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AUTHOR Green, Harry A.
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ABSTRACT

Ways of measuring the fiscal capacity of school systems are examined in this paper, which presents a representative tax system model. Fiscal capacity is influenced by factors other than tax base size; the "ideal" model should address adjustments for variations in cost across communities and school systems. The first section examines the definitions of fiscal capacity, and section 2 discusses revenue sources for education that are used in measuring tax capacity. Approaches to measuring fiscal capacity are described next, which are based on a legal tax base, exported-adjusted income, or a representative tax system. A regression-weighted representative tax system (RTS) is then applied to Tennessee counties, examining local variables that influence fiscal capacity: per pupil own-source revenue, equalized property assessment, taxable sales, and capita income; average daily attendance-to-population ratio; and residential and farm property ratio. Problems in estimating fiscal capacity in the Tennessee school systems--shared tax bases and double-counting of tax bases--are discussed next. A correlation analysis of tax variables is presented in the final section. Four tables and an application of the RTS model to other states are included. (9 references) (LMI)

The Tennessee Advisory Commission
on Intergovernmental Relations

Suite 508
226 Capitol Blvd. Building
Nashville, TN 37219
Phone: (615) 741-3012



# Measuring Fiscal Capacity of School Systems

*by:*

***Harry A. Green***
***Executive Director***

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*The American Education Finance Association*

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*(Revised)*

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# What is Fiscal Capacity?

**Fiscal capacity is commonly defined as the potential ability of local governments, or school systems, to raise revenues from their own sources, relative to the cost of their service responsibilities**[1]. The phrase "relative to the cost of their service responsibility" is an important modifier. This means that potential fiscal capacity is influenced by factors other than the size of tax bases. The "cost of service responsibilities" is a function of a set of costs associated with the provision of differential community services and also a function of price-level differences caused by variations in supply and demand factors. It is extremely difficult to adjust for these costs across communities and school systems, but an "ideal" fiscal capacity model should address them in some appropriate manner.

Methodologically, a measure of ***fiscal capacity*** can be calculated by expressing the tax bases, or the revenue collected, in units of some common needs variable that is comparable across taxing jurisdictions. The most widely-used needs variable is population and fiscal capacity is frequently expressed in per capita units. Another common variable is school population and fiscal capacity can be expressed in per pupil units.

Within the context of a representative tax system, there are two approaches to estimating fiscal capacity. First, there is the theoretical argument that fiscal capacity indicators should use economic concepts to define tax bases. This will express potential fiscal capacity in terms of tax bases unconstrained by public policy limitations.

The second approach is the legal definition of tax bases. Under this approach, public limitations on local tax bases are accepted as common to all tax jurisdictions and, as a consequence, fiscal capacity is restricted to those amounts that potentially can be collected from delimited tax bases. "Potentially" as used here means that all local tax bases are defined to equal the maximum legal tax base for each taxing jurisdiction, subject to average tax rates. ***The legal definition of tax base approach is the method utilized in this analysis because all jurisdictions are subject to identical limitations.***

To distinguish it from tax capacity, fiscal capacity is always expressed in units of service responsibilities. In this case, service responsibility units are a per pupil measure called weighted full time equivalent average daily attendance (WFTEADA).

## Measuring Tax Capacity: The Practice

Historically, fiscal equalization formulas for education have used local property wealth to measure local tax capacity. There are many different approaches to the use of property wealth just as there are marked differences in assessment policy and practices among the states. With the exception of Hawaii, all states use property as a determinant of local tax capacity. The variation among the states is shown below:[2]

| | |
|---|---|
| property exclusively | 31 States |
| property and income | 12 States |
| property, income and other taxes | 1 State |
| property and other taxes | 5 States |

Presently, 13 States utilize income data in addition to property wealth, to determine tax capacity. These states are Alabama, Connecticut, Kansas, Maryland, Missouri, Nebraska, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and Virginia.

### *Revenue Sources for Education*

In 1986-87, State governments funded nearly 50% of all K-12 public education in the United States. Local governments and school districts funded 44% while the federal government funded 6 percent. The highest level of state funding is Hawaii (88%) followed by New Mexico (75%). The highest level of local funding is found in New Hampshire (91%).

The most important source of local revenue is the ad valorem property tax but the dependence on this tax varies considerably among states depending on the fiscal independence of school districts. In the case of fiscally independent school districts, the property tax is usually the sole local source. In the case of fiscally dependent school districts, the property tax is supplemented by a number of other sources including local sales taxes, income or payroll taxes, severance taxes, payments-in-lieu of taxes and litigation taxes.

Townships, cities and county governments are also heavily dependent on the property tax. Because of this there are likely to be competitive trade-offs between the revenue needs for educational services and other local public services. This trade-off linkage is less clear in the case of independent school districts, but given the popular antipathy for property taxes nationwide, it is expected that the demand for school services is tempered by the tax burden imposed on the same taxpayer for other services by other overlapping jurisdictions.

## Approaches to Fiscal Capacity

Basically, there are three theoretical approaches to measuring fiscal capacity for local governments and school systems: (1) the use of the actual legal tax base; (2) the use of export-adjusted income; and, (3) a representative tax system approach.

### *Legal Tax Base*

The proponents of this approach argue that tax capacity of local governments and school districts should be taxed based on actual tax policy. Thus, if property is the sole source of local revenue, only property should be used. If other taxes in addition to property are authorized, then they should be included in the tax capacity index. According to one proponent, the inclusion of non-authorized tax bases in a measure of tax capacity "can lead to horizontal inequity unless district populations are homogeneous".[3]

### *The Use of Income*

Per capita income (PCI) has long been the preferred measurement of fiscal capacity or ability to pay. PCI has been widely used in federal grant formulas as an indication of fiscal capacity. Moreover, it has frequently been used by many states--both formally and informally--to measure variations in local capacities. PCI has the advantage of being easy to understand and the data is readily available on a timely basis for states and county areas. However, the data is not so readily available for cities or school districts and some other income measure is needed.

There are four basic measures of income produced on a periodic basis, none of which are comprehensive: resident personal income (BEA); money income (Census); adjusted gross (or taxable) income (IRS); and, income by place of work (BEA). As illustrated by ACIR, these measures vary because of a number of reasons and consequently produce different results.[4]

### *Exported-Adjusted Income*

A problem with the use of any local tax base to determine tax capacity is the issue of "tax exporting". Because some local governments can impose taxes that are paid by nonresidents, their tax capacity is correspondingly increased and the fiscal burden of residents reduced.

In the past few years, considerable attention has been given to exported-adjusted income (EAI) as an approach to measure fiscal capacity, fiscal health, fiscal condition, and tax burden.[5]. Ladd and Yinger uniformly

define three tax bases (property, sales, earnings) and measure the revenue that can be raised with a standard tax burden. Based on tax exportability analysis, export ratios were determined for property, sales and earnings and a weighted average export ratio for each jurisdiction. Fiscal capacity (or "revenue raising capacity") is then defined as the standard tax burden times income adjusted by the weighted export ratio, or :

$$FY = T*Y(1+e)$$

Thomas Pogue argues that the use of EAI does not result in horizontal equity when the property tax is actually used because "tax exporting as it is conventionally defined and measured does not indicate the extent to which individuals can shift taxes imposed on them".[6]

### *Tax Exporting and Fiscal Burden*

The property tax is the single most important source of local revenue for all school systems aggregately and most school systems individually. However, there are a few systems in Tennessee that rely more heavily on local sales taxes than property taxes.

The actual fiscal burden on residents of either city or county governments to support education depends on how much of the property and sales tax can be "exported" to non-residents. For those taxing authorities with a high concentration of business property, there is a significant probability that a substantial part of the tax burden, both property and sales, can be exported. However, if residential and/or farm property is disproportionately large, there is little opportunity for exporting the tax burden.

The ability to export taxes enhances the tax capacity of a school system because it decreases the fiscal burden on residents. For a given level of taxation, a school system with a high commercial/industrial component in its base has less fiscal burden than one with a high residential or farm component. Recent estimates indicate that between 44%-50% of the tax burden on commercial/industrial property is paid by non-residents.[7] Also, a high proportion of commercial property indicates that some of the local sales tax can be exported.

### *Representative Tax System*

The Representative Tax System approach was developed by ACIR in 1960 and it has gone through a number of refinements during the ensuing 30 years. The RTS estimates tax capacity by applying uniform tax rates to a standardized set of tax bases. Thus, the tax capacity of a city, county or school district would be the weighted sum of the yield from its different tax

bases with the weight being average tax rates. The RTS has three important advantages: (1) it is relatively straight forward and easy to comprehend; (2) it is feasible to implement for local governments within a single state; (3) it provides a comprehensive measure of tax resources available from multiple sources. Because uniform rates are used for each local government or school district, estimated tax revenues vary only because of differences in the tax bases.

There is considerable controversy and disagreement about the most appropriate method for measuring fiscal capacity. In 1983, Congress directed the Secretary of the Treasury to conduct an extensive series of studies about intergovernmental fiscal relations including fiscal capacity. In the Treasury report the following observation was made:[8]

> Major theoretical approaches to capacity measurement require indicators of resident income, comprehensively defined and adjusted for tax exporting. However, such indicators are not currently feasible because of the diversity of professional opinion on the incidence of State and local taxes and the unavailability of certain key data. These problems are not likely to be resolved in the near future.
>
> If policymakers wish to move away from the per capita income indicator of State revenue-raising capacity, a measure of Total Taxable Resources and a ***modified Representative Tax System*** are the most promising short-run options (emphasis added).

It is in this context that the Representative Tax System model has been adapted for this analysis.

## Regression-Weighted Representative Tax System for County Areas in Tennessee

Fiscal capacity for education is calculated first for the 95 county-areas. This is based on total taxable (or potentially taxable) resources and total county-area Weighted Full Time Equivalent Average Daily Attendance (WFTEADA). Total taxable resources are total equalized property assessment, and total taxable sales. Money income is also included to represent all the other sources of local revenue from taxes and fees and to

represent the taxpayer's ability to pay. Following this approach, there is no "double counting" of the property tax base that is subject to county, city, and special school district taxes. Also, this approach ensures that the local sales tax base is measured uniformly according to "local economies".

The method used is multivariate regression analysis. The tax bases are:

- weighted per pupil equalized property assessment
- weighted per pupil local taxable sales
- weighted per pupil money income

The model has two other variables:

- the ratio of ADA to population
- the ratio of farm and residential assessment to total assessment.

## Local Variables Affecting Fiscal Capacity

Clearly, the total value of property assessment impacts local spending decisions, but the level of assessment will have different impacts when other tax bases, such as taxable sales and income, also vary across tax jurisdictions. As the analysis presented below shows, there is significant variation among the tax base variables.

**Per Pupil Own-Source Revenue.** This is the dependent variable used in the RTS regression model. Much of the variation in this variable is believed to occur because of tax base disparities among tax jurisdictions and differences among resident fiscal burdens. The highest value is $1,829 (Davidson County), the lowest is $214 (Hancock County), a ratio of 8.5 to 1. The average for all 95 counties is $1,007. The coefficient of variation is 37.6 percent.

**Per Pupil Equalized Property Assessment (P).** Tennessee has a classified property tax system with different assessment ratios: Utility (55%); Commercial/Industrial (40%); Personal property (30%); residential and farms (25%). This variable is the weighted total assessment, adjusted by appropriate appraisal/sales ratios and expressed in per pupil units. The highest value is $85,587 (Davidson County) the lowest value is $16,924 (Morgan County), a ratio of 5 to 1. The average value for the 95 counties is $38,326. The coefficient of variation is 34.02%.

**Per Pupil Taxable Sales (S).** Tennessee has a local option sales tax and all 95 counties utilize the tax significantly. By law, 50% of this tax must go for education and by practice, substantial amounts of the second half are also used for funding education. Per pupil taxable sales varied from a high of $68,064 (Davidson) to a low of $4,288 (Clay), a ratio of almost 16 to 1. The average for all 95 counties is $26,413. The coefficient of variation is 59.63 percent.

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**Per Capita Income (Y).** Per capita money income serves as a proxy of the ability of citizens to pay taxes. It also serves as a representative proxy of all other local own-source revenue not derived from property or sales taxes. Per capita income ranges from a high of $11,733 in Davidson County to a low of $4,274 in Hancock County, a ratio of 2.75 to 1. The average for all 95 counties is $7,834 and the coefficient of variation is 18.3 percent.

**ADA to Population Ratio (ADA).** This is a measure of service responsibility included to reflect expenditure needs. The higher the ratio, the greater the need for per pupil own-source revenue. The logic is that the greater the number of pupils per 100 persons, the greater the fiscal burden for each resident taxpayer. The highest value is 26.0 pupils per 100 persons (Sequatchie County), the lowest value is 15.46 (Davidson County). The mean value is 21.0 and the coefficient of variation is 7.9 percent.

**Residential and Farm Property Ratio (RES).** This is the ratio of all equalized residential and farm assessment in each county to total equalized property assessment. A high residential/farm ratio indicates a low capacity to export taxes and a higher-than-average resident fiscal burden. Thus, the greater the value of equalized business property ratio, the smaller is the proportion of total taxes paid by resident tax payers and the greater the exportability.

Tennessee assessment practices do not distinguish between residential commercial property and non-residential commercial property. Moreover, assessment practices do not distinguish between family owned farms and corporate owned farms. These factors indicate that this ratio, while a reasonable measure, is less than perfect. To equalize property across jurisdictions, nominal assessment is adjusted by appraisal/sales price ratios based on studies conducted biennially.

The highest ratio is 88.21% in Van Buren County and the lowest is 38.11% in Davidson County. The average value for the 95 counties is 64.8% and the coefficient of variation is 15.5 percent.

## Representative Tax System Empirical Model

A linear multivariate specification is used for the actual regression model. The regression equation is:

$$FC = B_0 + B_1 P + B_2 S + B_3 Y + B_4 ADA + B_5 RES$$

Where:

| | |
|---|---|
| FC = | predicted fiscal capacity |
| P = | per pupil equalized property assessment |
| S = | per pupil taxable sales |
| Y = | per capita money income |
| ADA = | school population to total population ratio |
| RES = | equalized residential/farm assessment to total assessment |
| B's = | regression weights |

The accurate measurement of tax exporting is very complex. No attempt was made to estimate the tax exporting by individual tax base. It is assumed that all of the tax on residential property is probably borne by residents while some portion of that on business property is exported to nonresidents. Moreover, the greater the proportion of business property, the greater the ability to export taxes. Conversely, the greater the proportion of RES, the less the ability to export taxes.

The ratio of K-12 population to total population is included as an additional measure of service responsibilities.

### Empirical Results

The results of the estimated regression equation are:

$$FC = 928.39436 + \underset{(1.23)}{.0031}\, P + \underset{(2.51)}{.0060}\, S + \underset{(5.05)}{.0726} Y - \underset{(2.25)}{2168.1759}\, ADA - \underset{(4.20)}{771.31112}\, RES$$

$R^2 = 0.7773$ $\quad F = 62.1222$

Adjusted $R^2 = 0.7648$

This model explained 77% of the variation in per pupil own-source revenue. The sales, income, ADA and RES variables are significant at the .01 level and property is significant at the .21 level. Clearly, income is the most significant variable.

It is assumed that the regression coefficients of P, S and Y, are actually average tax rates that when applied to the tax base produces an estimate of fiscal capacity from each base. The P coefficient indicates that for every $100 increase in the property base, expressed in per pupil units, fiscal capacity increases .31. The S coefficient indicates that for every $100 increase in per pupil taxable sales, fiscal capacity increases $.60. And, the Y coefficient indicates that for every $100 increase in per capita income, fiscal capacity increases $7.26.

The ADA coefficient has a negative sign and indicates inverse variation; that is, fiscal capacity declines as the ADA ratio increases. This is the expected result because the greater the service responsibility, the lesser is the fiscal capacity. In other words, fiscal capacity will always be greater if it is not related to expenditure needs (service responsibilities). This coefficient means that for every one percentage point increase in ADA, fiscal capacity declines by $21.68.

The coefficient of the percentage of the property tax base that is residential and farm (RES) has a negative sign indicting inverse variation. If the value of RES increases, fiscal capacity decreases. The coefficient on RES indicates that a one percentage point increase in residential and farm assessment is associated with a decrease of $7.71 in the average fiscal capacity.

As the subsequent correlation analysis indicates, a number of the variables are strongly intercorrelated. As a consequence, the interpretation of the partial coefficients may be inaccurate. However, since the purpose of the model is the prediction of fiscal capacity, and since the collinear structure in the model reflects the population measured, multicollinearity does not detract from the accuracy of the results.[9]

One solution to the low level of significance attached to per pupil equalized assessment would be to drop it from the model. This doesn't have much effect on the $R^2$ but that is undesirable because property is the principal source of local revenue for school funding and it is unrealistic to exclude it from a fiscal capacity model.

As expected, the signs are "correct"--all the tax base variables have positive signs; the ADA and RES ratios are negative. Thus, the greater the tax bases, the greater the fiscal capacity. The greater the ADA population, the greater the pressure on local resources; and, the greater the Residential/Farm ratio, the greater the local fiscal burden and the greater the inability to export taxes.

Other Specifications

A number of other regression equations were estimated using different variables. Particularly, each class of property was cited as a separate variable and in various combinations and using double log specification. Sales and income were the only variables that were consistently significant. Of 10 different specifications, adjusted $R^2$ was never greater than 0.55.

To measure tax exporting, the business assessment to total assessment ratio was the preferred theoretical variable. However, in successive regression runs, it was insignificant.

## Some Difficulties of Estimating Fiscal Capacity for School Systems in Tennessee

### *Shared Tax Bases*

Estimating potential fiscal capacity of school systems by regression analysis is somewhat more difficult than producing county-area estimates. First, there are 139 school systems located in 95 counties and, as a consequence, sub-county tax bases must be identified. ***This creates a problem at the sub-county level because the major tax bases - property and sales - are shared among city and county governments and special school districts.*** In addition, personal income data and money income data are not available for special school districts. Money income data is available for city and county areas but the data is not usually current. Personal income data, although fairly current, is available only for county areas. Thus, if income is to be included in the tax base some reasonable method must be used to estimate the potential income base for sub-county areas. Analysis revealed that equalized residential assessment and money income were highly correlated (0.997). This high degree of association suggests that property assessment can be used to predict income.

Special school districts (SSDs), as contrasted to city and county school systems, present special problems. No school system is fiscally independent, but each school system must be linked to a tax base that can be defined. Technically, SSDs have no defined tax base because they have no independent authority to tax. The Tennessee General Assembly, through private acts, sets property tax rates that are applied to property assessment in each school district area. Sales tax revenues are based on situs and belong either to city or county governments. The only claim to the sales tax base that SSDs have is a WFTEADA share of local sales tax collections used for education. This WFTEADA share of local sales tax collections

was used to estimate a "hypothetical" local sales tax base for school systems.

***Two different models were tested for the 139 school systems. The first was a regression-weighted model similar to the county-area RTS model discussed above. An alternative approach was considered that is called a "normative" representative tax system model.*** The major differences were: (A) tax rates are calculated by an independent procedure; and, (B) the model assumes no interaction between the two defined tax bases of property and sales. Basically, this approach applies average tax rates to the local tax bases.

### *Double-Counting of Tax Bases*

***The use of these models, though conceptually logical, resulted in the property tax base of multi-district counties to be partially double-counted, and the sales tax base to be undercounted in other counties.*** In those 32 multi-district counties, the defined tax base is total county-area assessment, plus city assessment plus special school district assessment. In the other 63 counties, the property tax base was only total county-area assessment. Relevant to the sales tax bases, the situs collections of cities with school systems ***was included*** in the base because it is a potential source of education funding. In the other 63 counties, city situs sales tax collections were not considered a part of the base because there are no city schools.

***The simplest and most cost-effective method to solve this problem of "overlapping tax bases" is to assign to county governments the full responsibility for raising state matching funds required by fiscal equalization.*** The county government could levy a county-wide tax rate sufficient for this purpose and the equivalent tax yield could go into a county-area education fund for matching state funds.

If the RTS regression model is used with unique tax bases for 139 school systems, adjustments will be required in the dependent variable. Local own-source revenue would need to be adjusted for both sales and property tax distributions that do not strictly coincide with unique tax bases.

## Correlation Analysis of Tax Variables

The coefficient of correlation measures the degree of the linear relationship between two variables. The coefficient is positive if large values of variable A are associated with large values of variable B and negative if large values of A are associated with small values of B. Whatever its sign, the closer the coefficient is to the value of one, the greater the relationship between the two variables.

Table 1 presents 19 different correlation analyses of tax base variables and local revenue. The analyses are based on per pupil values, per capita values, and total values. The strongest per pupil association is between equalized business property assessment and total equalized assessment (0.915). The second strongest per pupil association is between equalized residential property and money income (0.834). The third strongest per pupil association is between total equalized property and money income (0.820). This indicates quite clearly the tendency for property wealth and money income to be concentrated. Actually, around 74% of these two tax bases are located in 19 counties. (See Table 2)

The fourth strongest per pupil relationship is between business property and local school revenue (0.814). This is not a surprising finding and simply underscores the common sense observation that school districts with a large commercial property base raise more school revenues than those districts with a small commercial base.

All of the coefficients reveal fairly strong correlations with the exception of those relating to equalized farm property. The farm property coefficients are not very strong and mostly measure inverse relationships. Not surprisingly, high values of per pupil farm property are associated with low values of local school revenue, taxable sales, money income and business property.

Similar relationships exist when the variables are expressed in per capita and aggregate terms. In per capita terms, the associations are somewhat weaker and in aggregate terms, somewhat stronger.

Relative to the tax base variables and local school revenue, the strongest relationships are money income (0.996) followed by taxable sales (0.982) and total equalized property assessment (0.981). **This strong relationship between local school revenues and money income indicates quite clearly why income should be included in measures of fiscal capacity.**

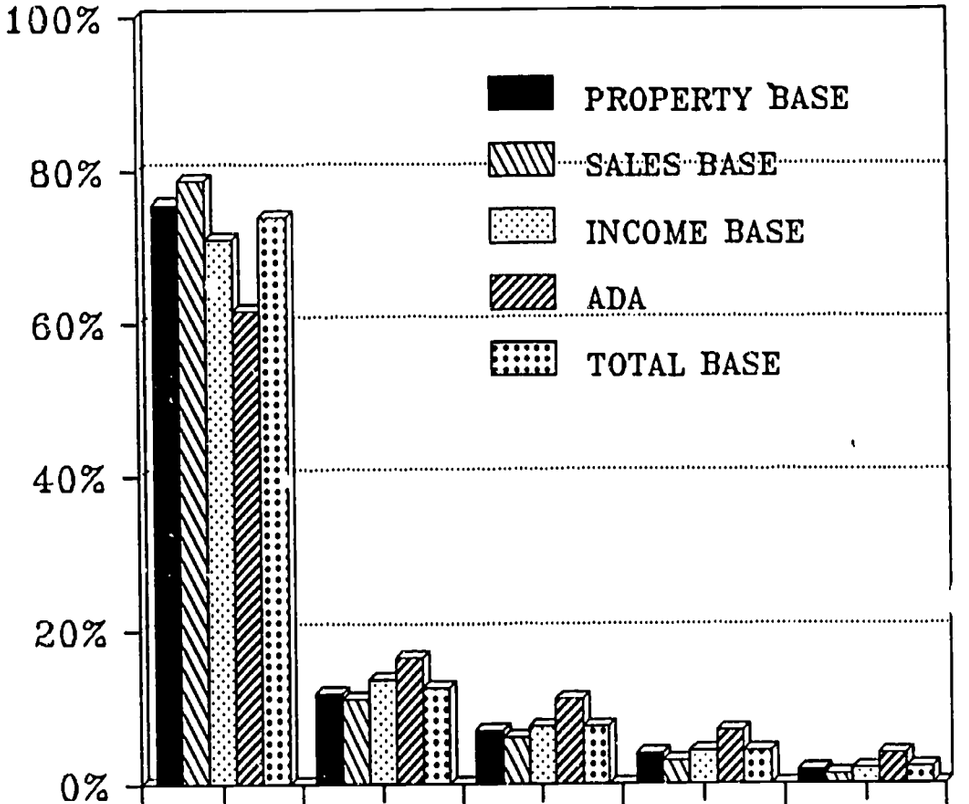
Table 1

# CORRELATION ANALYSIS

| Variables | Per Pupil (WFTEADA) | Per Capita | Aggregate |
|---|---|---|---|
| Business Property/ All Property | 0.915 | 0.883 | 0.992 |
| Residential Property/Income Base | 0.834 | 0.810 | 0.997 |
| All Property/Income Base | 0.820 | 0.748 | 0.985 |
| Business Property/LSR | 0.814 | 0.765 | 0.955 |
| **LSR/Income Base** | **0.809** | **0.761** | **0.996** |
| Business Property/Local Sales Base | 0.807 | 0.734 | 0.985 |
| Business Property/Income Base | 0.763 | 0.679 | 0.957 |
| **All Property/LSR** | **0.762** | **0.701** | **0.981** |
| **LSR/Local Sales base** | **0.761** | **0.691** | **0.982** |
| Residential Property/LSR | 0.748 | 0.681 | 0.993 |
| Business Property/Residential Property | 0.747 | 0.666 | 0.965 |
| All Property/Local Sales Base | 0.735 | 0.642 | 0.993 |
| Local Sales Base/Income Base | 0.733 | 0.626 | 0.981 |
| Residential Property/Local Sales Base | 0.721 | 0.630 | 0.985 |
| Farm Property/Income Base | -0.377 | -0.392 | 0.335 |
| Business Property/Farm Property | -0.448 | -0.437 | 0.251 |
| Farm Property/Residential | -0.476 | -0.451 | 0.343 |
| Farm Property/LSR | -0.514 | -0.500 | 0.313 |
| Farm Property/Local Sales Base | -0.534 | -0.555 | 0.287 |

*LSR is Local School Revenue*

# Table 2
# TAX BASE DISPARITY/DIVERSITY AMONG COUNTIES BY QUINTILE




| | First | Second | Third | Fourth | Fifth |
|---|---|---|---|---|---|
| PROPERTY BASE | 75.56% | 11.8% | 7% | 3.9% | 1.8% |
| SALES BASE | 78.6% | 11% | 6.1% | 3.1% | 1.2% |
| INCOME BASE | 70.99% | 13.5% | 7.4% | 4.2% | 2% |
| ADA | 61.6% | 16.3% | 11.1% | 7% | 4% |
| TOTAL BASE | 73.9% | 12.4% | 7.4% | 4.2% | 2.1% |

*PREPARED BY TACIR*

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## Alternative Approaches to Measuring Tax Capacity--Does it Make a Difference?

There are as many different alternatives to measuring tax capacity as there are ways to define local wealth. It is important for policymakers to comprehend that different approaches yield different outcomes, directly affecting each jurisdiction's contribution to a fiscal equalization scheme.

Table 3 illustrates the effects of changing the definition of local wealth. Eight different definitions of local wealth serve as allocators of the estimated local contribution to a fiscal equalization plan. The alternative measures of wealth used are:

- equalized property assessment, 1987;
- local option sales tax base, 1987;
- money income, 1987;
- property, sales and income bases;
- property and sales bases;
- property and income bases;
- sales and income bases and;
- RTS Regression Model.

It is important to observe that there are some very large range differentials among the 8 alternatives, but there does not appear to be any pattern based on population.

# CAPACITY BY REVENUE BASES AND MODEL CALCULATED FISCAL CAPACITY

*1988 DATA FOR CAPACITY BASES*

| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (Ranked) (8) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | COUNTY | EQUALIZED PROPERTY ASSESSMENT % of STATE | LOCAL OPTION SALES BASE % of STATE | MONEY INCOME % OF STATE | PROPERTY, INCOME & SALES BASES % of STATE | PROPERTY & SALES BASES % of STATE | PROPERTY & INCOME BASES % of STATE | SALES & INCOME BASES % of STATE | TACIR MODEL CAPACITY % of STATE | % CHANGE IN HIGH & LOW ALLOCATION |
| 1 | SHELBY | 17.45% | 21.81% | 18.15% | 18.78% | 19.23% | 17.83% | 19.49% | 19.72% | 24.98% |
| 2 | DAVIDSON | 17.62% | 20.34% | 13.09% | 16.40% | 18.73% | 15.16% | 15.74% | 14.48% | 55.33% |
| 3 | KNOX | 7.02% | 6.99% | 7.71% | 7.30% | 7.00% | 7.40% | 7.45% | 7.56% | 10.40% |
| 4 | HAMILTON | 7.07% | 6.20% | 6.52% | 6.63% | 6.71% | 6.77% | 6.40% | 6.96% | 14.04% |
| 5 | SULLIVAN | 3.48% | 3.52% | 3.21% | 3.38% | 3.50% | 3.33% | 3.32% | 3.62% | 13.00% |
| 6 | RUTHERFOR | 2.30% | 2.40% | 2.29% | 2.32% | 2.34% | 2.29% | 2.33% | 2.57% | 12.33% |
| 7 | SUMNER | 1.91% | 1.57% | 2.25% | 1.97% | 1.77% | 2.10% | 2.00% | 2.04% | 43.82% |
| 8 | WILLIAMSO | 2.60% | 1.06% | 2.19% | 2.06% | 1.97% | 2.38% | 1.77% | 2.02% | 146.09% |
| 9 | WASHINGTO | 1.71% | 2.09% | 1.97% | 1.91% | 1.87% | 1.85% | 2.02% | 1.94% | 22.48% |
| 10 | BLOUNT | 1.76% | 1.81% | 1.81% | 1.79% | 1.78% | 1.78% | 1.81% | 1.78% | 2.86% |
| 11 | MONTGOME | 1.31% | 1.66% | 1.69% | 1.55% | 1.45% | 1.51% | 1.68% | 1.70% | 29.79% |
| 12 | BRADLEY | 1.40% | 1.43% | 1.47% | 1.44% | 1.41% | 1.44% | 1.45% | 1.57% | 11.72% |
| 13 | ANDERSON | 1.10% | 0.98% | 1.57% | 1.26% | 1.05% | 1.35% | 1.35% | 1.41% | 60.51% |
| 14 | WILSON | 1.30% | 0.69% | 1.49% | 1.23% | 1.05% | 1.40% | 1.19% | 1.22% | 116.26% |
| 15 | SEVIER | 1.37% | 2.01% | 0.85% | 1.31% | 1.63% | 1.09% | 1.27% | 1.17% | 135.64% |
| 16 | HAMBLEN | 1.00% | 1.04% | 0.99% | 1.01% | 1.02% | 1.00% | 1.01% | 1.08% | 8.33% |
| 17 | MADISON | 1.52% | 1.51% | 1.55% | 1.53% | 1.51% | 1.54% | 1.54% | 1.06% | 46.24% |
| 18 | PUTNAM | 0.85% | 1.20% | 0.95% | 0.98% | 0.99% | 0.91% | 1.04% | 0.99% | 40.57% |
| 19 | ROANE | 0.87% | 0.63% | 1.01% | 0.87% | 0.77% | 0.95% | 0.87% | 0.95% | 60.48% |
| 20 | MCMINN | 0.91% | 0.67% | 0.83% | 0.82% | 0.81% | 0.86% | 0.77% | 0.94% | 40.41% |
| 21 | GREENE | 0.92% | 0.61% | 1.03% | 0.89% | 0.79% | 0.98% | 0.87% | 0.93% | 69.73% |
| 22 | MAURY | 1.23% | 1.17% | 1.09% | 1.16% | 1.20% | 1.16% | 1.12% | 0.86% | 42.70% |
| 23 | COFFEE | 0.70% | 0.92% | 0.85% | 0.81% | 0.79% | 0.78% | 0.88% | 0.86% | 32.24% |
| 24 | HAWKINS | 0.84% | 0.41% | 0.80% | 0.72% | 0.67% | 0.82% | 0.66% | 0.80% | 102.61% |
| 25 | GIBSON | 0.69% | 0.71% | 0.88% | 0.77% | 0.70% | 0.79% | 0.82% | 0.80% | 27.41% |
| 26 | CARTER | 0.59% | 0.57% | 0.84% | 0.69% | 0.59% | 0.73% | 0.74% | 0.71% | 47.13% |
| 27 | ROBERTSON | 0.71% | 0.54% | 0.76% | 0.69% | 0.64% | 0.74% | 0.68% | 0.66% | 39.18% |
| 28 | DYER | 0.50% | 0.72% | 0.63% | 0.60% | 0.59% | 0.57% | 0.66% | 0.64% | 44.74% |
| 29 | DICKSON | 0.58% | 0.64% | 0.66% | 0.63% | 0.61% | 0.63% | 0.65% | 0.62% | 13.79% |
| 30 | OBION | 0.56% | 0.57% | 0.68% | 0.61% | 0.57% | 0.63% | 0.64% | 0.62% | 21.59% |
| 31 | LOUDON | 0.62% | 0.25% | 0.58% | 0.52% | 0.47% | 0.60% | 0.46% | 0.57% | 150.73% |
| 32 | LAWRENCE | 0.51% | 0.52% | 0.60% | 0.55% | 0.51% | 0.56% | 0.57% | 0.55% | 17.54% |
| 33 | WARREN | 0.50% | 0.51% | 0.56% | 0.53% | 0.51% | 0.53% | 0.55% | 0.54% | 12.61% |
| 34 | MONROE | 0.40% | 0.43% | 0.58% | 0.48% | 0.41% | 0.50% | 0.53% | 0.53% | 44.33% |
| 35 | MCNAIRY | 0.31% | 0.25% | 0.37% | 0.32% | 0.29% | 0.34% | 0.33% | 0.52% | 108.11% |
| 36 | BEDFORD | 0.49% | 0.38% | 0.58% | 0.50% | 0.44% | 0.54% | 0.51% | 0.51% | 52.84% |
| 37 | HENRY | 0.46% | 0.49% | 0.54% | 0.50% | 0.47% | 0.50% | 0.52% | 0.50% | 17.00% |
| 38 | CUMBERLAN | 0.59% | 0.63% | 0.51% | 0.57% | 0.60% | 0.55% | 0.55% | 0.49% | 27.12% |
| 39 | CAMPBELL | 0.45% | 0.47% | 0.51% | 0.48% | 0.46% | 0.48% | 0.50% | 0.49% | 14.42% |
| 40 | WEAKLEY | 0.47% | 0.42% | 0.56% | 0.49% | 0.45% | 0.52% | 0.51% | 0.48% | 35.12% |
| 41 | FRANKLIN | 0.50% | 0.41% | 0.61% | 0.53% | 0.46% | 0.56% | 0.54% | 0.48% | 47.80% |
| 42 | JEFFERSON | 0.53% | 0.36% | 0.55% | 0.50% | 0.46% | 0.54% | 0.48% | 0.47% | 50.64% |
| 43 | TIPTON | 0.53% | 0.38% | 0.60% | 0.52% | 0.47% | 0.57% | 0.52% | 0.46% | 57.48% |
| 44 | MARSHALL | 0.46% | 0.36% | 0.43% | 0.42% | 0.42% | 0.44% | 0.40% | 0.45% | 28.76% |
| 45 | GILES | 0.43% | 0.26% | 0.45% | 0.40% | 0.36% | 0.44% | 0.38% | 0.42% | 74.14% |
| 46 | COCKE | 0.34% | 0.41% | 0.42% | 0.39% | 0.37% | 0.38% | 0.41% | 0.42% | 21.36% |
| 47 | CARROLL | 0.33% | 0.33% | 0.50% | 0.40% | 0.33% | 0.42% | 0.44% | 0.41% | 54.51% |
| 48 | RHEA | 0.34% | 0.32% | 0.42% | 0.37% | 0.34% | 0.39% | 0.39% | 0.40% | 30.22% |
| 49 | MARION | 0.40% | 0.38% | 0.42% | 0.40% | 0.39% | 0.41% | 0.41% | 0.39% | 10.53% |
| 50 | HARDIN | 0.46% | 0.24% | 0.35% | 0.36% | 0.37% | 0.40% | 0.31% | 0.39% | 94.99% |
| 51 | LINCOLN | 0.43% | 0.28% | 0.49% | 0.42% | 0.37% | 0.46% | 0.41% | 0.38% | 75.19% |
| 52 | CHEATHAM | 0.38% | 0.22% | 0.51% | 0.40% | 0.32% | 0.45% | 0.41% | 0.36% | 126.48% |
| 53 | HUMPHREYS | 0.34% | 0.25% | 0.30% | 0.30% | 0.30% | 0.32% | 0.28% | 0.33% | 36.22% |
| 54 | MACON | 0.23% | 0.19% | 0.26% | 0.23% | 0.21% | 0.25% | 0.23% | 0.33% | 76.34% |
| 55 | WHITE | 0.29% | 0.26% | 0.34% | 0.30% | 0.27% | 0.32% | 0.31% | 0.31% | 33.22% |
| 56 | LAUDERDAL | 0.29% | 0.25% | 0.38% | 0.32% | 0.27% | 0.34% | 0.33% | 0.31% | 50.51% |
| 57 | HENDERSON | 0.26% | 0.30% | 0.36% | 0.31% | 0.28% | 0.31% | 0.34% | 0.30% | 40.47% |

Table 3

# CAPACITY BY REVENUE BASES AND MODEL CALCULATED FISCAL CAPACITY

*1988 DATA FOR CAPACITY BASES*

| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (Ranked) (8) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EQUALIZED PROPERTY ASSESSMENT | LOCAL OPTION SALES BASE | MONEY INCOME | PROPERTY, INCOME & SALES BASES | PROPERTY & SALES BASES | PROPERTY & INCOME BASES | SALES & INCOME BASES | TACIR MODEL CAPACITY | % CHANGE IN HIGH & LOW ALLOCATION |
| | COUNTY | % of STATE | % of STATE | % OF STATE | % of STATE | % of STATE | % of STATE | % of STATE | % of STATE | |
| 58 | FAYETTE | 0.42% | 0.19% | 0.36% | 0.34% | 0.33% | 0.39% | 0.30% | 0.30% | 116.66% |
| 59 | HAYWOOD | 0.38% | 0.16% | 0.30% | 0.29% | 0.29% | 0.34% | 0.25% | 0.30% | 136.87% |
| 60 | CLAIBORNE | 0.37% | 0.23% | 0.37% | 0.34% | 0.31% | 0.37% | 0.32% | 0.29% | 58.47% |
| 61 | SCOTT | 0.23% | 0.20% | 0.30% | 0.25% | 0.22% | 0.27% | 0.26% | 0.29% | 46.59% |
| 62 | HARDEMAN | 0.31% | 0.27% | 0.35% | 0.32% | 0.30% | 0.33% | 0.32% | 0.29% | 28.42% |
| 63 | UNICOI | .22% | 0.16% | 0.30% | 0.24% | 0.20% | 0.26% | 0.25% | 0.24% | 82.43% |
| 64 | HICKMAN | 0.26% | 0.14% | 0.27% | 0.24% | 0.21% | 0.27% | 0.22% | 0.22% | 95.15% |
| 65 | POLK | 0.20% | 0.13% | 0.21% | 0.19% | 0.17% | 0.20% | 0.18% | 0.21% | 66.17% |
| 66 | DEKALB | 0.23% | 0.12% | 0.27% | 0.22% | 0.19% | 0.25% | 0.21% | 0.20% | 124.96% |
| 67 | SMITH | 0.22% | 0.18% | 0.23% | 0.21% | 0.20% | 0.22% | 0.21% | 0.20% | 27.75% |
| 68 | BENTON | 0.19% | 0.22% | 0.26% | 0.23% | 0.20% | 0.23% | 0.25% | 0.20% | 38.85% |
| 69 | OVERTON | 0.19% | 0.14% | 0.25% | 0.21% | 0.17% | 0.23% | 0.21% | 0.20% | 79.40% |
| 70 | MORGAN | 0.19% | 0.09% | 0.24% | 0.18% | 0.15% | 0.22% | 0.18% | 0.19% | 177.02% |
| 71 | CROCKETT | 0.23% | 0.12% | 0.24% | 0.21% | 0.19% | 0.23% | 0.19% | 0.19% | 102.75% |
| 72 | GRAINGER | 0.20% | 0.08% | 0.26% | 0.20% | 0.15% | 0.23% | 0.19% | 0.17% | 207.35% |
| 73 | JOHNSON | 0.21% | 0.08% | 0.20% | 0.17% | 0.16% | 0.20% | 0.16% | 0.17% | 149.96% |
| 74 | WAYNE | 0.21% | 0.10% | 0.20% | 0.18% | 0.16% | 0.20% | 0.16% | 0.16% | 103.32% |
| 75 | CHESTER | 0.15% | 0.12% | 0.21% | 0.17% | 0.14% | 0.19% | 0.18% | 0.16% | 85.43% |
| 76 | GRUNDY | 0.14% | 0.09% | 0.20% | 0.16% | 0.12% | 0.18% | 0.16% | 0.14% | 121.04% |
| 77 | FENTRESS | 0.19% | 0.11% | 0.18% | 0.17% | 0.16% | 0.18% | 0.15% | 0.14% | 74.86% |
| 78 | CANNON | 0.14% | 0.07% | 0.19% | 0.14% | 0.11% | 0.17% | 0.15% | 0.14% | 178.62% |
| 79 | DECATUR | 0.15% | 0.11% | 0.17% | 0.15% | 0.13% | 0.17% | 0.15% | 0.13% | 64.33% |
| 80 | UNION | 0.15% | 0.05% | 0.17% | 0.14% | 0.11% | 0.16% | 0.13% | 0.12% | 232.42% |
| 81 | SEQUATCHIE | 0.15% | 0.11% | 0.13% | 0.13% | 0.13% | 0.14% | 0.12% | 0.12% | 38.36% |
| 82 | LEWIS | 0.10% | 0.09% | 0.15% | 0.12% | 0.10% | 0.13% | 0.13% | 0.12% | 59.62% |
| 83 | JACKSON | 0.12% | 0.06% | 0.15% | 0.11% | 0.09% | 0.13% | 0.11% | 0.11% | 154.16% |
| 84 | BLEDSOE | 0.14% | 0.06% | 0.14% | 0.12% | 0.11% | 0.14% | 0.11% | 0.11% | 130.49% |
| 85 | STEWART | 0.13% | 0.09% | 0.14% | 0.13% | 0.11% | 0.14% | 0.12% | 0.11% | 65.85% |
| 86 | MEIGS | 0.14% | 0.05% | 0.13% | 0.11% | 0.10% | 0.13% | 0.10% | 0.10% | 180.44% |
| 87 | TROUSDALE | 0.09% | 0.06% | 0.11% | 0.09% | 0.08% | 0.10% | 0.09% | 0.10% | 68.60% |
| 88 | MOORE | 0.13% | 0.02% | 0.09% | 0.09% | 0.09% | 0.11% | 0.07% | 0.10% | 511.82% |
| 89 | LAKE | 0.09% | 0.06% | 0.11% | 0.09% | 0.08% | 0.10% | 0.09% | 0.09% | 69.13% |
| 90 | HOUSTON | 0.09% | 0.07% | 0.11% | 0.09% | 0.08% | 0.10% | 0.10% | 0.08% | 59.08% |
| 91 | PERRY | 0.12% | 0.05% | 0.10% | 0.10% | 0.09% | 0.11% | 0.08% | 0.08% | 151.62% |
| 92 | CLAY | 0.09% | 0.03% | 0.11% | 0.08% | 0.07% | 0.10% | 0.08% | 0.07% | 238.21% |
| 93 | VAN BUREN | 0.08% | 0.02% | 0.07% | 0.06% | 0.05% | 0.08% | 0.05% | 0.04% | 397.05% |
| 94 | PICKETT | 0.06% | 0.03% | 0.06% | 0.05% | 0.04% | 0.06% | 0.05% | 0.04% | 129.52% |
| 95 | HANCOCK | 0.08% | 0.03% | 0.07% | 0.06% | 0.06% | 0.07% | 0.05% | 0.04% | 182.01% |
| | TOTAL | 100.00% | 100.00% | 100.00% | 100.00% | 100% | 100% | 100% | 100% | |

# Table 4

| SCHOOL DISTRICT INFORMATION BY GEOGRAPHIC DISTRICTS | NUMBER OF COUNTIES | NUMBER OF SCHOOL DISTRICTS | DO SCHOOL DISTRICT BOUNDARIES CORRESPOND TO BOUNDARIES OF CITIES, COUNTIES ? YES | NO |
|---|---|---|---|---|
| **NEW ENGLAND** | | | | |
| CONNECTICUT | 8 | 169 | X | |
| MAINE | 16 | 283 | X | |
| MASSACHUSETTS | 14 | 436 | X | |
| NEW HAMPSHIRE | 10 | 177 | X | |
| RHODE ISLAND | 5 | 37 | X | |
| VERMONT | 14 | 251 | X | |
| **MIDEAST** | | | | |
| DELAWARE | 3 | 19 | | X |
| MARYLAND | 24 | 24 | X | |
| NEW JERSEY | 21 | 591 | X | |
| NEW YORK | 62 | 718 | | X |
| PENNSYLVANIA | 67 | 501 | | X |
| **GREAT LAKES** | | | | |
| ILLINOIS | 102 | 954 | | X |
| INDIANA | 92 | 296 | | X |
| MICHIGAN | 83 | 618 | | X |
| OHIO | 88 | 613 | | X |
| WISCONSIN | 72 | 428 | | X |
| **PLAINS** | | | | |
| IOWA | 99 | 430 | | X |
| KANSAS | 105 | 304 | | X |
| MINNESOTA | 87 | 432 | | X |
| MISSOURI | 115 | 543 | | X |
| NEBRASKA | 93 | 804 | | X |
| NORTH DAKOTA | 53 | 280 | | X |
| SOUTH DAKOTA | 66 | 183 | | X |
| **SOUTHEAST** | | | | |
| ALABAMA | 67 | 130 | X | |
| ARKANSAS | 75 | 324 | | X |
| FLORDIA | 67 | 67 | X | |
| GEORGIA | 159 | 185 | X | |
| KENTUCKY | 120 | 176 | X | |
| LOUISIANA | 64 | 66 | X | |
| MISSISSIPPI | 82 | 151 | X | |
| NORTH CAROLINA | 100 | 134 | X | |
| SOUTH CAROLINA | 46 | 91 | X | |
| TENNESSEE | 95 | 140 | X | |
| VIRGINIA | 95 | 138 | X | |
| WEST VIRGINIA | 55 | 55 | X | |

# Table 4

| SCHOOL DISTRICT INFORMATION BY GEOGRAPHIC DISTRICTS | NUMBER OF COUNTIES | NUMBER OF SCHOOL DISTRICTS | DO SCHOOL DISTRICT BOUNDARIES CORRESPOND TO BOUNDARIES OF CITIES, COUNTIES ? YES | NO |
|---|---|---|---|---|
| SOUTHWEST | | | | |
| ARIZONA | 15 | 220 | | X |
| NEW MEXICO | 33 | 88 | | X |
| OKLAHOMA | 77 | 592 | | X |
| TEXAS | 254 | 1,068 | | X |
| ROCKY MOUNTAIN | | | | |
| COLORADO | 60 | 176 | | X |
| IDAHO | 44 | 113 | | X |
| MONTANA | 56 | 545 | | X |
| NEVADA | 17 | 17 | X | |
| UTAH | 35 | 40 | | X |
| WYOMING | 23 | 49 | | X |
| FAR WEST | | | | |
| CALIFORNIA | 58 | 1,018 | | X |
| NEVADA | 17 | 17 | X | |
| OREGON | 36 | 300 | X | |
| WASHINGTON | 39 | 296 | | X |
| ALASKA | 15 | 54 | X | |
| HAWAII | 7 | 7 | X | |
| UNITED STATES | 3,110 | 15,348 | 23 | 27 |

*SOURCE: TACIR Telephone Survey of Each State's Education Dept., Jan. 1991.*

## Application of RTS Regression Model to Other States

There is enormous diversity in the pattern of local governments and school districts among the 50 States. The RTS Regression model is designed to produce an analysis of interactive tax bases that are subject to city, county and school taxes.

A recent TACIR survey revealed that in 23 States, the RTS model could be readily applied because all school districts are geographically loçated within single counties (See Table 4). This means that fiscal capacity for all local services, including education, can be measured within defined generalized boundaries.

However, there are 27 States where school district boundaries overlap county areas. Without more specific geographical data, it is impossible to state precisely how extensively this approach can be applied. It depends on the quality of the data available pertaining to property, income and sales. Hopefully, modern geographical information systems can be used to enhance this effort.

It can be assumed that the property assessment data available is for all school systems, cities and counties. Therefore, the property base would not likely be a problem. In 1980, the Census Bureau, at the behest of the Department of Education collected income data by school systems. The Census Bureau is still undecided about whether or not to collect it currently but, if so, it wouldn't be available until 1993. Irrespective of Census action, it is possible to develop estimating procedures to determine income by school districts.

Concerning taxable sales, most revenue departments collect information in such a way that location of sales collections can be identified. If this information can be extracted from revenue data bases, methods can be developed to allocate sales to appropriate local jurisdictions. The issue of confidentiality could arise in cases where there are only one or two retail establishments. Usually these would be very small areas and methods can easily be developed to approximate sales data that is suppressed because of confidentiality.

Thus, it would be possible to apply the RTS method rather broadly, either on county area or school districts bases. The issue to be resolved is whether the RTS is the appropriate method and whether it is cost effective in all jurisdictions. Whatever may be the case, it is clear that greater policy effort must be devoted to measuring the capacity to export taxes.

## Notes

1. For a full review of fiscal capacity issues, see the following cited report and related volumes of work papers. U.S. Department of the Treasury, Office of State and Local Finance. Federal-State-Local Fiscal Relations: Report to the President and the Congress. Washington, D.C., September, 1985.

2. Deborah A. Verstegen, School Finance At A Glance. Education Commission of the States, April 1990. And John Augenblick, "States Consider Ways to Fine-Tune School Finance Systems", The Fiscal Letter. National Conference of State Legislatures, November/December, 1990.

3. Thomas F. Pogue, "School District Fiscal Capacity: Measurement and Equalization". Proceedings of the Eighty-Second Annual Conference. National Tax Association--Tax Institute of America, 1989, p. 19. For an excellent review of the complexity of measuring equity in school finance, see Robert Berne and Leanna Stiefel, The Measurement of Equity in School Finance. Baltimore: Johns Hopkin's University Press, 1984 (particularly Chapter 2). For a current assessment of horizontal equity see Richard A. Musgrave, "Horizontal Equity, Once More", National Tax Journal, V.XLIII, pp. 113-122; and Louis Kaplow, "Horizontal Equity: Measures in Search of a Principle", National Tax Journal, V. XLII, pp. 139-154.

4. U.S. Advisory Commission on Intergovernmental Relations. Tax Capacity of the Fifty States: Methodological Estimates. Washington, D.C., March 1982.

5. Helen F. Ladd and John Yinger. American's Ailing Cities. Baltimore: Johns Hopkin's University Press, 1989. Helen F. Ladd, "How States can Measure the Fiscal Health of Local Governments". Cambridge, Massachusetts: Lincoln Institute of Land Policy, 1989. Also see Kerri Ratcliffe, John Yinger, et al., "The Fiscal Condition of School Districts in Nebraska", in Final Report of the Nebraska Comprehensive Tax Study. Syracuse University, 1988.

6. Op cit p. 22.

7. Ladd & Yinger, op. cit, and Ratcliffe and Yinger, op.cit.

8. Op. cit, p. xv.

9. See Barry Chiswick and Stephen Chiswick. Statistics and Econometrics: A Problem Solving Text. Baltimore: University Park Press, 1975, pp. 189-191.

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