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POLICY RESEARCH WORKING PAPER 1387

Fiscal Decentralization and the Size of Government

An Extension with Evidence from Cross-Country Data

Countries, such as economies in transition, that want to reduce the size of the public sector should decentralize both taxing and spending decisions.

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Summary findings

Prior analyses of the relationship between fiscal decentralization and the size of government treat fiscal decentralization as the decentralization of either taxing or spending powers. But decisions about taxation and spending are inseparable.

Ehdaie corrects this deficiency and analyzes the effect of simultaneous decentralization of taxing and spending powers — "fiscal decentralization" — on the overall size of the public sector using cross-country data.

The econometric results of his study show that:

- The simultaneous decentralization of the national government's taxing and spending powers tends to reduce the size of the public sector.
- Revenue-sharing arrangements in which decisions about taxation are made by the national government tend to eliminate the constraining effect of the decentralized spending power.

What do these findings suggest?

Countries, such as economies in transition, that want to reduce the size of the public sector should decentralize both taxing and spending decisions.

This paper — a product of the Public Economics Division, Policy Research Department — is part of a larger effort in the department to study the economic consequences of fiscal decentralization. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Carlina Jones, room N10-063, extension 37699 (18 pages). December 1994.

Fiscal Decentralization and the Size of Government

An Extension with Evidence from Cross-Country Data

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I. Introduction

Many studies have attempted a test of the Leviathan hypothesis [Brennan and Buchanan (1980)], that fiscal decentralization serves as a constraint on the behavior of revenue-maximizing governments and thereby, restrains the overall size of public sector. Among others, Oates (1985), Marlow (1988), Grossman (1989; 1992), Joulfaian and Marlow (1991), and Kneebone (1992) examined the hypothesis at the national government level. A problem with all of these studies is that they treat fiscal decentralization as the decentralization of either taxing or spending powers, neglecting the inseparability of taxing and spending decisions.[2]

The present paper argues that fiscal decentralization in the Leviathan model of government is a composite, constitutional action containing the two inseparable elements of taxing and spending decisions. It then uses international cross-country data to investigate whether the simultaneous decentralization of the national government's taxing and spending powers tends to act as a constraining influence on the overall size of public sector. If so, wouldn't revenue sharing with taxing decisions concentrated in the hands of the revenue-maximizing national government circumvent the constraining influence of decentralization of the spending power? The answers are important for policymakers in all transition and many market-oriented economies as governments often decentralize their spending powers while pursuing the objective of a smaller public sector [for example, Bird and Wallich (1993)].

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[2]This inseparability issue was also ignored by other studies attempted a test of the hypothesis at the state or country government level, for example, Oates (1985), Nelson (1987), Raimondo (1989), Zax (1989), and Joulfaian and Marlow (1990).

The organization of the paper is as follows. The next section deals with the inseparability of taxing and spending decisions in the Leviathan model of fiscal decentralization, followed by a brief discussion of the problems with the results of previous studies. The third section discusses the empirical model. The estimation method and empirical results are presented in the fourth section. The fifth section is devoted to concluding remarks.

II. The Leviathan Model of Fiscal Decentralization

Drawing by analogy on the conventional theory of monopoly in the private sector, Brennan and Buchanan (1980) modelled government as a monolithic entity, "Leviathan", that systematically seeks to maximize the total revenues that it extracts from the economy through the excessive tax-pricing of public goods and services it supplies. The government's ability to maximize revenue and hence expenditure, they argue, is limited only by constitutional constraints placed upon its actions. One such constraint would be the decentralization of the national (central) government's taxing and spending powers, with subnational units of government taxing and spending "independently" [Brennan and Buchanan (1980), 185].

Decentralization of taxing and spending powers provides taxpayers with options among "separate taxing-spending jurisdictions". Through the potential exercise of these options, taxpayers control the behavior of revenue-maximizing governments along the lines of the Tiebout (1956) model. In a Tiebout-style world, any attempt by one jurisdiction to raise the tax price of local public goods and services it supplies will result in migration of its citizen-taxpayers to an alternative jurisdiction in the pursuit of fiscal gains. Interjurisdictional competition for mobile citizen-taxpayers and other economic resources limits governments' excessive tax pricing powers,

encourages a more cost-efficient production-supply of local public goods and services, and thereby, restrains the overall size of the public sector. In short, the Leviathan model contends that, other things equal,

> "Total government intrusions into the economy should be smaller, *ceteris paribus*, the greater the extent to which taxes and expenditures are decentralized....." [Brennan and Buchanan (1980), p. 185].

To further emphasize the inseparability of tax and expenditure decentralization in their hypothesis, Brennan and Buchanan (1980) argued: "Possibility for collusion among separate governmental units....must be included in 'other things equal'.", p. 185. They predicted that, within the constitutionally decentralized fiscal structure, subnational governments would try to circumvent competitive pressures through colluding among themselves or with the national government. One obvious collusion would be agreements between subnational governments and the national government. Subnational governments would cede taxing powers to the national government. National government would establish a revenue-maximizing, uniform tax system across all jurisdictions. The tax revenues would be then shared among governments, with subnational governments receiving their shares in the form of intergovernmental transfers (grants) according to Grossman (1989).

Revenue sharing, Brennan and Buchanan (1980) argue, subverts the primary purpose of the fiscal decentralization, which is to create competition between subnational governments. It removes one major element of the competitive government process, i.e., tax competition, by establishing a uniform tax system across jurisdictions and encourages the expansion of the public sector through the concentration of taxing powers in the hands of the revenue-maximizing

national government, circumventing the constraining influence of the expenditure decentralization. Each subnational unit of government must have responsibility for raising its own revenue and should be precluded from entering into revenue sharing agreements with the national or other subnational units of government [Brennan and Buchanan (1980), p. 183]. The inseparability of revenue-raising and spending responsibilities at the subnational level of government clearly requires the simultaneous assignment of the national government's taxing and spending powers to subnational governments.

In short, the Leviathan model implies that, other things equal, the simultaneous decentralization of the national government's taxing and spending powers, "fiscal decentralization", should act as a constraining influence on the overall size of the public sector.[3] And 'other things equal' should include the simultaneous transfer of the national government's revenue (revenue sharing) and assignment of its spending power to subnational units of government, "fiscal collusion". The effect of fiscal collusion on the public sector size is ambiguous, depending on whether the stimulating effect of revenue sharing would exceed or fall short of the constraining influence of decentralization of the spending power.

However, as mentioned earlier, previous attempts to conduct an econometric test of the fiscal decentralization hypothesis at the national government level ignored the simultaneity of taxing and spending decisions, for example, Oates (1985), Marlow (1988), Grossman (1989; 1992), Joulfaian and Marlow (1991), and Kneebone (1992). They measured fiscal [de]centralization by a [de]centralization ratio of taxing or spending powers, i.e., the share of

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[3]Alternative theories of government behavior supporting this hypothesis include Richard Musgrave's (1959) model of how the distribution function of government would be carried out by subnational governments, and the more traditional public choice models (for example, Walter Hettich and Stanley Winer, 1984).

[sub]national government[s] own-tax revenue in total subnational-national government revenues or the [sub]national governmen[s] share of total subnational-national government expenditures, and collusion by the ratio of grants to total subnational governments own-tax revenues.[4] In the context of the Leviathan model, the coefficient of the [de]centralization ratio of taxing or spending powers, alone, has no economic interpretation although it has been used by these studies as a statistical criterion to test the fiscal decentralization hypothesis. Contrary to this hypothesis, the collusion variable would not remain unchanged with the extent of fiscal decentralization. As an inseparable component of fiscal decentralization, the extent of decentralization of taxing powers would automatically cause an increase in subnational governments own-tax revenues and thus a decrease in the collusion variable.

The present paper extends the existing literature, treating fiscal decentralization as the simultaneous decentralization of the government's taxing and spending powers.

III. The Empirical Model

The Leviathan model predicts that, other things equal, the overall size of the public sector should inversely vary with the extent of simultaneous decentralization of the national government's taxing and spending decisions (fiscal decentralization). Furthermore, "other things equal" should include the simultaneous transfer of the national government's revenue and of its spending powers to subnational governments (fiscal collusion). Accordingly, this paper defines

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[4]Regarding the collusion variable, Oates (1985) used the ratio of grants over subnational governments revenues for intergovernmental grants but did not discuss possibility for collusion among governments. Marlow (1988) ignored collusion. Grossman (1989) dealt with collusion but used Oates' (1985) grant variable as a measure of collusion. Other studies adopted Grossman's collusion variable.

the measure of fiscal decentralization, "FIS_DEC", as the ratio of total subnational governments own-source revenues used to finance their expenditures to total subnational-national government expenditures. FIS_DEC varies only with the extent of simultaneous [de]centralization of the national government's taxing and spending powers. Its variation excludes changes in the decentralization degree of expenditures financed through sources other than the subnational governments own-source revenues.

As a measure of fiscal collusion, "FIS_COL", this paper uses the ratio of the national government's revenues transferred to subnational governments over total subnational-national government expenditures. FIS_COL only varies with the variation of simultaneous transfer of the national government's revenue and assignment of its spending responsibility to subnational governments. It remains fixed with the extent of fiscal [de]centralization. FIS_DEC and FIS_COL are independent, policy variables.

The present paper adopts the measure of public-sector size, PUB_SIZ, employed by Marlow (1988), Grossman (1989; 1992), Joulfaian and Marlow (1991), and Kneebone (1992). PUB_SIZ is defined as the total general government expenditures share of gross domestic products.

To test the fiscal decentralization hypothesis, the level (or growth) of PUB_SIZ are assumed to be related to the level (or growth) of FIS_DEC, FIS_COL and a set of other control variables, "Z", as follows:

$$PUB\_SIZ = \alpha_0 + \alpha_1 FIS\_DEC + \alpha_2 FIS\_COL + \alpha_3 Z + U \qquad (1)$$

or

$$PUB\_SIZ^{*} = \alpha_0 + \alpha_1 FIS\_DEC^{*} + \alpha_2 FIS\_COL^{*} + \alpha_3 Z^{*} + U^{*} \qquad (2)$$

where

PUB_SIZ = ratio of total national-subnational government expenditures to GDP;

FIS_DEC = ratio of total subnational governments own-source revenues over total national-subnational government expenditures;

FIS_COL = ratio of the national government's revenues transferred to subnational governments over total national-subnational government expenditures;

Z = a vector of other control variables;

U = disturbance terms;

and superscript asterisks in equation (2) refer to the growth rate of variables.

Equations (1) and (2) are similar to the estimating equations employed by previous studies with exception of the measurements of the FIS_DEC, FIS_COL, FIS_DEC* and FIS_COL*.

The Leviathan fiscal decentralization hypothesis implies $\alpha_1 < 0$. The sign of α_2 may be positive or negative, depending on whether the stimulating effect of transfer of the national government's revenue to subnational governments (revenue sharing) on the size of the public sector would exceed or fall short of the constraining influence of the decentralized expenditures financed through revenue-transfers. The positive sign of α_2 regardless of its significance level would indicate that revenue sharing with taxing decisions concentrated in the hands of revenue-maximizing national government exterminates the constraining influence of decentalization of the spending power, providing further support for the Leviathan model.

To control for the influence of other variables, the present paper follows Oates' (1985) international cross-country analysis and uses gross domestic product per capita at the constant 1987 US dollar, "GDP_PER", for Wagner's Law and total population or the share of urban population in total population, "URB_POP", as a scale variable. According to Wagner's law, demand for public goods and services is more income-elastic than demand for private goods and services, implying a positive relationship between PUB_SIZ, the demand for public goods-services relative to total demand for public-private goods-services, and GDP_PER. GDP_PER also controls for the positive effect of economic development on the size of the public sector. The more developed (industrialized) a country, the higher would be its GDP per capita and thus public-sector size. As regards the effect of scale variable, Oates (1985) has argued that the more urbanized or populated a state, the smaller should be its public sector, reflecting some economies in providing services to more densely populated areas. The counter-hypothesis argues that growth of urban or total population would increase demand for public services, encouraging the expansion of the public sector, for example, Kneebone (1992).[5]

IV. Estimation Methods and Empirical Results

The information on public finances in the IMF Government Financial Statistics Yearbook (1992) were used to assemble measures of PUB_SIZ, FIS_DEC and FIS_COL for a sample of 30 countries in 1987, the most recent year which provided the largest size of sample (30), and 1977, the earliest year for which data were available for the most of countries in the sample (26).

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[5]It might be argued that inclusion of some exogenous variables in the model may improve the explanatory power of the equations. But the purpose of this paper is to provide an extension of the earlier studies.

Growth rates of these measures over the 1977-87 period were used to generate cross-country data for PUB_SIZ*, FISC_DEC* and FIS_COL*. The longer the period, the more would be the variation in these growth rates across countries. Data for other variables were extracted from World Tables (1992). The list of countries can be found in the appendix.

Equations (1) and (2) were, respectively, estimated using the level of variables in 1977 and 1987 and their 1977-87 growth rates by means of least-squares method (Table 1).[6] Consistent with the Leviathan model, coefficient of fiscal-decentralization variable is negative in all of the equations. But the results are suspect due to the presence of a serious degree of multicollinearity according to Klien's rule (1962). In all of the equations, multiple correlation coefficient of the dependent variable (Y) with all independent variables (X_i), "$R^2_{y.all\ x's}$", falls short of multiple correlation coefficient of at least one independent variable with all other independent variables, "$R^2_{xi.other\ x's}$". Such a serious degree of multicolinearity could affect the sign or size of the parameters which are crucial for the purpose of this study.[7]

A step-wise regression procedure was employed to search for the source of multicollinearity. The scale variable was found to be the major cause of multicollinearity in all of the equations, capturing the effects of other explanatory variables without making a significant contribution to the variation of the public-sector size. This variable, which was not important for

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[6]Following Oates (1985), equation (1) was also estimated using a logistic transformation of the dependent variable to allow the dependent variable to range over the whole set of real number. consistent with Oates' findings, the results were remarkably similar to those without the transformation; therefore, those presented here do not make use of the logistic transformation. In addition to GDP per capita, the present paper also used dummy variable, one for industrial and zero for developing countries, to capture the effect of development on the overall size of public sector; its coefficient was found to be of insignificant in explaining variation of the public-sector size.

[7]For more details about the effect of multicollinearity on the signs and sizes of the parameters, see: Maddala (1977), P. 185.

Table 1. Estimation Results[1]

Equation (1)			Equation (2)	
Ind. var.[2]	1977	1987	Ind. var.[2]	1977-87
FIS_DEC	-0.2592 (-1.15) [0.412]	-0.2714 (-1.23) [0.333]	FIS_DEC*	-0.0805 (-1.13) [0.130]
FIS_COL	0.0102 (0.050) [0.123]	0.1672 (0.57) [0.029]	FIS_COL*	0.0004 (0.366) [0.048]
GDP_PER	0.0141 (2.12) [0.644]	0.0109 (2.39) [0.514]	GDP_PER*	-0.6151 (-1.79) [0.261]
URB_POP	0.0019 (1.04) [0.5241]	0.0019 (1.21) [0.359]	URB_POP*	0.2219 (0.667) [0.112]
CONSTANT	0.1673 (2.44)	0.2199 (2.91)	CONSTANT*	0.2405[b] (2.63)
F	5.97	4.36	F	1.50
R^2	0.57	0.45	R^2	0.25
Adj.R^2	0.48	0.39	Adj. R^2	0.08

[1] Dependent variable is the total subnational-national government expenditures share of GDP in equation (1) and its 1977-87 growth rate in equation (2). Within the parentheses are t-statistics. Within the brackets are the multiple correlation coefficient of each independent variable with all other independent variables included in the model.

[2] FIS_DEC = total subnational governments own-source revenues over total subnational-national government expenditures; FIS_COL = the national government's revenues transferred to subnational governments over total subnational-national government expenditures; GDP_PER = GDP per capita at constant 1987 $US (1000); URB_POP = the share of urban population in total population (%). Superscript "*" s refer to the 1977-87 growth rates.

the purpose of this paper, was excluded from all of the equations and the equations were re-estimated (Table 2).

Test of hypotheses about the parameters, which are also crucial for the purpose of this study, would be suspect with the presence of heteroscedasticity, and endogeneity of fiscal decentralization and collusion variables. Heteroscedasticity is often encountered in cross-section data. A test for homoscedasticity was conducted using Glejser's (1969) procedure. The test results, which can be found in the appendix, reject the alternative hypothesis in all of the equations, that heteroscedasticity exists. Finally, the overall size of public sector might endogenously influence fiscal decentralization and collusion (independent variables), creating correlation between these independent variables and error terms. This problem may emerge from certain government activities which require or imply a national government role, e.g., military spending. Growth of these government activities and consequently the overall size of public sector may cause declining fiscal decentralization and collusion. To address this matter, equation (1) was estimated using instrument variable technique. The estimation results, which are presented in the appendix, were remarkably similar to the LS ones, indicating that fiscal decentralization and fiscal collusion variables are independent of the public-sector size and consequently error terms.

Table 2 reports the final estimation results. The explanatory power of equation (1), in both 1977 and 1987, is higher than the explanatory power of equation (2), with the former explaining almost 70 percent of total variations in the overall size of public sector. Consistent with Wagner's Law, the level of per capita GDP (GDP_PER) has a positive and statistically significant association with the level of the public sector size (PUB_SIZ) in both 1977 and 1987.

Table 2. The Estimation Results: After Exluding the Scale Variable[1]

Equation (1)			Equation (2)	
Ind. var.[2]	1977	1987	Ind. var.[2]	1977-87
FIS_DEC	-0.3378[a] (-1.52) [0.371]	-0.2788[a] (-1.38) [0.332]	FIS_DEC*	-0.0957[a] (-1.44) [0.130]
FIS_COL	0.0571 (0.26) [0.105]	0.2049 (0.74) [0.023]	FIS_COL*	0.0003 (0.28) [0.038]
GDP_PER	0.0208[b] (4.38) [0.309]	0.0136[b] (3.80) [0.336]	GDP_PER*	-0.6781[a] (-1.80) [0.001]
CONSTANT	0.2423[b] (5.24)	0.3172[b] (7.57)	CONSTANT*	0.2649[b] (3.21)
F	6.79	5.68	F	1.91
R^2	0.54	0.44	R^2	0.23
Adj.R^2	0.46	0.37	Adj. R^2	0.11

[1] Dependent variable is total subnational-national government expenditures share of GDP in equation (1) and its 1977-87 growth rate in equation (2). Within the parentheses are t-statistics. Within the brackets are the multiple correlation coefficient of each independent variable with all other independent variables included in the model.

[2] FIS_DEC = total subnational governments own-source revenues over total subnational-national government expenditures; FIS_COL = the national government's revenues transferred to subnational governments over total subnational-national government expenditures; GDP_PER = GDP per capita at constant 1987 $US (1000). Superscript "*" s refer to the 1977-87 growth rates.

[a] Significant at the 90 percent probability level, one-tail test for the coefficients of FIS_DEC and FIS_DEC*.

[b] Significant at 95 percent probability level.

As hypothesized, fiscal decentralization (FIS_DEC and FIS_DEC*) exerts a negative influence on the size of the public sector in all of the equations, being significantly different from zero at the above 90 percent probability level.

Finally, coefficient of fiscal-collusion variable (FIS_COL and FIS_COL*) in all of the equations is positive but not significantly different from zero. This result, which is consistent with the Leviathan model, indicates that the stimulating effect of transfer of the national government's revenue to subnational governments (revenue sharing) significantly neutralizes the constraining influence of the decentralized expenditures financed through revenue-transfers.

V. Conclusion

Earlier attempts to examine the relation between fiscal decentralization and government size treat fiscal decentralization as the decentralization of either taxing or spending powers, neglecting the inseparability of taxing and spending decisions which makes interpretation of the results in the context of the model difficult. The present paper extends the existing literature, arguing that fiscal decentralization is a composite, constitutional action containing the two inseparable elements of taxing and spending decisions. It then employs an econometric model to investigate the effect of fiscal decentralization on the overall size of public sector using international cross-country data.

The empirical results show that (i) the simultaneous decentralization of the national government's taxing and spending powers exerts a negative and significant influence on the overall size of public sector; and (ii) revenue sharing with taxing decisions concentrated in the hands of national government eliminates the negative influence of decentralization of the spending power.

These findings suggest that the countries pursuing the objective of a smaller public sector but just decentralizing their spending powers should decentralize their taxing decisions as well.

APPENDIX

The Test Results for Homoscedasticity--H_0: $\sigma_i=0$.
t-statistics for σ_is[1]

Equations:	$\lvert e \rvert = \sigma_0+\Sigma\sigma_i x_i$		$\lvert e \rvert = \sigma_0+\sigma_i x_i$		$\lvert e^* \rvert = \sigma_0+\Sigma\sigma_i x^*_i$	$\lvert e^* \rvert = \sigma_0+\sigma_i x^*_i$
x_is	1977	1987	1977	1987	1977-87	1977-87
Form A:						
FIS_DEC	-1.0	0.11	-1.3	0.91	0.57	0.67
FIS_COL	-1.03	-1.11	-1.29	-1.28	-0.51	-0.63
GDP_PER	0.39	1.31	0.54	1.73	-0.78	-0.78
Form B:						
$\frac{1}{\text{FIS\_DEC}}$	1.09	0.65	1.26	0.87	-0.59	-0.63
$\frac{1}{\text{FIS\_COL}}$	0.41	-0.79	0.41	-0.67	0.35	0.34
$\frac{1}{\text{GDP\_PER}}$	-1.17	0.18	-0.40	0.77	-0.78	-0.78
Form C:						
$\sqrt{\text{FIS\_DEC}}$	-1.26	-0.27	-1.34	-0.63	0.98	0.58
$\sqrt{\text{FIS\_COL}}$	-0.89	-0.72	-1.13	-0.85	-0.52	-0.39
$\sqrt{\text{GDP\_PER}}$	-0.79	-1.18	-0.27	-1.73	-1.02	-1.25

[1] x^*_i is the 1977-87 growth rate of x_i . $\lvert e \rvert$ =absolute values of the OLS estimates of errors in equations (1) for 1977 and 1987; $\lvert e^* \rvert$ =absolute values of the OLS estimates of errors in equation (2).

Estimation Results Using Instrument Variable Technique*

Ind. variables	1977	1987
FIS_DEC	-0.3648[a] (-1.58)	-0.2956[a] (-1.34)
FIS_COL	0.0724 (0.42)	0.2252 (0.76)
GDP_PER	0.0214[b] (4.43)	0.0139[b] (3.71)
CONSTANT	0.2405[b] (5.19)	0.3175[b] (7.43)
F	6.81	5.31
R^2	0.52	0.45
Adj.R^2	0.41	0.39

* Lagged FIS_DEC and FIS_COL were used as instrument variables.

[a] Significant at 90 percent probability level, one-tail test for FISC_DEC.

[b] Significant at 95 percent probability level.

List of countries:

Argentina	Australia	Belgium	Brazil	Canada
Chile	Finland	France	Germany	Hungary
India	Ireland	Israel	Italy	Japan
Kenya	Luxembourg	Malaysia	Mexico	Netherlands
Norway	Paraguay	Poland	Romania	South Africa
Spain	Sweden	Thailand	UK	US

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