cukierman, A., S. Webb and B., Neyapti, (1992), Measuring The Independence of Central Banks and Its Effect on Policy Outcomes, *The World Bank Economic Review*, 6, 353-98, September.

Davoodi, H. R. (1998), “Fiscal Decentralization and Economic Growth: A Cross-Country Study”, *Journal of Urban Economics* (U.S.), 43, pp.244-257.

De Mello, L., (2000a), "Can Fiscal Decentralization Strengthen Social Capital?", *IMF Working Paper*, WP/00/129.

De Mello, (2000b), Fiscal Decentralization and Intergovernmental Fiscal Relations: A Cross-Country Analysis", *World Development*, Vol. 28, No. 2, pp. 365-380.

De Mello, L. and M. Barenstein, (2001), "Fiscal Decentralization and Governance: A Cross-Country Analysis", *IMF Working Paper* WP/01/71.

Dethier, J.-J., (2000), (ed.), Governance, decentralization, and reform in China, India, and Russia, Kluwer Academic Publishers, Boston.

Donahue, (1997), "Tiebout or Not Tiebout? The Market Metaphor and America's Devolution Debate", the *Journal of Economic Perspectives*, Vol. 11, No. 4, pp.73-81.

Eaton, K., (2001), "Political Obstacles to Decentralization: Evidence from Argentina and Philippines", *Development and Change*, Vol. 32, pp. 101-27.

Feltenstein, A. and S. Iwata (2002), “Decentralization and Macroeconomic Performance in China: Regional Autonomy Has its Costs”, manuscript, IMF.

Fisman, R. and R. Gatti, (2002), "Decentralization and Corruption: Evidence Across Countries", *Journal of Public Economics* 83, pp. 325-545.

Greene, W.H., (1993), Econometric Analysis, MacMillan Publishing Company.

Haussman, J., (1979), "Specification Tests in Econometrics", *Econometrica*, Vol. 46, pp. 1251-71.

Hope, K.R., (2000), "Decentralization and Local Governance Theory and Practice in Botswana", *Development Southern Africa*, Vol. 17, No. 4, October.

Hsiao, C., (1986), Analysis of Panel Data, Economietric Society Monographs, Cambridge University Press.

Inman, R.P. and D.L.Rubinfield, (1997), "Rethinking Federalism", *the Journal of Economic Perspectives*, Vol. 11, No. 4, pp.43-64.

Kaufmann, D., A. Kraay and P. Zoido-Lobaton, (2002), "Governance Matters II: Updated Indicators for 2000/01, The World Bank.

King, D. and Y. Ma, "Fiscal Decentralization, Central Bank Independence and Inflation", *Economic Letters* 72, 2001, 95-98.

Lin, J. Y. and Z. Liu, (2000), " Fiscal Decentralization and Economic Growth in China", mimeograph, University of Chicago.

Litvack, J., (1999), "Decentralization Briefing Notes", World Bank Institute, The World Bank

Neyapti, B. (2002), "Fiscal Decentralization and Its Outcomes for the Turkish Economy: An Empirical Investigation", Bilkent University.

Norris, E., J.Martinez-Vazquez and J.Noregaard, (2000), "Making Decentralization Work: The Case of Russia, Ukraine and Kazakstan, mimeograph, IMF.

Oates, W, (1972), Fiscal Decentralization, New York, Harcourt Brace Jovanowich.

Oates, W, (2001), " Fiscal Decentralization and Economic Development", mimeograph, University of Maryland, College Park.

Panizza, U., (1999), "On the Determinants of Fiscal Centralization: Theory and Evidence", *Journal of Public Economics* 74, pp. 97-139.

Robalino, D.A., O.F. Picazo and A.Voetberg, (2001), "Does Fiscal Decentralization Improve Health Outcomes? Evidence from a Cross-Country Analysis", mimeograph.

Samuelson, Paul A. (1954), " The Pure Theory of Public Expenditure", Review of Economics and Statistics, Vol. 36, No. 4, November, 387-389.

Tanzi, V., (2000), "On Fiscal Federalism: Issues to Worry About", mimeograph.

Treisman, D., (2000), "Decentralization and the Quality of Government",

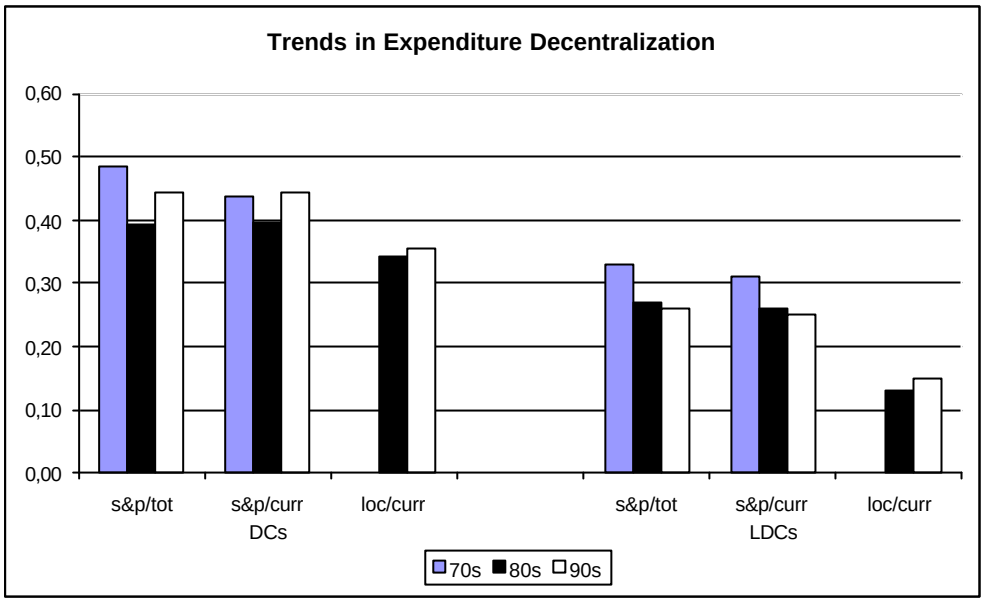
Department of Political Science, University of California, Los Angeles.

Wasylenko, M., (2001), "Fiscal Decentralization and Economic Development", mimeograph, The Maxwell School, Syracuse University.

Von Braun, J. and U. Grote, (2000), "Does Decentralization Serve the Poor?", Center for Development Research, University of Bonn, Germany.

Yilmaz, S., (2000), Book Review: Governance, Decentralization and Reform in China, India and Russia, Editor: Dethier, J., World Bank Institute, Washington D.C.

Figure 1: Trends in Expenditure and Revenue Decentralization in Developed and Less Developed Countries since 1970s.



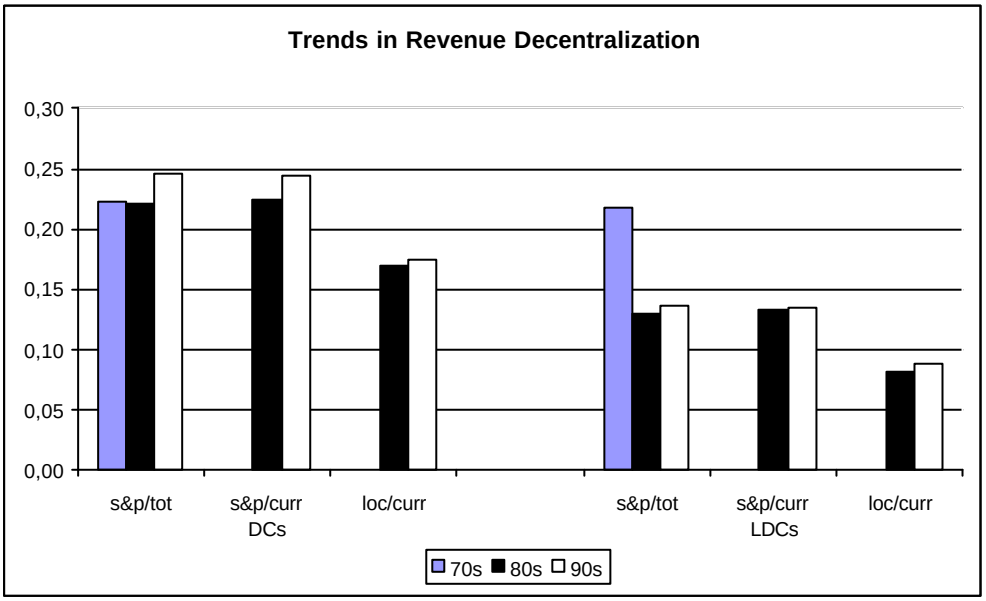


Table 2.a: Dependent Variable: Deficit/GDP

Explanatory variables:	1	2	3	4	5	6
	s&p/TOT	s&p/CURR	loc/CURR	s&p/TOT	s&p/CURR	loc/CURR
Expenditure Decentralization	-9.94***	-18.54***	-36.25**	-27.13***	-22.55***	-59.60**
	(-2.91)	(-5.35)	(-2.27)	(-5.42)	(-5.83)	(-2.27)
Revenue Decentralization	6,24	4,76	-61.99**	12,01	5,91	-144.24***
	(0.94)	(0.74)	(-2.36)	(1.56)	(0.85)	(-3.89)
DC*Expenditure Decentralization				28.23***	18.21**	48,84
				(4.21)	(2.16)	(1.50)
DC* Revenue Decentralization				-1.62	-6.10	211.33***
				(-0.11)	(-0.35)	(4.03)
R-bar squared	0,27	0,40	0,23	0,33	0,41	0,28
# of observations	269	189	478	269	189	478
F-test for ED in DC's (1)				0,06	0,34	0,31
F-test for RD in DC's (2)				0,75	0,002	3.28*

Notes: Figures in parantheses are the t-ratios

(1) Test of the hypothesis that the coefficient of expenditure decentralization in developed countries is zero.

(2) Test of the hypothesis that the coefficient of revenue decentralization in developed countries is zero.

*** reject null at 1 per cent significance level.

** reject null at 5 per cent significance level but not 1 per cent.

* reject null at 10 per cent significance level but not 5 per cent and 1 per cent.

Table 2.b: Controlling for size effect and business cycles

	Dependent Variable: Deficit/GDP		
	1	2	3
Explanatory variables:	s&p/TOT	s&p/CURR	loc/CURR
Expenditure Decentralization	-0.14***	-0.16***	0.57***
	(-4.71)	(-4.98)	(3.75)
Revenue Decentralization	0,04	-0.03	-0.77***
	(0.74)	(-0.42)	(-3.43)
G	0.25***	0.23***	1.17***
	(7.55)	(5.36)	(13.28)
GDPgr	-0.001***	-0.001	0.0004
	(-3.37)	(-1.55)	(0.42)
R-bar squared	0,46	0,50	0,47
# of observations	266	187	470

Note: figures in parantheses are the t-ratios

*** reject null at 1 per cent significance level.

** reject null at 5 per cent significance level but not 1 per cent.

* reject null at 10 per cent significance level but not 5 per cent and 1 per cent.

Table 3 : Signs of Individual interactive terms (Models 2 and 2'):

	1	2	3
	s&p/TOT	s&p/CURR	loc/CURR
Explanatory variables:			
Interactions of Expenditure Decentralization with:			
Political Stability			
Government efficiency	+	+	+
Voice and accountability	+	+	+
Regulation quality	+	+	+
Control of corruption	+	+	+
Rule of law	+	+	+
Population	–	–	
Ethnolinguistic Fractionalization	+	+	
Area	–	–	
Local Elections			+
Interactions of Revenue Decentralization with:			
Political Stability			
Government efficiency			+
Voice and accountability			+
Regulation quality			+
Control of corruption			+
Rule of law			+
Population	–	–	
Ethnolinguistic Fractionalization			
Area			
Local Elections	–		+

Note: Only the significant coefficient signs are reported

Table 4: Weighted Least Squares (weights: normalized population figures), controlling for size effect and business cycles.

	Dependent Variable: Deficit/GDP		
Explanatory variables:	1	2	3
	s&p/TOT	s&p/CURR	loc/CURR
Expenditure Decentralization	-0.35***	-0,32***	-0,33***
	(-11.28)	(-8.60)	(-7.87)
Revenue Decentralization	-0.004***	-0.002	-0,0002
	(-3.02)	(-1.32)	(-0.16)
G	0.28***	0.15***	0.22***
	(10.37)	(4.51)	(7.99)
GDPgr	-0.0002	0,0004	-0.001*
	(-0.46)	(0.69)	(-1.96)
Corr(Y-fitted,Y)^2 (2)	0,32	0,3	0,72
# of observations	266	187	470

Notes: (1) Figures in parantheses are the t-ratios;
(2) R-bar-squared for weighted least squares are meaningless. The corresponding figures for the unweigted regressions are: 0.11; 0.12 and 0,3, respectively.

*** reject null at 1 per cent significance level.

** reject null at 5 per cent significance level but not 1 per cent.

* reject null at 10 per cent significance level but not 5 per cent and 1 per cent.

Table 5 : Signs of Individual interactive terms (Models 3 and 3')
(WLS with weights: normalized population figures)

	Dependent Variable: Deficit/GDP		
	1	2	3
Explanatory variables:	s&p/TOT	s&p/CURR	loc/CURR
Interactions of Expenditure Decentralization with:			
Political Stability	–	–	–
Government efficiency	–	–	–
Voice and accountability		–	–
Regulation quality	–	–	–
Control of corruption	–	–	–
Rule of law	–	–	–
Population			
Ethnolinguistic Fractionalization	–	–	–
Area	–	–	
Local Elections		`	
Interactions of Revenue Decentralization with:			
Political Stability	–	–	–
Government efficiency	–	–	–
Voice and accountability	–	–	–
Regulation quality	–	–	–
Control of corruption	–	–	–
Rule of law	–	–	–
Population			
Ethnolinguistic Fractionalization	–	–	–
Area	–	–	–
Local Elections	–	–	–

Note: Only the significant coefficient signs are reported
(*) In these regressions decentaralization is not itself significant.
(**) Revenue decentralization itself is mostly positively significant for the first 2 columns of D regressions and the 1st column of Deficits,and mostly negatively significant for the 3rd column of Deficits.