Searching for Leviathan: An Empirical Study

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Searching for Leviathan: An Empirical Study

By WALLACE E. OATES*

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

In several papers and a recent book, Geoffrey Brennan and James Buchanan (1977, 1978, 1980) have put forth a striking and controversial view of the public sector. Drawing by analogy on the conventional theory of monopoly in the private sector, they envision a monolithic government that systematically seeks to exploit its citizenry through the maximization of the tax revenues that it extracts from the economy. From this perspective, they develop a fiscal constitution whose central purpose is to constrain "Leviathan" by limiting in various ways its access to tax and other fiscal instruments.

While the Leviathan hypothesis has been the source of lively debate and a wide range of policy proposals, it has not been the subject of much systematic empirical work or testing.[1] This is a matter of some importance since the policy implications of the Leviathan view are disturbing, to put it mildly. In particular, Brennan and Buchanan virtually stand on their heads many of the basic theorems in public finance for an efficient and equitable tax system. If, in fact, the Leviathan view is an inaccurate depiction of the functioning of the public sector, the introduction of their policy proposals is likely to make a sorry mess of the fiscal system.

The Leviathan model does, however, have some straightforward implications for observable fiscal behavior. It is the purpose of this paper to examine one of these testable implications. Brennan and Buchanan stress that fiscal decentralization is itself a powerful constraint on Leviathan: competition among governments in the context of the "interjurisdictional mobility of persons in pursuit of 'fiscal gains' can offer partial or possibly complete substitutes for explicit fiscal constraints on the taxing power" (1980, p. 184). Such competition among governments in a federal system that places heavy reliance on "local" fiscal decisions will greatly limit the capacity of Leviathan to channel resources into the public sector. In short, as indicated by the epigraph to this paper, the Leviathan model implies that, other things equal, the size of the public sector should vary inversely with the extent of fiscal decentralization.[2]

[1] For a critical appraisal of the Leviathan model, see Richard Musgrave (1981).

[2] As Musgrave has pointed out to me, other sorts of models besides Leviathan could produce such an outcome. He notes, in particular, the redistribution function. Under a highly decentralized public sector, there is likely to be comparatively little in the way of assistance to the poor for two reasons. First, sorting out along Tiebout lines will imply relatively income-homogeneous jurisdictions with little scope for redistribution from wealthy to poor *within* jurisdictions. And, second, the fear of attracting mobile poor with relatively generous support programs will tend to deter the adoption of such programs. All this suggests that the scope for public relief programs will be more circumscribed under a relatively decentralized fiscal system. This would lead us to expect comparatively larger budgets where the public sector is more centralized as a result of a greater demand for assistance to low-income households.

I. More on the Empirical Test

Brennan and Buchanan thus see a decentralized public sector as a mechanism for limiting the growth or size of government. But there is an alternative view. Suppose that instead of a monopolistic setting, competition among political parties produces an outcome that conforms fairly closely to the tastes of the citizenry—as under the conventional median-voter model. In such a competitive political environment, one would have no reason to expect a negative association between the size of public budgets and the degree of fiscal decentralization. In a centralized setting, the outcome would conform to the preferences of the "overall" median voter. If, in contrast, levels of output were set independently in each jurisdiction, the median voter in each locality would effectively choose the budget. It is impossible to determine whether the average level of output in the decentralized case would exceed or fall short of output under centralized decision making without knowing both the distribution of tastes and the location of the populace.[3]

In fact, one might argue for the competitive case that, *from a purely budgetary perspective*, increased fiscal decentralization would typically result in a higher level of government expenditure. Greater decentralization may result in the loss of certain "economies of scale" with a consequent increase in costs of administration. This, of course, need not imply an inferior outcome; the welfare gains from the tailoring of local budgets to local preferences and from the

wider range of choice available to mobile consumers may more than offset the additional administrative expenditures. The point is simply that fiscal decentralization may be relatively expensive in budgetary terms. Thus, a more competitive view of the functioning of the public sector would suggest, contrary to the Leviathan model, an absence of a positive association between government size and fiscal centralization with the possibility that this association might even be negative.

John Wallis, an American economic historian, has suggested to me an even stronger hypothesis. He contends that since individuals have more control over public decisions at the local than at the state or national level, they will wish to empower the public sector with a wider range of functions and responsibility where these activities are carried out at more localized levels of government. Based on his reading of American history, Wallis offers the conjecture that over time and across states, the state-local sector has tended to be larger, the more decentralized is fiscal decision making.

The resolution of this debate requires recourse to the actual facts of governmental structure and budgetary outcomes. A little over a decade ago in the context of a larger study. I undertook a cursory examination of the relationship between the size of government and the extent of fiscal decentralization, using a cross-sectional sample of 57 countries (1972, pp. 209–13). Regressing a measure of the size of the public sector (tax revenues as a fraction of national income) on a fiscal centralization ratio (i.e., central-government tax revenues as a percentage of total tax revenues), I found a strong and statistically significant negative association. Increased fiscal decentralization in this simple regression equation was associated with a *larger* government sector. However, after controlling for the effect of the level of income on the size of government (i.e., Wagner's "Law"), the relationship between the two variables of interest became much weaker: the sign remained negative but was not significantly different from zero at the usual confidence levels. This earlier work thus

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[3]As Musgrave suggested to me, the result is likely to depend critically on the arrangement of preferences in the tails of the distribution. Suppose, for example, that the upper tail of the distribution of tastes stretches out quite far. This will have little impact on the outcome under centralized decision making, since the distribution of the tail has no effect on the median voter. Under a more decentralized system, however, these high demanders might reside together in a jurisdiction with an extraordinarily high level of output. Musgrave conjectures that the tail on the high side might be expected to be the more skewed so that, *ceteris paribus*, the budget is likely to be larger under decentralization.

does not support the Brennan-Buchanan model of Leviathan; in none of the statistical tests did the results suggest that fiscal decentralization was significantly associated with a relatively small public sector.

In view of the renewed interest in this issue, I turn in this paper to a more careful study of this relationship, making use of two quite different bodies of data. First, the International Monetary Fund (1982) has recently provided an extraordinarily rich set of information on public finances disaggregated by level of government. From this data, I have been able to assemble measures of the extent of fiscal centralization for a sample of 43 countries. The second sample is quite different: it consists of the state-local sector in each of the 48 contiguous states in the United States. For this second sample, I explore the association between the budgetary size of state and local government in each state and the degree of decentralization of the state-local "fisc."

Each of the two samples has its relative strengths and weaknesses for purposes of this study. The international sample encompasses much greater diversity in governmental structure and consequently provides considerably more variation in the variables of interest. There is, in a sense, more to work with here. However, this comes at some cost, for the state-local data are undoubtedly more reliable and comparable than those from different countries; there should, therefore, be less in the way of measurement error and differing classifications of budgetary items. Finally, there is the issue of the extent of fiscal mobility. There must typically exist greater mobility across state than national boundaries suggesting that fiscal decentralization, from the Brennan-Buchanan perspective, should enforce a greater fiscal "discipline" on state than on national governments. In short, the scope for state governments to extract "surplus" from their residents is probably less than for the central government. Nevertheless, state governments are surely in a much less constrained position than are the myriad of smaller local governments that compete with one another within a state's borders. The Leviathan model would thus predict that, other things equal,

those states with a more decentralized fiscal structure should have a smaller state-local sector.

The testing procedure will be to take as the null hypothesis the proposition that government size and the extent of decentralization bear no relation to one another. Since the various views discussed above suggest that the relationship between these two variables could be either negative or positive, it is appropriate to use a two-tailed test to determine if we can reject the null hypothesis in favor of the alternatives.

II. Empirical Results: The State-Local Sector

As a measure of the "size" of the public sector, the Leviathan view suggests that we focus on the level of tax revenue that the state extracts from the economy. Normalizing for the level of income, I take as the dependent variable for this part of the study aggregate state-local tax receipts in each state as a fraction of personal income (G). The appropriate measure of the extent of decentralization is less clear. In consequence, I have used three plausible indices of state-local decentralization. The first two are fiscal centralization ratios: the state share of state-local general revenues (R, a revenue measure) and the state share of state-local total expenditure (E, an expenditure measure). As a third and a nonfiscal index of decentralization, I have employed the absolute number of local government units in the state (L).[4] This variable is suggested by Brennan and Buchanan's observation that "the potential for fiscal exploitation varies inversely with the number of competing governmental units in the inclusive territory" (1980, p. 185).[5]

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[4] I experimented with some variants of L involving the normalization of the number of local governments for land area and for population size. In these forms, its explanatory power was considerably reduced compared to its unnormalized form.

[5] In an interesting theoretical paper, Dennis Epple and Allan Zelenitz (1981) have explored the extent to which competition among local jurisdictions can limit the power of local governments to extract tax revenues from their residents. They find that increasing the number of local jurisdictions limits the scope for such taxation, but cannot eliminate it entirely.

TABLE 1–SUMMARY STATISTICS

Variable	Mean	Maximum	Minimum	SD
G	.12	.18	.10	.02
R	.58	.78	.43	.08
E	.43	.59	.22	.08
L	1660	6620	120	1450

Note: G = total state-local tax receipts as a fraction of state personal income; R = state share of state-local general revenues; E = state share of state-local total expenditures; L = number of local government units; and SD = standard deviation.

TABLE 2—SPEARMAN RANK CORRELATION COEFFICIENT

Variable Pair	Correlation Coefficient	t-Statistic
G, R	− .22	1.50
G, E	− .25	1.73
G, L	− .06	0.41

Table 1 reports the basic summary statistics for the four variables. State-local tax revenues as a fraction of personal income (G) have a mean value of .12 and vary from a high of .18 for New York to a low of .10 for Ohio. There is considerable diversity in the extent of fiscal concentration: the centralization ratio for revenues (R), for example, varies from a maximum of .78 for New Mexico to a minimum of .43 for New Hampshire with a mean value of .58. Likewise, the number of local governments ranges from 6,620 in Illinois to only 120 in Rhode Island. The sources of the data are listed in the Appendix. I would note that the fiscal data come from the *1977 Census of Governments*. It seemed advisable to use a year prior to the "disturbances" introduced by the numerous measures enacted under the fiscal-limitation movement in the United States.

As a first and admittedly crude examination of the associations among these variables, I looked at the simple rank correlation between G and each of the three measures of state-local decentralization. While this fails to hold constant for the influence of other variables, it does give some sense of the simple relationship between the pairs of variables without imposing any a priori assumptions concerning the probability distribution of the population from which the sample was drawn. Table 2 reports the value of the Spearman rank correlation coefficient (Spearman's *rho*) between G and each of the decentralization measures and the associated t-statistic (Sidney Siegel, 1956, p. 202). The correlation between G and each of the fiscal centralization ratios is negative, indicating that a more centralized state-local sector

tends to be associated with a *smaller* state-local sector. Although the negative correlation runs counter to the prediction of the Leviathan model, the association is not sufficiently strong in either case to reject the null hypothesis of a zero correlation at a .05 significance level using a two-tailed test.[6] In contrast, the correlation between G and L, the number of local governments, has the negative sign implied by the Leviathan hypothesis; however, the relationship is very weak, and again we cannot reject the null hypothesis of a zero correlation. The simple rank correlations thus do not support the Leviathan model.

In an attempt to control for other variables that influence the size of the public sector, I move next to a multiple-regression analysis. In the absence of a fully specified model of the economy, I have resorted to a series of admittedly *ad hoc*, reduced-form equations using explanatory variables that other studies have found to be of significance in explaining the size of the government sector.[7] The regression analysis requires one further modification: since the dependent variable has a range limited to the zero-to-one interval, the basic assumptions of the regres-

[6]As an alternative testing procedure, I might have focused on the Brennan-Buchanan prediction of a positive relationship between G and the measure of fiscal centralization and taken it as the alternative to the null hypothesis of no relationship. This procedure would imply a one-tailed test of H_0 against H_1. However, as the regression results will make clear, this form of test would not alter the basic findings.

[7]Although I am unhappy with my inability to derive formally the equation to be estimated from a fully specified structural model, I would note that the dependent variable is the ratio of government revenues to personal income. The complete structural model would thus have to determine both the level of government budgetary activity and the level of private income—a formidable task.

TABLE 3—ESTIMATED REGRESSION EQUATIONS

(1R)	$G' = -1.8 -\ .004R$ (11.5) (1.5)	$R^2 = .04$
(1E)	$G' = -1.7 -\ .006E^*$ (14.9) (2.2)	$R^2 = .10$
(1L)	$G' = -2.0 +\ .5 \times 10^{-5}L$ (59.2) (0.3)	$R^2 = .003$
(2R)	$G' = -2.9 +\ .0001Y^* -\ .003P\ -\ .002U\ +.01I^* -\ .006R$ (8.7) (3.5) (0.4) (1.7) (2.8) (1.7)	$R^2 = .32$
(2E)	$G' = -2.8 +\ .0001Y^* -\ .0002P -\ .002U\ +.008I -\ .004E$ (6.6) (3.1) (0.0) (2.0) (1.9) (1.0)	$R^2 = .29$
(2L)	$G' = -3.0 +\ .0001Y^* -\ .008P\ -\ .002U^* +.007I -\ .00002L$ (9.2) (3.7) (1.0) (2.1) (1.8) (1.1)	$R^2 = .29$

Note: The numbers in parentheses below the estimated coefficients are the absolute values of the *t*-statistic. An asterisk indicates that the estimated coefficient is statistically significant at the .05 level (using a two-tail test). U = percentage of state's population residing within Standard Metropolitan Statistical Areas (SMSA); P = population (in millions); Y = state personal income per capita; I = intergovernmental grants as a percentage of state-local general revenues.

sion model are not satisfied. To correct for this, I have used the logistic transformation to create a new dependent variable whose value can range over the whole set of real numbers (see, for example, Robert Pindyck and Daniel Rubinfeld, 1981, p. 287). Table 3 reports the findings for the transformed G (denoted G'). The results, incidentally, do not differ substantively from those if the transformation is not used.

The first three equations in Table 3 are the simple regressions of G' on each of the measures of decentralization. They are roughly consistent with the rank correlations, indicating negative associations of G' with R and E. The simple correlation with L is now positive but remains very weak. The next three equations attempt to control for the influence of other key variables on the size of the public sector. The level of per capita income (Y), for example, has a positive and significant association with the size of the public sector (consistent with earlier studies of Wagner's Law). Population size (P) exhibits a postivie sign but is not significantly different from zero in any of the three equations. Next, the extent of urbanization (U) is negatively related to G' and is statistically significant in one of the three equations. Other things equal, the more urbanized a state, the smaller is its public sector, reflecting perhaps some economies in providing

services to more densely populated areas.[8] There exists a body of theoretical and econometric work suggesting that intergovernmental grants provide a significant stimulus to expenditures by the recipient. The findings here are consistent with this. The variable I, the percentage of state-local general revenues that comes from intergovernmental grants, has the expected positive coefficient and is statistically significant in equation (2R).

Of central interest here is the effect of including these control variables on the measured influence of the decentralization variables. The fiscal centralization ratios, R and E, retain their negative sign, but in neither case can we reject the null hypothesis of no association. The number of local governments L now has a negative sign (consistent with the Leviathan view) and a somewhat larger *t*-statistic, but we are likewise unable to reject the null hypothesis of no association at the .05 level. The results of the multiple-regression analysis do not appear to provide

[8] Rubinfeld has suggested that the negative and significant sign of the estimated coefficient of the urbanization variable could be interpreted as providing support for Leviathan. The contention is that in more highly urbanized areas, the Tiebout process of sorting can better work itself out. Thus, more highly urbanized states are likely, from this perspective, to be effectively more decentralized.

real support for either the view that decentralization constrains the size of the public sector or that it results in a more expansive government sector. I would note, moreover, that these findings seem quite robust. I experimented with several different specifications of the multiple-regression equation, including the use of some nonlinear transformations of the key variables. In a few instances, the fiscal centralization variables were both negative and statistically significant, providing some support for the Wallis hypothesis. But in no cases did I find any significant coefficients with the sign predicted by the Leviathan model.[9]

III. Empirical Results: The World Sample

The procedures for analyzing the data from my international sample of 43 countries are essentially the same as those for the state-local study. First I have computed the Spearman rank correlation coefficients between a revenue measure of government size and my measures of fiscal centralization. And second, I present estimates of regression equations using basically the same control variables as earlier. In addition to results for the world sample as a whole, I report the estimated equations for two subsamples: a group of 18 industrialized countries (so classified by the IMF) and the remaining 25 "developing" countries. As will become apparent shortly, there are some striking and important differences between the developing

[9] There is a further issue. Since some grant funds take a matching form, the level of public spending may influence the amount of intergovernmental grants-in-aid. Intergovernmental grants (I) thus may be taken to be an endogenous variable in the multiple-regression equations implying the presence of simultaneous-equation bias. Likewise, one can make a case for the endogeneity of the fiscal centralization ratios, R and E. To address this matter, I reestimated equations $(2R)$, $(2E)$, and $(2L)$ using the two-stage least squares procedure ($2SLS$) and treating I, R, and E as endogenous variables. In the $2SLS$ equations, the estimated coefficient for the grant variable remained positive but its t-statistic declined somewhat. The estimated coefficients of the centralization variables (R, E, and L) retained their negative signs but were not significantly different from zero.

TABLE 4—SUMMARY STATISTICS

Variable	Mean	Maximum	Minimum	SD
(a) World Sample ($N = 43$)				
G	.31	.57	.12	.13
R	.85	.99	.48	.14
E	.79	.99	.40	.18
(b) Industrial Countries ($N = 18$)				
G	.42	.57	.26	.09
R	.76	.96	.48	.15
E	.65	.92	.40	.16
(c) Developing Countries ($N = 25$)				
G	.22	.50	.12	.09
R	.92	.99	.71	.08
E	.89	.99	.63	.11

Note: G = total public revenues as a fraction of *GDP*; R = central government share of total government revenue; E = central government share of total public expenditure.

and industrialized countries in terms of both the size and structure of the public sector.

Table 4 presents the summary statistics for the world sample. The government-size variable G (here defined as total public revenues divided by gross domestic product) exhibits considerably more variation than in the set of state-local data. Tax revenues as a fraction of *GDP* have a mean value of .31 and range from a high of .57 in Sweden to a low of .12 in Bangledesh. For the international sample, I have only fiscal measures of the extent of centralization: R is the fraction of total general revenues going to the central government, and E is the fraction of total public expenditure attributable to the central government. For purposes of E, intergovernmental grants are excluded from the grantor's expenditures so that E is the central government's share of total disbursements. As Table 4 indicates, the extent of fiscal centralization ranges widely within the sample, reaching from almost complete centralization of .99 to a central government share of well under one-half.

Panels (b) and (c) of Table 4 reveal the dramatic differences between the typical industrialized and developing country. The industrialized countries exhibit both a much larger size of the public sector (a mean value of G of .42 compared to .22) and a far less centralized government sector (a mean of E

of .65 compared to .89). The developing countries are characterized by relatively small, but highly centralized, public sectors.

A listing of the data and their sources appears in the Appendix. I have used IMF data to construct the fiscal centralization ratios. From the IMF *Government Finance Statistics Yearbook* (1982), I included in this study every country for which I had reasonable assurance that the data encompassed all the relevant levels and units of government. I computed the centralization ratios for the most recent year for which data were available—1980 or 1981 in most cases—but reaching back as far as 1976 in a few instances. This produced the sample of 43 countries. Regarding the nonfiscal data, I have used as a measure of per capita income (in U.S. dollars) the recent estimates by Robert Summers et al. (1980) from the International Comparison Project of the United Nations.

Table 5 reports the rank correlation coefficients and associated *t*-statistics between G and R and between G and E for the entire world sample and for the two subsamples. For the entire set of 43 countries, the rank correlation between the size of the public sector and the extent of centralization is strongly and significantly negative. A relatively decentralized public sector is typically comparatively large. However, this result is misleading. It reflects the fact just noted that the poorer developing countries have small, centralized public sectors, while the industrialized countries have relatively large and decentralized governments. When we examine the coefficients for the two subsamples, we find that there is no longer a significant relationship between the variables. Within the subsamples, government size seems to have little relation to the degree of centralization in the public sector.

Turning next to the regression analysis in Table 6 (where again I make use of the logistic transformation of G, denoted G'), note first that the simple regressions ($1R$) and ($1E$) confirm the rank-correlation analysis. For the whole sample, G is negatively and significantly related to both R and E, but within each subsample, this association effectively disappears. Equations ($2R$) and

TABLE 5—SPEARMAN RANK CORRELATION COEFFICIENT

Variable	Correlation Coefficient	*t*-Statistic
(a) World Sample		
G, R	− .39	2.71
G, E	− .49	3.60
(b) Industrialized Countries		
G, R	− .02	0.08
G, E	− .15	0.61
(c) Developing Countries		
G, R	.20	0.98
G, E	.12	0.58

($2E$) are the multiple-regression equations, where the control variables are basically the same as in the state-local equations. Within each of the samples, equation ($2R$) is virtually identical with ($2E$), suggesting that it makes little difference whether we use a revenue or expenditure measure of the extent of fiscal centralization. For the entire world sample, the multiple-regression equations have substantial explanatory power: they can "explain" nearly 80 percent of the variation in the size of the public sector. In particular, I find that other things equal, high-income countries typically have relatively large public sectors, populous nations tend to have comparatively small government sectors, and countries that rely heavily on intergovernmental grants have, on average, large public sectors. However, the measures of fiscal centralization, R and E, contribute virtually nothing to the explanatory power of the equations. The extent of centralization in the public sector appears to have little effect on the size of government.[10]

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[10]Responding to the empirical findings for the international sample, Edwin Mills has offered the interesting suggestion that to measure Leviathan's monopoly power, the fiscal autonomy of decentralized governments is probably a better measure than their share of taxes or spending. Mills suggests a constitutional variable: the existence of a federal constitution. Following up on this, I find that if I divide the total sample into 8 federal and 35 nonfederal countries, the mean size of the public sector as a fraction of *GDP* (i.e., G in the earlier equations) is slightly larger for federal countries. Probably of more relevance, however, within the subsample of 18 industrialized countries, the mean value of G is somewhat less for the 6 federal countries than for the 12

TABLE 6—ESTIMATED REGRESSION EQUATIONS

(a) World Sample

(1R) $G' =$ 0.8 $-$ 2.0R* $R^2 = .16$
                         (1.3)   (2.8)

(1E) $G' =$ 0.6 $-$ 1.9E* $R^2 = .26$
                         (1.6)   (3.8)

(2R) $G' = -$ 1.9 $+$ .0003Y* $-$ .004P* $+$.001U $+$0.6I* $+$0.1R $R^2 = .78$
                         (3.7)   (5.0)   (2.8)   (0.4)   (2.5)   (0.2)

(2E) $G' = -$ 1.9 $+$ .0003Y* $-$ .004P* $+$.001U $+$0.6I* $+$0.1E $R^2 = .78$
                         (4.6)   (5.2)   (2.9)   (0.4)   (2.7)   (0.3)

(b) Industrialized Countries

(1R) $G' = -$ 0.3 $-$ .07R $R^2 = .001$
                         (0.5)   (0.1)

(1E) $G' = -$ .003 $-$ 0.5E $R^2 = .04$
                         (0.0)   (0.8)

(2R) $G' = -$ 1.8 $+$ .0004Y* $-$ .005P* $-$ .007U $+$0.7I $+$0.4R $R^2 = .57$
                         (2.3)   (3.0)   (3.1)   (1.2)   (1.8)   (0.5)

(2E) $G' = -$ 1.9 $+$ .0004Y* $-$ .005P* $-$ .007U $+$0.8I* $+$0.4E $R^2 = .57$
                         (2.6)   (3.2)   (3.2)   (1.3)   (2.3)   (0.7)

(c) Developing Countries

(1R) $G' = -$ 2.2 $+$ 0.9R $R^2 = .02$
                         (1.8)   (0.7)

(1E) $G' = -$ 1.5 $+$ 0.3E $R^2 = .004$
                         (1.9)   (0.3)

(2R) $G' = -$ 2.9 $+$ .0004Y $+$ .0003P $+$.004U $+$0.4I $+$1.0R $R^2 = .59$
                         (2.2)   (1.6)   (0.1)   (0.5)   (1.2)   (0.7)

(2E) $G' = -$ 2.7 $+$ .0004Y $+$ .0002P $+$.004U $+$0.5I $+$0.7E $R^2 = .59$
                         (2.9)   (1.6)   (0.1)   (0.5)   (1.6)   (0.8)

Note: The numbers in parentheses below the estimated coefficients are the absolute values of the associated t-statistic. An asterisk indicates that the estimated coefficient is statistically significant at the .05 level (using a two-tail test); $Y =$ income per capita in U.S. dollars for 1977; $P =$ population (in millions); $U =$ percentage of population living in urban areas; $I =$ intergovernmental grants as a percentage of total government general revenues.

nonfederal nations—a result that is presumably consistent with the Leviathan hypothesis. However, in neither case could a simple test for the difference between the means reject the null hypothesis that the observations come from the same population (at a .95 level of confidence). I also reestimated the regression equations in Table 6 substituting for the fiscal centralization ratios a dummy variable equal to one for those countries with a federal constitution and zero otherwise. In the multiple regression equations, the estimated coefficients on the dummy variable were of negative sign. Taking the point estimate for this coefficient from the equation for the industrialized countries, one finds that, ceteris paribus, the value of G for a federal country is about 5 percentage points less than for a nonfederal nation. However, in none of the equations was the t-statistic of sufficient size to reject the null hypothesis of no association. Related to this, Richard Bird (1984) using a sample of 13 countries from a study by Morris Beck (1981) finds that, over the period 1950–77, the rate of growth of real government expenditure in relation to GNP was actually slightly higher in federal than in nonfederal countries. It seems hard to find any really significant differences here.

The multiple-regression equations for the two subsamples tell pretty much the same story (except that the t-ratios for the subsample of developing countries tend to be somewhat smaller). The fiscal-centralization variables have positive coefficients, but the t-ratios remain quite small. Finally, like the results for the state-local analysis, the findings for the international sample seem quite robust. The use of a number of alternative specifications of the equations and variables did not alter the substance of the results.[11]

[11]As with the state-local sample, I reestimated the multiple-regression equations using 2SLS and treating intergovernmental grants (I) and the centralization ratios (R and E) as endogenous variables. The general pattern of the results remained similar to those reported in Table 6 although there was a substantial reduction in the t-statistic for the grant variable (I). The estimated coefficients for the centralization ratios remained statistically insignificant.

IV. Conclusion

Overall, the results of this study suggest that there does not exist a strong, systematic relationship between the size of government and the degree of centralization of the public sector. At the offset, I set forth as the null hypothesis the proposition that centralization and the size of government have little to do with one another. We certainly cannot reject this proposition from the findings in any of the samples or subsamples in this study.

What implications can we draw from all this? I would stress that the basic finding does not imply that there is no place in public economics for the revenue-maximization hypothesis. There is, in fact, considerable evidence to support budget-maximizing behavior by public agents in certain sorts of institutional settings (for example, the literature on bureaucracy). But it is another matter to try to characterize the entire public sector as a monolithic, monopolistic actor with the sole objective of making the government sector as large as possible. The results, it seems to me, cast considerable doubt on the usefulness of the Leviathan model. If, in fact, potentially pervasive revenue-maximizing forces are at work in the public sector, we should expect to see these forces manifest themselves in terms of larger budgets where given the opportunity to do so. As Brennan and Buchanan suggest, Leviathan will have much more scope for action in a relatively centralized public sector. But I seem to find no real difference in outcomes whether Leviathan is constrained by decentralization or not. Perhaps, after all, Leviathan is a mythical beast.

APPENDIX

Sample of countries:

Australia	Cyprus
Austria	Denmark
Bangledesh	Ecuador
Brazil	Ethiopia
Canada	Fiji
Chile	Finland
Costa Rica	France

Germany (West)	Norway
Greece	Pakistan
Honduras	Panama
Iceland	Paraguay
Iran	Philippines
Ireland	South Africa
Israel	Spain
Kenya	Sweden
Korea	Switzerland
Luxembourg	Thailand
Malawi	Tunisia
Mauritius	United Kingdom
Mexico	United States
Netherlands	Uruguay
New Zealand	

Sources of data for the state-local study:

Fiscal data: *1977 Census of Governments*, Vol. 4, No. 5, Tables 23, 24, 35, and 39. The same source was used for total population, urban population, number of local governments, and income per capita, but came from Table 46. The land area, population density, and date entered the union is from *The World Almanac...*, 1980.

Sources of data for the international study:

Fiscal data: IMF *Government Statistics Yearbook*, Vol. VI, 1982; the income per capita: Summers et al., pp. 19–66 (data used for 1977); *GDP*: United Nations *Yearbook of National Accounts Statistics, 1980*, Vol. 1, 1982; total population: *United Nations Demographic Yearbook 1981*, Table 6, 1983; urban population was from the same source but supplemented by *The World Almanac...*, 1983.

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