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3 The Effects of Jurisdiction Types and Numbers on Local Public Finance

Jeffrey S. Zax

3.1 Introduction

Local government in the United States is a multitiered structure. The purpose of this study is to investigate the effects of alternative local government structures on aggregate local public debt and expenditures. These effects are dominated by two opposing principles of efficiency. First, larger—and, therefore, fewer—governments may capture economies of scale in the production and distribution of local public goods. Second, smaller and more plentiful governments may provide a greater variety of public good bundles, and, therefore, healthy competition for each other.

Both of these principles have implications for the optimal structure of local government. Unfortunately, the implications of each have become, for the most part, competitive rather than complementary prescriptions. The first principle has been compelling to specialists in public administration, the second to economists. In consequence, the public administration program for local government reform consists of local government consolidation. The economists' program consists of fragmentation.

This study demonstrates that both principles are operative in the determination of aggregate county public debt and expenditure (the sums of debt and expenditures for all governments within a county, including the county itself) as shares of total county personal income.

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Aggregate debt and expenditures are positive functions of jurisdictions per capita, suggesting that small jurisdictions are inefficient. However, they are negative functions of jurisdictions per dollar of government expenditure, suggesting that when jurisdictions have large average "market shares," they use their monopoly power to expand the local public sector. In addition, agggregate debt and expenditures are negative functions of the absolute number of governments. For the most part, these results also characterize the effects of surrounding jurisdictions on city government debt and expenditures.

The structure of local government within counties is less important than the number of units. The income share of local government debt is, in general, sensitive to the number of local jurisdictions but not to their types. However, the income share of government expenditures is significantly more sensitive to the numbers of municipalities than to the numbers of single-purpose school and special districts.

These results imply, unsurprisingly, that neither consolidation nor fragmentation is unambiguously superior. In a system of general-purpose local governments, neither the extreme of jurisdictions which are many, small, competitive, and inefficient nor that of jurisdictions which are few, large, efficient, and monopolistic will minimize debt and expenditures.

As policy, both consolidation and fragmentation may be inferior to a third strategy in which single-purpose governments are more prominent. Both programs, implicitly, advocate fewer tiers of local government. Under consolidation, tiers are subsumed into a single county- or metropolitan-area-wide government. Under fragmentation, multiunit single-purpose districts are decomposed into single units. However, the intermediate tier of single-purpose jurisdictions may be essential to the best compromise between economies of scale and competitive supply.

3.2 Consolidation and Fragmentation

The 50 states of America are, with few exceptions, divided into counties which in aggregate exhaust state territory. These counties are the top tier of local government. County territory is, in turn, exhausted by jurisdictions which provide primary and secondary education. These jurisdictions are most often single-purpose school districts. Within counties, centers of population are incorporated as general-purpose municipalities. They occasionally include primary and secondary education among their functions. Sewerage, water, transit, and other services may be provided by single-purpose special districts, usually within counties, but to areas which include more than one general-purpose government (ACIR 1982).

For the most part, the positive theory of this system addresses the number and types of jurisdictions separately. Multiple jurisdictions are beneficial because they restrict the opportunities for monopoly behavior by local government officials. However, they also restrict the opportunities to take advantage of returns to scale in government production and to redistribute wealth. Single-purpose jurisdictions are beneficial because they reduce the power of general-purpose governments. However, they increase the complexity of local government, which may create fiscal illusions under which citizens accept higher debt levels than they would if the costs and benefits of government were more readily calculable.

Fragmented local jurisdictions are beneficial because they offer citizens choice among different collections of local public goods. If few alternative jurisdictions are available, inefficient jurisdictions need not fear the sanctions which could potentially be imposed by taxpayer and tax base emigration. Public officials, whose personal objectives are served by bigger government (Niskanen 1975), can expand government activity beyond levels which would be acceptable to voters if the "market" in local public services were more "complete."

If the variety of available jurisdictions is sufficient, citizen mobility may render inconsequential the geographic monopoly held by each jurisdiction within its own borders (Tiebout 1956). In the absence of intrajurisdictional politics (citizen voice), the monopoly power of individual jurisdictions is inversely related to the number of jurisdictions. However, with fixed jurisdictional boundaries (land is immobile), citizen exit will not entirely deprive local governments of monopoly power, regardless of the number of alternative jurisdictions (Epple and Zelenitz 1981).

The advantages of sufficient jurisdictional choice are relevant to many issues in government organization. For example, annexations reduce the potential alternatives to the annexing jurisdiction, and may therefore permit higher expenditures (Mehay 1981). Municipal incorporations dilute the monopoly power of existing municipalities. This effect is explicitly recognized in the statutes of 18 states, where new municipalities are prohibited within specified distances of existing municipalities (ACIR 1982). Where existing municipalities can prevent new incorporations, incorporations may be less frequent and expenditures by existing municipalities higher (Martin and Wagner 1978). Revenue- or tax-base-sharing reduces competition among jurisdictions by insulating individual jurisdictions from changes in their tax base. Here again, expenditures may increase (McKenzie and Staaf 1978).

Despite the appeal of competition through multiple jurisdictions, the case for fragmentation is not conclusive. Large jurisdictions may capture economies of scale or coordination that are lost to smaller units

(Rothenberg 1975; ACIR 1975). In addition, small jurisdictions cannot effectively redistribute wealth, since intrajurisdictional variation in wealth would be small and adverse selection easy (Reschovsky 1980). If large units of local government are more efficient than small units, consolidation, rather than fragmentation, will reduce the size of local government.

Though recent theoretical considerations of local government predominantly present arguments in favor of fragmentation,[1] the arguments in favor of consolidation are consequential. Presentations for either position do not so much contradict as ignore each other. For example, most models of local government monopoly assume constant or decreasing returns to scale (Epple and Zelenitz 1981; Wagner and Weber 1975).

Studies which consider the advantages of both small- and large-scale local government are rare and speculative: Martin and McKenzie hypothesize that citizens will not benefit from the efficiencies available through consolidation because the bureaucracy, whose monopoly power is enhanced by consolidation, will appropriate all the gains. Mullen hypothesizes that fragmentation is a luxury good, "bought" by wealthier citizens at the cost of inefficiency in order to enjoy local autonomy. Empirically, local government debt and expenditures must be minimized for a given level of services when local jurisdictions strike a careful balance between the efficiency of large units and the competitive vulnerability of small units.

Similarly, within the system of local governments, single-purpose jurisdictions may either reduce or expand local government activity. To the extent that they increase the numbers of local governments, they contribute to the competitive pressures all face. In this role, they reduce aggregate local government expenditures for a given level of services (Wagner and Weber 1975; Mehay 1984).

However, single-purpose governments also complicate the structure of local government. If this creates a fiscal illusion among citizens as to the true tax price of the local services they receive, single-purpose jurisdictions may allow aggregate government activity to expand beyond the limits that would be set by an electorate which fully understood their effects (DiLorenzo 1982). The principle purpose of special districts may be to circumvent statutory limits on general obligation debt of general-purpose governments (Copeland 1961; Wagner 1976; Eppel and Spatt 1986).

The arguments for and against consolidation are also relevant. If single-purpose jurisdictions obtain economies of scale that are unattainable by the general-purpose governments they serve (ACIR 1982), they reduce the size of local government. If they are so big as to replace the geographic monopolies of general-purpose governments with func-

tional monopolies, bureaucratic self-interest may lead to an expansion of the local public sector. This danger is enhanced by the structure of many special districts, whose officials are appointed by the general purpose governments they serve and are, therefore, isolated from the electorate.

Arguments in favor of both reductions and expansions of local government through single-purpose jurisdictions are appealing. Empirically, they present a challenge to identify both the competitive, efficient, and the monopolizing, illusory effects of single-purpose jurisdictions.

3.3 Numbers and Types of Local Jurisdictions

Government hierarchies within county-level jurisdictions provide comparisons which test for the public finance effects of differences in local government organization. Comparisons across counties are appropriate for three reasons. First, counties are large enough to contain structures of smaller jurisdictions. Second, they are small enough to permit Tiebout-style sorting by potential residents. Third, and most important, the aggreggate of services provided by counties and the jurisdictions they contain typically make up the complete array of local services available to county residents. Comparisons across counties, within states, can conveniently account for differences in service arrays.

There are approximately 3,130 county-level governments in the United States.[2] Among them are examples of almost all degrees of local government fragmentation and consolidation. Seventeen counties contain no local governments.[3] Five counties contain more than 200. Cook County, Illinois, is the most fragmented in terms of jurisdiction counts, with 513 local jurisdictions.

However, Cook County also has more than five million residents, or approximately one jurisdiction per 1,000. In per capita terms, at least 25 percent of all counties are more fragmented. Residents in Slope County, North Dakota, are most generously endowed, with 27.6 jurisdictions per 1,000 residents. Slope County also has the smallest average jurisdictions, in financial terms: 27.1 jurisdictions per $1,000,000 in aggregate local government expenditures.

In contrast, the greatest geographic densities are in eastern states. Bergen and Hudson, counties in New Jersey directly across the Hudson river from New York City, both have more than 0.6 jurisdictions per square mile. Table 3.1 presents the entire distribution of jurisdictions per county, per square mile, per 1,000 county population, and per $1,000,000 aggregate expenditure.

Table 3.2 presents distributions of cities and towns per county, special districts per county, and school districts per county. Seventy-six counties contain only cities or towns. Eighty-five percent of counties have

Table 3.1 **Distribution of Counties by Jurisdictions, Jurisdictions per Square Mile, Jurisdiction per 1,000 Capita, and Jurisdictions per $1,000,000 Expenditures**

Local Jurisdiction per County		Local Jurisdictions per Square Mile	
Number	Percent	Number	Percent
0	.5	0	.5
1– 10	34.6	0–.005	8.1
11– 20	21.8	.005–.015	22.1
21– 30	13.7	.015–.025	18.8
31– 50	17.0	.025–.05	22.2
51–100	10.2	.05–.1	20.9
> 101	2.1	> .1	7.4

Local Jurisdictions per 1,000 Capita		Local Jurisdictions per $1,000,000 Expenditures
Number	Percent	Percent
0	.5	.5
0– .2	15.5	16.3
.2– .5	23.5	22.5
.5–1.0	23.2	25.0
1.1–2.0	19.4	20.8
2.1–5.0	13.3	11.7
> 5.1	4.5	3.2

Notes: Jurisdictions and expenditures are measured as of 1982. Population is measured as of 1980.

N = 3,129 counties.

Table 3.2 **Distribution of Counties by Number of Cities and Towns, Special Districts, and School Districts**

Number	Cities and Towns per County %	Special Districts per County %	School Districts per County %
0	2.0	5.4	12.2
1– 2	21.9	23.1	35.0
3– 5	23.9	28.2	25.8
6–10	17.5	18.5	16.7
11–20	15.1	14.1	7.6
21–50	17.8	9.0	2.5
> 51	1.8	1.8	.3

Note: N = 3,129 counties.

governments of all three types. Cook County has the most cities and towns, 150, and the most special districts, 152. Harris County, Texas, has 348 school districts. Slope County, again, has the most cities and towns per 1,000 capita, with slightly over 20. Loving County's one special district amounts to 10.9 special districts per 1,000 capita. McPherson County, Nebraska, has 13.4 school districts per 1,000 capita.

As tables 3.1 and 3.2 demonstrate, few counties match these extreme jurisdiction numbers, by any measure. However, by any measure, the variation in jurisdiction numbers across counties is striking. Furthermore, counties vary dramatically in the mix of municipalities, special districts, and school districts they contain. They therefore provide an appropriate sample in which to investigate the effects of the tier-structure of local government on the size of the local public sector.

3.4 Local Jurisdictions and Aggregate County Public Finance

Comparisons of aggregate debt levels, debt changes, and expenditure levels across counties reveal the effects of local government structure on agggregate local public finance. If small, competitive jurisdictions are most efficient, counties with many jurisdictions will have smaller aggregate local public sector debt and expenditure levels than counties with few, for any level of public services. If large-scale government is efficient, their debt and expenditure levels will be higher.[4] Though the theories which support fragmentation and consolidation are not explicitly dynamic, the relationship between efficiency and growth in aggregate local public sector debt may also be negative.

Following Gordon and Slemrod (1986), debt is measured here as a fraction of aggregate county personal income, both gross and net of sinking, bond, and insurance funds. Their econometric specification for debt determination also forms the basis for tests of government structure effects. In their regression model, debt is a linear function of imputed marginal tax rates, the proportion of adults aged 25 to 44, the proportion of adults greater than 60 years old, the percentage of households which changed housing units between 1975 and 1980, the percentage of households which changed county of residence between 1975 and 1980, the percentage of housing units with renter occupants, the percentage of housing units constructed between 1975 and 1980, and dummy variables for state. Gordon and Slemrod use these variables to capture variations in population characteristics and in tastes for local public goods across counties. Here, a variable measuring the interquartile range of the 1980 within-county family income distribution provides additional controls for heterogeneity in county populations.

Gordon and Slemrod apply this model to a sample consisting of municipalities in New England in order to determine the effects of

federal income taxation on arbitrage through the local public sector. This study applies it to a sample of 3,129 observations, each representing aggregate local governmental activity within the borders of a single county-level government, to determine the effects of government structure on government size. Accordingly, a dummy variable representing counties in Standard Metropolitan Statistical Areas (SMSA's), a vector of dummy variables representing local provision of 22 different services,[5] and measures of the number and type of within-county jurisdictions augment the Gordon/Slemrod specification.[6]

The same specification is used here for equations which estimate county aggregate local public expenditures and the 1982 fiscal year change in long-term debt, as proportions of aggregate county personal income. This is a convenient specification for debt changes, as a comparison to equations for debt levels. It is also similar to the canonical expenditure specifications of Borcherding and Deacon (1986) and Bergstrom and Goodman (1973) though not identical.[7]

In this specification, coefficients on the jurisdiction measures test the effects of consolidation and fragmentation. In principle, finance measures and jurisdiction counts may be mutually dependent. The decision to create new or combine old jurisdictions can depend on the expected effects of these changes on local public services and finance.

Unfortunately, the effects of finance choices on jurisdiction structure are ambiguous. For example, a population with strong tastes and high expenditures for local public services may fragment their county so as to provide many specialized bundles of public goods, or consolidate so as to efficiently provide large quantities of "commodity" public services.

In practice, this issue is occasionally important. In some periods jurisdictional structures have been quite flexible. Between 1962 and 1972, the number of local jurisdictions in the United States fell by 14.2 percent, from 91,186 to 78,218. This reduction was confined entirely to school districts, whose numbers fell by 54.5 percent. Numbers of counties, cities, and townships were virtually constant, while numbers of special districts grew by 30.4 percent (ACIR 1982).

Local government structure has recently been less malleable. Since 1972 local government numbers have changed little, growing by only 5.2 percent. Municipality counts have grown by only 3.0 percent, township counts have fallen by 1.5 percent, school district counts have fallen by 5.9 percent, and special district counts have grown by 19.7 percent (ACIR 1982; U.S. Bureau of the Census 1984).

Despite the theoretical connection, effects of public finance on jurisdiction structure are certainly negligible in the sample studied here. Jurisdictional counts by county in 1982, the year under study, are almost perfectly predictable by 1977 counts alone. Regressions of 1982 on 1977

counts achieve R^2s of .95 for special districts, and greater than .99 for cities, towns, and school districts.[8] Given 1977 jurisdiction counts, there is very little variance left to 1982 counts which could depend on public finance choices in all the intervening years, much less in 1982.

Table 3.3 presents equations for gross and net debt levels, debt changes and expenditure shares in aggregate income as functions of the number and squared number of jurisdictions in the county.[9] Increases in juris-

Table 3.3 **Equations for Aggregate County Debt and Total Expenditure Shares in Total Personal Income with Jurisdiction Counts**

Independent Variable	Gross County Debt	Net County Debt	Change, County Long-term Debt	Total County Expenditure
Number of local jurisdictions in county	−.00370	−.00284	−.00238	−.00101
	(3.05)	(2.60)	(3.70)	(4.18)
Number of local jurisdictions in county, squared	.00000681	.00000523	.00000492	.00000174
	(1.84)	(1.57)	(2.50)	(2.36)
Interquartile range, family income distribution	.0000463	.0000483	.0000244	−.00000211
	(7.74)	(8.97)	(7.68)	(1.78)
Marginal federal income tax rate	−4.15	−3.01	−1.45	−1.47
	(1.51)	(1.22)	(.992)	(2.70)
Marginal federal income tax rate, squared	5.72	3.78	1.74	2.16
	(1.45)	(1.06)	(.827)	(2.76)
Marginal state income tax rate	−13.0	−11.9	−10.2	−3.59
	(1.06)	(1.08)	(1.57)	(1.47)
Marginal state income tax rate, squared	92.9	73.7	79.2	19.2
	(1.57)	(1.38)	(2.51)	(1.63)
Percentage of adult population aged 25–44	−1.15	−.484	−.546	−.533
	(1.26)	(.590)	(1.13)	(2.94)
Percentage of adult population aged 61 or more	−1.26	−.676	−.590	−.526
	(1.39)	(.828)	(1.22)	(2.92)
Percentage in same house as 1975	.0852	−.0217	−.204	.413
	(.284)	(.0805)	(1.28)	(6.94)
Percentage in same county, different house as 1975	.847	.686	.526	.167
	(2.23)	(2.00)	(2.60)	(2.21)
Percentage in rental units	.0292	−.203	−.229	.441
	(.102)	(.787)	(1.50)	(7.75)
Percentage structures built since 1975	1.10	.770	.202	.540
	(2.83)	(2.20)	(.977)	(6.98)
Included in an SMSA	−.105	−.0947	−.0442	−.0224
	(2.42)	(2.43)	(1.92)	(2.60)
Intercept	.565	.0733	.537	.395
	(.600)	(.0865)	(1.07)	(2.11)
R^2	.104	.0977	.0757	.230
Means of Dependent Variables	.184	.111	.0504	.199

Note: *t*-statistics are in parentheses. All equations have 3,043 degrees of freedom.

dictions per county reduce levels of all four dependent variables with 1 percent significance. In terms of jurisdiction counts, fragmentation reduces the aggregate size of the local public sector. This result is consistent with the hypothesis that monopolizing bureaucrats have greater power in larger jurisdictions.[10]

This effect diminishes as jurisdiction numbers increase. Quadratic terms in jurisdiction counts are positive, significant at 5 percent for total expenditures and the change in long-term debt, and at 10 percent for gross debt. Together, the linear and quadratic terms imply that, within state, and with given functions and population characteristics, the income share of total local government expenditures is minimized with 290 jurisdictions per county. Holding these factors constant, this share is 12.2 percentage points smaller with 290 jurisdictions per county than with 25, the average value across counties. All other explanatory variables constant, gross debt is minimized with 272 jurisdictions and the change in long-term debt is minimized with 242. As noted above, few counties actually contain this many local jurisdictions.

Section 3.3 introduced three measures of jurisdiction density in addition to absolute jurisdiction counts. Table 3.4 presents the coefficients

Table 3.4 **Coefficients for Various Jurisdiction Measures in Equations for Aggregate County Debt and Total Expenditure Shares in Total Personal Income**

Jurisdiction Measure	Gross County Debt	Net County Debt	Change, County Long-term Debt	Total County Expenditure
Jurisdictions per $1,000,000 expenditures	−.124	−.107	−.0464	−.0239
	(5.33)	(5.09)	(3.72)	(5.15)
Jurisdictions per $1,000,000 expenditures, squared	.00459	.00381	.00164	.000928
	(3.21)	(2.95)	(2.15)	(3.26)
R^2	.111	.104	.0762	.232
Jurisdictions per square mile	−1.16	−.958	−.927	−.166
	(1.78)	(1.64)	(2.68)	(1.29)
Jurisdictions per square mile, squared	1.30	1.11	1.15	.122
	(1.31)	(1.24)	(2.18)	(.615)
R^2	.102	.0963	.0735	.225
Jurisdictions per 1,000 capita	−.0152	−.0280	−.0123	.0212
	(.690)	(1.41)	(1.05)	(4.86)
Jurisdictions per 1,000 capita, squared	−.000255	.000227	.000159	−.000916
	(.194)	(.192)	(.227)	(3.51)
R^2	.102	.0970	.0721	.231

Note: *t*-statistics are in parentheses. All equations have 3,043 degrees of freedom.

estimated for jurisdictions per 1,000 capita, per square mile, and per $1,000,000 government expenditures, when each replaces absolute jurisdiction counts in the specification of table 3.3.[11]

Regression equations achieve higher explanatory power with jurisdictions measured per $1,000,000 expenditures than with any of the other three "normalizations." All linear terms and three quadratic terms are significant at 1 percent, the remaining quadratic term at 5 percent. Consistent with the results in table 3.3, increasing jurisdictions per $1,000,000 expenditures—in effect, reducing jurisdictional "market share"—reduces the income share of local public debt and expenditures at a diminishing rate.

Jurisdictional normalizations with land area are less successful, but consistent. In all four equations, the linear coefficient on jurisdictions per square mile has a negative, and the quadratic term a positive sign. However, only two of these coefficients are significant at 5 percent, with a third significant at 10 percent.

Linear coefficients on jurisdictions per 1,000 capita are similarly negative in all debt equations, but insignificant. Two of three quadratic terms in these equations are positive, but again all three are insignificant. Both coefficients are significant in the expenditure equation, but here signs are reversed. The income share of local government expenditures appears to increase at a diminishing rate as the number of governments per capita increases. In effect, increases in the population served reduce the local government share in income.

This last result is the only indication in the equations of tables 3.3 and 3.4 that jurisdiction numbers may have efficiency as well as monopoly effects. Equations which contain only one measure of jurisdiction density cannot identify both. Equations which contain linear and quadratic terms for two or more measures suggest that both effects are important in the determination of public finance income shares.

Among the four measures of jurisdiction density, there are eleven different combinations of two or more. Each measure performs consistently in all equations which include combinations of which it is a part. Linear coefficients on absolute jurisdiction numbers and jurisdictions per $1,000,000 are invariably negative and usually significant. Quadratic coefficients on these two are significantly positive. Linear and quadratic coefficients on jurisdictions per 1,000 capita are positive and negative, respectively, and often significant. In combination with other measures, linear and quadratic coefficients on jurisdictions per square mile are rarely significant.

Table 3.5 presents equation estimates for the specification which best represents these effects. It includes linear and quadratic terms for all measures of jurisdiction density with the exception of jurisdictions per square mile. Linear and quadratic terms for jurisdictions per square mile are insignificant when added to this specification.

Table 3.5 **Equations for Aggregate County Debt and Total Expenditure Shares in Total Personal Income with Multiple Jurisdiction Measures**

Independent Variable	Gross County Debt	Net County Debt	Change, County Long-term Debt	Total County Expenditures
Number of local jurisdictions in county	−.00213	−.00148	−.00185	−.000672
	(1.73)	(1.33)	(2.81)	(2.86)
Number of local jurisdictions in county, squared	.00000338	.00000223	.00000376	.00000107
	(.908)	(.664)	(1.88)	(1.50)
Jurisdiction per 1,000 capita	.274	.185	.0769	.132
	(6.52)	(4.89)	(3.42)	(16.5)
Jurisdictions per 1,000 capita, squared	−.0147	−.0105	−.00407	−.00618
	(4.97)	(3.94)	(2.57)	(11.0)
Jurisdictions per $1,000,000 expenditures	−.357	−.264	−.107	−.139
	(8.14)	(6.66)	(4.54)	(16.6)
Jurisdictions per $1,000,000 expenditures, squared	.0186	.0138	.00534	.00687
	(5.80)	(4.77)	(3.11)	(11.2)
Interquartile range, family income distribution	.0000465	.0000482	.0000245	−.00000175
	(7.84)	(9.00)	(7.70)	(1.55)
Marginal federal income tax rate	−5.13	−3.49	−1.69	−2.23
	(1.88)	(1.41)	(1.16)	(4.29)
Marginal federal income tax rate, squared	6.51	4.01	1.90	3.01
	(1.66)	(1.13)	(.904)	(4.02)
Marginal state income tax rate	−10.7	−11.0	−9.70	−1.53
	(.878)	(.999)	(1.49)	(.659)
Marginal state income tax rate, squared	76.8	66.0	75.2	6.68
	(1.30)	(1.24)	(2.38)	(.594)
Percentage of adult population aged 25–44	−.705	−.218	−.423	−.274
	(.775)	(.265)	(.869)	(1.58)
Percentage of adult population aged 61 or more	−.635	−.234	−.402	−.263
	(.701)	(.286)	(.830)	(1.52)
Percentage in same house as 1975	−.0233	−.0859	−.231	.346
	(.0782)	(.319)	(1.45)	(6.09)
Percentage in same county, different house as 1975	.637	.448	.440	.207
	(1.64)	(1.28)	(2.12)	(2.80)
Percentage in rental units	−.150	−.321	−.281	.347
	(.527)	(1.25)	(1.84)	(6.39)
Percentage structures built since 1975	.927	.607	.139	.520
	(2.39)	(1.73)	(.669)	(7.02)
Included in an SMSA	−.0966	−.0902	−.0422	−.0165
	(2.25)	(2.32)	(1.83)	(2.01)
Intercept	.735	.246	.599	.402
	(.786)	(.291)	(1.20)	(2.25)
R^2	.125	.112	.0825	.305

Note: *t*-statistics are in parentheses. All equations have 3,039 degrees of freedom.

The effects of jurisdictions per $1,000,000 are again consistent with those predicted by the competitive model of fragmentation. In all four equations, linear coefficients for jurisdictions per $1,000,000 are negative, quadratic terms are negative, and all coefficients are significant at 1 percent. Minimum debt and expenditure income shares occur in the range of 9.6 to 10.1 governments per $1,000,000 expenditure.

Absolute jurisdiction counts have similar, but weaker effects. The linear coefficient on counts is always negative, significant at 1 percent for the change in long-term debt and total expenditures and at 10 percent for gross debt. Quadratic terms are all positive, but only that for the change in long-term debt is significant, at 10 percent. Accepting point estimates for both linear and quadratic effects, minimum debt and expenditure income shares occur in the approximate range of 250 to 330 governments per county.

As demonstrated in section 3.3, very few counties attain these income-share-minimizing levels of fragmentation. The coefficients on jurisdictions per 1,000 capita indicate that one reason for this failure may be that fragmentation at this level creates inefficiencies in public service production, as well as market efficiencies associated with competition. All linear coefficients for this measure are positive, all quadratic coefficients are negative, and all are significant at 1 percent. With respect to population served, local public debt and income shares are maximized in the range of 8.8 to 10.7 governments per 1,000 capita.[12] With a positive correlation between absolute jurisdiction numbers, county population, and absolute size of the local public sector, jurisdiction densities that minimize public sector income shares along the dimension of jurisdiction counts and market shares maximize them along the dimension of population served.

The results of tables 3.3, 3.4 and 3.5 are robust to many assumptions about local public finance. In particular, they do not depend upon counties of extreme size in the sample. The specifications in these tables produce identical results when applied to the subsample of counties with populations between one thousand and one million.[13]

However, equations calculated on the original sample, with separate measures of jurisdiction density for counties of greater than and less than 10,000 population, suggest that the effects of jurisdiction density may differ between small and large counties. Equations with single measures of jurisdiction density suggest, for example, that fragmentation reduces the income share of total government expenditures in only counties with populations which exceed 10,000.

Table 3.6 presents coefficients on jurisdiction measures from estimates of the specification of table 3.5, with interactions between all three jurisdiction measures and county size class. These coefficients indicate that effects in the two different county size classes are similar

Table 3.6 **Coefficients for Jurisdiction Measures Interacted with County Population Size Class**

Independent Variable	Gross County Debt	Net County Debt	Change, County Long-term Debt	Total County Expenditure
Counties with more than 10,000 population:				
Number of local jurisdictions in county	−.00212	−.00164	−.00160	−.000674
	(1.60)	(1.37)	(2.26)	(2.69)
Number of local jurisdictions in county, squared	.00000358	.00000283	.00000315	.00000113
	(.924)	(.808)	(1.51)	(1.54)
Jurisdictions per 1,000 capita	.743	.605	.117	.265
	(6.64)	(5.99)	(1.95)	(12.5)
Jurisdictions per 1,000 capita, squared	−.102	−.0851	−.0194	−.0311
	(4.63)	(4.28)	(1.64)	(7.43)
Jurisdictions per $1,000,000 expenditures	−.820	−.658	−.173	−.272
	(7.70)	(6.84)	(3.03)	(13.4)
Jurisdictions per $1,000,000 expenditures, squared	.107	.0861	.0256	.0327
	(5.01)	(4.46)	(2.23)	(8.07)
Counties with less than 10,000 population:				
Number of local jurisdictions in county	.00213	.00548	−.00277	.000340
	(.329)	(.937)	(.795)	(.277)
Number of local jurisdictions in county, squared	−.0000483	−.0000722	.00000616	−.0000134
	(.551)	(.912)	(.131)	(.806)
Jurisdictions per 1,000 capita	.221	.127	.0824	.119
	(4.49)	(2.85)	(3.11)	(12.7)
Jurisdictions per 1,000 capita, squared	−.0110	−.00667	−.00423	−.00520
	(3.37)	(2.26)	(2.41)	(8.37)
Jurisdictions per $1,000,000 expenditures	−.314	−.224	−.110	−.127
	(6.51)	(5.15)	(4.23)	(13.9)
Jurisdictions per $1,000,000 expenditures, Squared	.0148	.0103	.00538	.00585
	(4.36)	(3.34)	(2.94)	(9.06)
R^2	.131	.119	.0839	.317
F-tests and degrees of freedom for equality of effects across county population classes:				
Jurisdictions counts (2,3033)	.221	.768	.145	.398
	(.802)	(.465)	(.865)	(.672)
Jurisdictions per 1,000 capita (2,3033)	10.6	10.8	1.26	23.3
	(.0001)	(.0001)	(.283)	(.0001)
Juristicion per $1,000,000 expenditures (2,3033)	11.3	9.97	1.74	25.7
	(.0001)	(.0001)	(.176)	(.0001)
All three measures of jurisdiction density (6,3033)	3.97	3.80	.740	9.00
	(.0006)	(.0009)	(.617)	(.0001)

Note: *t*-statistics are in parentheses below coefficients. Significance levels are in parentheses below *F*-tests.

in direction and significance, but of significantly larger magnitude in counties with more than 10,000 residents. *F*-tests demonstrate that effects of jurisdictions per 1,000 capita and per $1,000,000 expenditure are significantly different across county population classes in all equations with the exception of that for changes in long-term debt. With this exception, effects of all three jurisdiction measures simultaneously differ significantly across classes as well. These results suggest that the interactions between jurisdictional structure and county size are a promising topic for further study.

The results of this section suggest that both fragmentation of market power and consolidation of service provision reduce local debt and expenditure income shares. Within states, holding constant population characteristics and the array of available local services, they suggest that the local public sector expands when governments command enough economic resources to confer some degree of monopoly power on their officials. It contracts when governments with large-scale efficiencies provide local public services.

3.5 Types of Jurisdictions and Aggregate County Public Finance

The results of the previous section describe the effects of jurisdiction numbers on income shares of local public sector debt, debt changes, and expenditures. As noted in section 3.2, local governments are of three types; general-purpose municipalities, single-purpose special districts, and single-purpose school districts. This section describes the differences and similarities between local government types in their effects on local public-sector income shares.

The equation specifications of table 3.3, with linear terms in jurisdiction counts, jurisdictions per 1,000 capita, and per $1,000,000 expenditures for all three jurisdiction types, estimate the effects of local government types on the size of the local public sector.[14] *F*-tests indicate that the effects of municipalities, special districts, and school districts, as counts or normalized by 1,000 capita or $1,000,000 expenditures, on gross debt, net debt, change in long-term debt, nonguaranteed debt, short-term debt, and fund holdings are statistically indistinguishable.[15]

These similarities imply that special districts are responsible for the recent explosion of nonguaranteed local public debt only through their numbers, and not through any special facility. Municipalities have been successful at issuing nonguaranteed debt on their own accounts, without the intervention of a special district. Furthermore, the recent growth of special districts has probably not increased total debt income shares by more than would have similar growth in municipalities.

However, *F*-tests in table 3.7 demonstrate that effects of jurisdiction types on guaranteed debt, fiscal-year changes in short-term debt, and

Table 3.7 Coefficients for Jurisdiction-Type Measures

Independent Variables	Guaranteed Debt	Change Short-Term Debt 1982 Fiscal Year	Total Expenditures
Cities and towns in county	−.000287	.0000757	−.000803
	(.457)	(1.80)	(2.00)
Special districts in county	−.000308	−.00000727	−.000214
	(.693)	(.245)	(.753)
School districts in county	−.000275	−.0000492	−.000485
	(.262)	(.701)	(.723)
Cities and towns per 1,000 capita	.0650	.00399	.0968
	(4.20)	(3.85)	(9.79)
Special districts per 1,000 capita	−.00956	−.000649	.0245
	(.635)	(.645)	(2.55)
School districts per 1,000 capita	−.00688	−.000392	.0535
	(.282)	(.241)	(3.44)
Cities and towns per $1,000,000 expenditures	−.0684	−.00466	−.102
	(4.09)	(4.17)	(9.51)
Special districts per $1,000,000 expenditures	.0245	.00184	−.0319
	(1.29)	(1.45)	(2.63)
School districts per $1,000,000 expenditures	.0124	.0000458	−.0662
	(.444)	(.0245)	(3.71)
R^2	.108	.0688	.280
F-tests and degrees of freedom for:			
Equality between city and special district effects (3,3036)	3.45	4.08	7.43
	(.0159)	(.0068)	(.0001)
Equality between city and school district effects (3,3036)	1.79	2.19	2.01
	(.145)	(.0853)	(.109)
Equality between special and school district effects (3,3036)	.108	.870	.777
	(.951)	(.458)	(.510)
Equality between city, special, and school district effects (6,3036)	1.95	2.38	3.91
	(.0690)	(.0267)	(.0007)

Note: *t*-statistics are in parentheses below coefficients. Significance levels are in parentheses below *F*-tests. *F*-tests test for joint equality between coefficients for number of jurisdictions, jurisdictions per 1,000 capita, and jurisdictions per $1,000,000 across two or three jurisdiction types.

total expenditures differ at significant or near-significant levels.[16] Municipalities are entirely responsible for income shares of full-faith-and-credit debt and for fiscal-year changes in short-term debt. Total expenditures are equally sensitive to numbers of school and special districts, but significantly more sensitive to numbers of municipalities.

Table 3.7 presents the coefficients on jurisdiction counts, jurisdictions per 1,000 capita, and per $1,000,000 expenditures, by type of jurisdiction, from regression models for these three variables. *t*-statistics for coefficients in equations for guaranteed debt and changes in short term debt demonstrate that neither special nor school districts have any significant effects on either.[17] The effects of cities and towns are similar to the effects of total jurisdictions in table 3.5. Income shares of guaranteed debt increase with municipalities per 1,000 capita, and diminish with municipalities per $1,000,000 expenditures. Effects on changes in short-term debt are similar, with the addition of a positive effect of city numbers.

In contrast, municipalities, special districts, and school districts all have significant effects on the income share of total expenditures. Each type of government has effects similar to those of total jurisdictions in table 3.5. However, *F*-tests of equality across jurisdictions reject the hypotheses that effects of municipalities are equal to those of special or school districts. Coefficients for municipalities are nearly twice as large as those for school districts, and three times the size of those for special districts.

Where jurisdiction types differ in their effects on the size of the local public sector, the incentives presented by consolidation and fragmentation operate most strongly on general-purpose governments. They may be constitutionally more flexible, because their responsibility for multiple functions gives them an additional dimension along which to adjust to changes in local government structure. They may also be more sensitive to voters, if elections for single-purpose governments attract less voter interest than do municipal elections. Regardless of explanation, the income share of local public expenditures expands most when municipalities have large budgets, and diminshes most when they serve large populations. This is an additional topic which deserves further study.

3.6 Multiple Jurisdictions and City Finances

The previous sections demonstrate that the aggregates of local public debt and expenditures depend on the hierarchical structure of local government. This implies that debt and expenditures in individual jurisdictions should depend on the numbers of surrounding jurisdictions as well. This section presents a preliminary investigation of these spill-

over effects among cities with populations greater than 10,000. Despite differences in structure and in sample, debt and expenditure income-share regressions for cities yield results which are similar to those for county aggregates.

The *Census of Governments, 1982,* Finance Summary Statistics Tape File A, and the *Census of Population and Housing, 1980,* Summary Tape Files 1C and 3C, report complete data for 2,796 general-purpose governments,[18] each with populations greater than 10,000. Only 1,066 of the counties analyzed above contain cities of this size. The counties represented in this city sample are a subsample of the sample above, comprising, naturally, the biggest counties. The counties in which these cities are located contain, on average, approximately 31.8 cities and towns, 33.7 special districts, and 20.7 school districts.

In principle, comparisons of public finances across these cities are more difficult than across counties, because they should control for differences in service arrays across overlapping special districts, school districts, and counties as well as across the cities under study. The analysis here controls only for differences in the service arrays provided by the cities themselves. It consists of regression equations similar to those of tables 3.3 and 3.5, with city-specific population and housing measures, and various measures of city density within counties.

The regressions of table 3.8 include two measures of city density for each city, the numbers of large and small cities in the same county. Large cities are those in this sample; small cities are all cities not in this sample. The number of large cities is defined as the number of cities in this sample that are located in the same county. The number of small cities is the difference between the number of large cities and the total number of cities in that county.[19]

The debt and expenditure income-share regressions of table 3.8 yield results which are both similar to, and extensions of, those for county aggregates.[20] As with the number of jurisdictions in table 3.3, the number of small cities has negative effects on all debt measures and on total expenditures. These effects are significant at 5 percent for gross debt and total expenditures, at 10 percent for net debt and changes in long-term debt.

In contrast, the number of large cities has positive effects on all three debt measures, though no effect on expenditures. This result is not consistent with the purported advantages of either consolidation or fragmentation. It may well be attributable to uncontrolled differences in the services provided by other levels of local government.

Table 3.9 presents a regression specification similar to that of table 3.5. This specification includes linear and quadratic terms in cities per 1,000 county population and cities per $1,000,000 aggregate local public sector expenditures in the county, as well as counts of large and small

Table 3.8 **Equations for Municipality Debt and Total Expenditure Shares in Total Personal Income with Jurisdiction Counts**

Independent Variables	Gross City Debt	Net City Debt	Change, City Long-term Debt	Total City Expenditure
Number of large cities in county	.000982	.000686	.000490	.0000366
	(2.36)	(1.75)	(2.41)	(.508)
Number of small cities in county	−.00101	−.000774	−.000405	−.000172
	(2.18)	(1.78)	(1.80)	(2.14)
Interquartile range, family income distribution	.00000101	.00000087	.00000051	.00000001
	(.988)	(.906)	(1.02)	(.0593)
Marginal federal income tax rate	1.39	.970	.667	−.0969
	(1.27)	(.944)	(1.25)	(.512)
Marginal federal income tax rate, squared	−2.49	−1.87	−1.16	−.0434
	(1.82)	(1.45)	(1.74)	(.183)
Marginal state income tax rate	5.49	7.31	2.54	1.32
	(1.60)	(2.26)	(1.52)	(2.22)
Marginal state income tax rate, squared	−27.8	−34.0	−12.9	−8.99
	(1.53)	(1.98)	(1.45)	(2.85)
Percentage of adult population aged 25–44	−.0884	−.0667	−.0133	−.0555
	(.455)	(.365)	(.140)	(1.65)
Percentage of adult population aged 61 or more	−.205	−.168	−.0604	−.0526
	(1.08)	(.939)	(.653)	(1.60)
Percentage in same house as 1975	.0576	.0824	.0170	.0793
	(.596)	(.907)	(.362)	(4.74)
Percentage in same county, different house as 1975	−.0105	−.00628	−.00953	.0158
	(.122)	(.0780)	(.228)	(1.07)
Percentage in rental units	.0482	.0412	.00471	.0989
	(.691)	(.629)	(.139)	(8.20)
Percentage structures built since 1975	.229	.216	.0828	.0707
	(2.70)	(2.72)	(2.00)	(4.82)
Included in an SMSA	−.00564	−.00276	.00338	−.00823
	(.317)	(.165)	(.389)	(2.67)
Intercept	−.112	−.138	−.0849	.0167
	(.377)	(.496)	(.589)	(.327)
R^2	.158	.143	.135	.657
Means of Dependent Variables	.0891	.0529	.0229	.0768

Note: *t*-statistics are in parentheses. All equations have 3,043 degrees of freedom.

cities. Coefficients for large and small city measures are similar to those in table 3.8.

Effects of other city density measures replicate the analogous effects in table 3.5. All linear and quadratic coefficients are significant, most at 1 percent and only one at 10 percent. Increasing the number of cities

Table 3.9 **Equations for Municipality Debt and Total Expenditure Shares in Total Personal Income with Multiple Jurisdiction Measures**

Independent Variables	Gross City Debt	Net City Debt	Change, City Long-term Debt	Total City Expenditure
Number of large cities in county	.000975	.000654	.000450	.0000715
	(2.22)	(1.58)	(2.09)	(.954)
Number of small cities in county	−.00130	−.000987	−.000457	−.000294
	(2.73)	(2.19)	(1.95)	(3.59)
Cities per 1,000 capita	1.56	1.22	.456	.534
	(4.46)	(3.77)	(2.66)	(8.94)
Cities per 1,000 capita, squared	−1.38	−1.07	−.433	−.489
	(2.97)	(2.46)	(1.91)	(6.16)
Cities per $1,000,000 expenditures	−1.64	−1.32	−.512	−.518
	(4.71)	(4.02)	(3.00)	(8.70)
Cities per $1,000,000 expenditures, squared	1.57	1.29	.523	.483
	(3.34)	(2.90)	(2.27)	(6.00)
Interquartile range, family income distribution	.0000011	.0000009	.0000005	.00000006
	(1.08)	(.972)	(1.03)	(.331)
Marginal federal income tax rate	1.36	.950	.663	−.115
	(1.24)	(.926)	(1.24)	(.618)
Marginal federal income tax rate, squared	−2.45	−1.86	−1.17	−.0124
	(1.80)	(1.45)	(1.76)	(.0533)
Marginal state income tax rate	5.46	7.34	2.66	1.24
	(1.58)	(2.26)	(1.57)	(2.11)
Marginal state income tax rate, squared	−27.2	−33.7	−13.4	−8.45
	(1.48)	(1.95)	(1.50)	(2.70)
Percentage of adult population aged 25–44	−.0644	−.0469	−.00739	−.0486
	(.332)	(.257)	(.0779)	(1.47)
Percentage of adult population aged 61 or more	−.190	−.153	−.0523	−.0515
	(.999)	(.857)	(.563)	(1.59)
Percentage in same house as 1975	.0707	.0907	.0152	.0871
	(.719)	(.980)	(.316)	(5.19)
Percentage in same county, different house as 1975	−.0304	−.0236	−.0182	.0115
	(.353)	(.291)	(.434)	(.783)
Percentage in rental units	.0671	.0543	.00645	.108
	(.950)	(.817)	(.187)	(8.93)
Percentage structures built since 1975	.230	.216	.0807	.0729
	(2.70)	(2.70)	(1.94)	(5.02)
Included in an SMSA	−.00510	−.00196	.00361	−.00839
	(.286)	(.117)	(.414)	(2.75)
Intercept	−.108	−.133	−.0788	.0142
	(.366)	(.480)	(.545)	(.282)
R^2	.166	.149	.138	.668

Note: *t*-statistics are in parentheses. All equations have 3,043 degrees of freedom.

per capita in the county increases the share of individual city debt and expenditures in the income of its residents at a diminishing rate. Increasing the number of cities per local government expenditure reduces the income share of city debt and expenditures at a diminishing rate.

These results reaffirm the simultaneous advantages of fragmentation and consolidation. The income shares of city finances increase with reductions in the population served, and fall with reductions in city market share. However, they also suggest that spillovers among large cities involve other considerations as well. These spillovers, which may also occur among counties, merit further investigation.

3.7 Conclusion

The recent scholarly literature on jurisdiction numbers has been predominantly hostile towards consolidation and to consolidationist advocacy. This attitude is unfair for two reasons. First, the advocates of consolidation have become relatively inactive. They were most active and influential at a time when school districts were far more numerous, and their position was correspondingly more persuasive.

Second, empirical demonstrations, in selected samples, of the advantages of competitive local governments have not allowed for the possibility that large-scale production and distribution may also be advantageous. The results here demonstrate that, across all counties in the country, jurisdiction numbers have negative effects on size of the local public sector when model specifications do not allow for simultaneous measures of competition and efficiency. These results suggest that, when they do, both the restraining influence of competition among jurisdictions, and the efficiencies of scale play a role in reducing the shares of local government debt and expenditures in aggregate income.

Debt and expenditures are minimized by simultaneously reducing jurisdiction market shares and expanding jurisdiction coverage. A system which depends wholly on general-purpose governments cannot exploit both mechanisms. Fragmentation means more competition and more redundancy, consolidation means more efficiency and more monopoly power.

Though numbers of single-purpose governments have smaller effects on expenditures than do numbers of municipalities, single-purpose governments may still play an important role in minimizing the size of the local public sector. If they are constructed to serve large, though not monopoly, shares of county population, and assigned only small fractions of total government activity, they may at once achieve both efficiency and competition. A complex system of local government which relies on them, judiciously, may provide local public services at less

current and future expense than can the simple systems of either consolidation or fragmentation.

Notes

1. Curiously, authors in this tradition perceive it to be the position of a distinct minority. Wagner and Weber (1975), Martin and McKenzie (1975), and Wikstrom (1978) are examples.

2. The *Census of Population, 1980* identifies 3,137. The *Census of Governments, 1982* identifies 3,132. The intersection between these two data sets contains 3,131 county-level governments. Among these are Washington, D.C. and New York City, whose government structures are unique. Omitting them, the sample for this paper is composed of 3,129 counties. For brevity, this paper refers to individual county-level governments as "counties," though a few are legally boroughs, townships, or independent cities.

3. County populations vary widely. The *Census of Population, 1980* reports that 25 counties had fewer than 1,000 inhabitants in 1980. Loving County, Texas, had only 91. At the same time, 25 counties had more than 1,000,000 inhabitants. Los Angeles, with 7,477,503 was the most populous.

4. Gordon and Slemrod (1986) and Mieszkowski (1986) agree that debt is appropriate finance for municipal activities only if municipal debt presents favorable opportunities for arbitrage, relative to combinations of tax financing and private debt. Nevertheless, the structure and number of jurisdictions may affect debt levels. Directly, fragmentation may create homogeneous districts in which electorates are uniform in their preferencs with regard to arbitrage opportunities. This effect may imply either higher or lower debt levels. Under consolidation, monopolizing bureaucrats may take advantage of the opportunities at all margins to enlarge government size. They may therefore issue debt beyond the limits imposed by profitable arbitration.

5. The *Census of Governments, 1982* surveys 31 government functions. Nine functions occur in at least 99 percent of all counties. In the regression equations below, these functions are not represented by explicit dummy variables. Instead, their effects are captured in the intercept term.

6. The *Census of Population and Housing, 1980.* Summary Tape Files 1C and 3C provide the measures of population characteristics, housing characteristics and the SMSA dummy used in this model. The *Census of Governments, 1982,* Finance Summary Statistics Tape File B is the source for the function dummies, the debt and expenditure statistics used here. Tape File A is the source for the jurisdiction counts.

The specific representation of marginal tax rates here differs from that in Gordon and Slemrod. The equations below include linear and quadratic terms in both marginal federal and marginal state income tax rates. Tax Foundation's *Facts and Figures on Government Finance, 1983* is the source for 1982 federal rates. State rates are a linear interpolation of 1982 rates given in Feenberg and Rosen (1986). Rate values are estimated as the marginal rates applicable to median family incomes by county, as reported in the *Census of Population and Housing, 1980.*

7. The Borcherding/Deacon and Bergstrom/Goodman models are linear in logarithms, with expenditures as the dependent variable, and population and

income among the independent variables. Here, population and income appear in the denominator of the dependent expenditure measure. Logarithmic expenditure equations for this sample of counties yield standard values for parameter estimates.

Borcherding/Deacon and Bergstrom/Goodman measure tax-share as the percentage of total property taxes attributable to estimated property taxes on homes of median value. They choose the property tax measure because property taxes constitute more than half of own-source revenue in 1962, the year from which their data are drawn. As they recognize, assumptions that the median voter has median income, and that the median income person owns a home of median value, effectively make their tax-share variable a function of income. In the expenditure models below, tax-share is an explicit function of income. In 1982, all taxes constitute only 49 percent of local government own-source revenue.

8. These regressions include only county-level governments in both the 1977 and 1982 *Census of Government,* with nonzero counts for the relevant government type: 3,108 for cities, 1,169 for towns, 2,843 for special districts, and 3,108 for school districts. Regressions that include all 3,108 available counties achieve identical results. Complete results are available from the author.

9. The performance of these debt equations is similar to those in Gordon and Slemrod (1986), although of lower explanatory power. However, they do not replicate the effects of income taxation on gross and net debt. Both federal and state marginal income tax rates are insignificant in these equations. Federal rates have strongly significant coefficients, and effects similar to those in Gordon and Slemrod, if the specification here omits the interquartile range of the family income distribution. This comparison suggests that the effects estimated by Gordon and Slemrod may be partially attributable to uncontrolled heterogeneity in population demands for public services. State marginal tax rates often have significant effects, similar to those of federal rates, in equations which omit state dummies.

10. Sjoquist (1982) reports a similar negative relationship between jurisdiction numbers and 1972 per capita expenditures for 48 SMSA's in the south, using a logarithmic specification which omits controls for state, function, and population characteristics.

11. Coefficients for the other explanatory variables are virtually invariant to different jurisdiction measures. In the expenditure equation, total expenditures are the denominator of the jurisdictions per $1,000,000 expenditures variable on the right hand side of the equation, as well as the numerator in the dependent variable. Therefore, this equation should be taken as illustrative rather than conclusive. This problem is analogous to that confronting regressions of rates of return on market shares. Jurisdictions measured relative to lagged total expenditures would probably yield similar results.

12. Schneider (1986) reports a contrary result; suburban governments per 100,000 SMSA population have a significant negative linear effect on total 1977 expenditures and 1972 expenditures for common functions. His sample is 757 suburban municipalities in only 46 SMSA's. He uses a linear specification which omits both state and function dummies.

13. The complete equations discussed in this and the next two paragraphs are available from the author.

14. These equations disaggregate the jurisdiction measures of tables 3.3 through 3.6. They omit quadratic terms for the different types of local government in order to simplify comparisons.

15. These equations are available from the author.

16. These tests are weakened by the inclusion of coefficients for jurisdiction counts. They reject equality across the three government types with much greater significance for jurisdictions per 1,000 capita and per $1,000,000.

17. Special districts may be legally prohibited from issuing guaranteed debt.

18. General-purpose governments are, for this analysis, all municipalities and towns in the eleven "strong-township" states (ACIR 1982). For convenience, they are referred to as cities in the rest of this section.

19. Quadratic terms in these variables are omitted because they are invariably insignificant.

20. Function and state dummies contribute substantially more explanatory power in city than in county regressions. In consequence, debt equations for cities have similar explanatory power to those for counties, though population variables appear less significant. Expenditure equations for cities attain substantially higher R^2s than those for counties.

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Comment

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An important, if overlooked, aspect of fiscal federalism is the impact of local government structure on the level and pattern of local public spending. Jeffrey Zax seeks to improve our understanding in this area by estimating the impact of different measures of jurisdictional fragmentation on the nature of government behavior. Zax's basic unit of

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observation is the county, and he tests his hypotheses on a sample that includes essentially every county in the United States, over 3,000 of them in all.

Perhaps the first interesting fact revealed in his analysis is the heterogeneity of the sample. Twenty-five counties had fewer than 1,000 inhabitants in 1980, while the same number of counties had over 1 million people living in them. This leads to my first comment about the paper's logic. In some types of empirical analysis, the unit of measurement is fairly obvious or at least subject to a fairly narrow range of choices. For example, if we were estimating labor supply functions we might choose to concentrate on the family or the individual, and if we were looking at investment behavior we would wish to look at the firm. But what is the appropriate unit of measurement for a study of the effects of governmental fragmentation?

What Zax appears to have in mind is a jurisdiction that is small enough for a type of Tiebout sorting to occur, but still large enough to have lower levels of government within it. But it is not clear that the designation "county" has a very clear or consistent meaning throughout the sample. One would not expect the 91 people in Loving County, Texas, to organize their lower levels of government to achieve the same objectives as the voters of Cook County, Illinois, whose number exceeds 5 million even without the inclusion of the deceased. This also highlights an econometric problem which the paper partially addresses: should these extreme observations be weighted equally, as they currently are, or should some account be taken of their very large size differences. At present, anomalous behavior of a few small governments could lead to estimates that would offer a poor description of the behavior of county governments representing most citizens. Even though the results are reported not to change when very small (population below 1,000) and very large (population above 1 million) counties are omitted, I would have found a comparison of weighted (by size of county) and unweighted regressions informative.

Let me turn now to the theory that underlies the paper. If one were designing a local jurisdictional structure within a county, one would face offsetting costs and benefits of the sort commonly encountered in questions of local public goods provision. On the one hand, the larger the number of governments, the greater their ability to respond to differences in tastes among constituents. On the other hand, such small governments might also face greater costs if their level of operation were below the minimum efficient scale. To this familiar trade-off between the satisfaction of heterogeneous tastes and the efficiency of provision, Zax adds the question of competition, arguing that counties with fewer jurisdictions, per some measure of county size, will lead to greater market power and poorer performance.

While one might attempt to characterize the optimal structure of government in such a model, Zax takes governmental structure as exogenous and instead estimates the impact of such structural variations on public expenditure and debt levels. Because he has not modeled the optimal behavior of governments, I am somewhat confused by the normative terminology he uses in describing his empirical findings. In section 3.1, for example, he equates the minimization of debt and expenditure with superior performance. Since most citizens would desire some positive levels of public spending on education, police, and fire protection, even if provided by inefficient and oligopolistic governments, Zax's comments suggest the view that government is inherently biased toward the overprovision of public goods.

The assumption of exogenous government structure is also a problem when one attempts to interpret the empirical results. For simultaneity bias to be avoided, it is necessary that the variations in governmental structure be independent of the population characteristics. Generally, however, one might expect that counties inhabited by people with a strong taste for public goods might find it sensible to establish more governments per capita in order to supply these goods. This would predict a positive sign if one regressed expenditures on the number of jurisdictions per capita, as Zax indeed finds empirically in the last column of table 3.4, without in any way suggesting inefficiency in the scale of governmental operation, which is the interpretation Zax gives to this result. Zax supports the exogeneity assumption with evidence that jurisdiction counts in 1982 are almost perfectly predictable using 1977 counts alone. If, however, local taste differences are a long-run phenomenon, there may still be a problem of simultaneity bias. I believe this may be a serious problem, but will say no more about it.

Let me turn now to the empirical relations that Zax estimates. There are many results reported, so I must be selective in my comments. He constructs a number of measures of each county's local government characteristics, and includes these along with other demographic variables in cross-sectional regressions to explain the ratios of aggregate government debt and public expenditures to total personal income in the county. I will focus on the equations that explain variations in expenditures, because I am less sure how to interpret the equations for government debt in the context of Zax's model.

There are several variables constructed to characterize government fragmentation. These include the number of all local jurisdictions and different types of such jurisdictions (such as cities and towns and school districts) per county, per thousand residents, and per million dollars of public expenditures, as well as the number of jurisdictions per square mile. Let me first summarize Zax's findings concerning these variables.

In table 3.3, the number of local jurisdictions per county is found

over most of the relevant range (the variable also enters in quadratic form so that the overall effect decreases and eventually switches sign with the variable's size) to have a significantly negative effect on expenditures per dollar of income, which Zax interprets as showing that fragmentation leads to competitive behavior. In table 3.4, we find that the number of jurisdictions per capita increases total expenditures while the number of jurisdictions per dollar of expenditure decreases expenditures, which are interpreted as showing that governments with small constituencies are inefficient but that governments with small budgets behave competitively. I see several difficulties with these interpretations.

First of all, why should population be a better measure of scale of operations than budget size? Second, why put one measure of fragmentation in table 3.3 and the others in table 3.4, if all are supposed to matter? Third, since government expenditures enter in the numerator of the dependent variable and the denominator of one of the explanatory variables, one would expect a negative sign on this variable even if jurisdictional structure were totally irrelevant to the determination of public spending levels. Finally, increased inefficiency would lead to higher spending levels only if the price elasticity of demand for the public goods is less than one in absolute value. Likewise, though a less competitive government might increase the price of government services, one might expect total expenditure on public goods to decline; a monopolist, for example, restricts output to the point at which marginal revenue equals a positive marginal cost.

In table 3.7, Zax divides the local jurisdictions into cities and towns, special districts, and school districts and repeats the analysis of table 3.4. He finds the same signs as before for each of the three types of jurisdictions: that the number of jurisdictions per capita increases expenditures while the number per dollar of expenditure decreases expenditures. It is interesting, howver, that the effects are much larger for cities and towns than for the other two measures. Zax does not really come up with a convincing explanation for this finding. I don't have one, either, but would suggest a closer examination of the pattern and frequency of these different forms of government in different parts of the country. My guess is that there is considerable variation in the use of special districts across different parts of the country and according to population density.

There are many other interesting results in this paper. I think that Jeffrey Zax has attacked a very complicated and difficult question. Many of the problems I have suggested are really a necessary byproduct of the decision to undertake such an ambitious task. Nevertheless, I think a tighter theoretical foundation and greater attention to certain econometric difficulties could yield substantial returns in helping us understand the full implications of these interesting and suggestive results.