A Users' Guide to Fiscal Capacity in the Tennessee Investment in Student Achievement Funding Formula

Staff Report to the Members of the Tennessee Advisory Commission on Intergovernmental Relations

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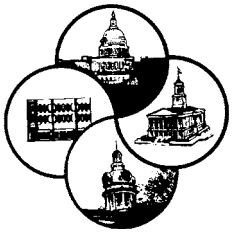

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A Users' Guide to Fiscal Capacity in the Tennessee Investment in Student Achievement Funding Formula

What is fiscal capacity?

Fiscal capacity is a measure of the potential ability of a particular government to generate revenue from their own sources relative to other similar governments. Fiscal capacity indicators are used mainly for

- regional analysis
- regional policy
- comparative fiscal policy analysis, and
- fiscal equalization policy.

Indicators for comparing states were discussed in TACIR's report *Measuring Fiscal Capacity: Tennessee Compared to Southeastern States* (1997) and include

- **gross state product**, the state counterpart to gross national product, typically used to monitor changes over time;
- **per capita personal income**, defined as consumption by a person, family or household plus the change in its net worth over a given period of time;
- **total taxable resources**, a combination of gross state product and per capita personal income done in a way that avoids double counting between those two measures;
- **export-adjusted income**, a theoretical approach intended to account for taxes paid by non-residents;
- **representative tax or revenue system**, designed to measure statutory tax bases that are commonly taxed by state and local governments.

The first four methods listed above may be characterized as indicators of individuals' ability to pay taxes; the fifth method focuses more on the ability of governments to raise revenue based on comprehensively defined tax bases and average tax rates.

Tennessee uses a modified version of the representative tax system (RTS) to measure fiscal capacity for the state's education funding formula—Tennessee Investment in Student Achievement (TISA)—to equalize base and weight funding across the 95 counties. Direct and outcome funding is not equalized. Fiscal capacity is distinctly different from fiscal effort. Capacity indicates what a government can do, not what it actually does. Governments cannot change their own fiscal capacity by changing their

tax rates. Fiscal capacity based on the RTS method depends on the revenue raised by all governments combined.

Not every county can raise the same amount of money per citizen with the same tax rates. The value of property varies from county to county as does economic activity in general. For updated information about counties' fiscal capacities, click on the following link: https://www.tn.gov/tacir/fiscal-capacity-for-education.html. The main sources of revenue for local governments in Tennessee are property and sales. Together, these make up more than 95% of all education revenue.

Why does fiscal capacity matter?

When states accept responsibility for partially funding local programs, treating taxpayers of each jurisdiction fairly becomes important. Because local governments cannot all raise the same revenue with the same tax rates, principles of fundamental fairness require that the state allocate its share of funding in a way that helps even things out so that residents in every part of the state are treated similarly with respect to their ability to pay taxes and the services provided there—known as horizontal equity/tax payer equity. If the state

- requires local governments to do something,
- provides only part of the money it takes to do it and
- requires local governments to match the state funds but
- makes them all put up the same share, say one fourth of the amount the state provides,

then residents of some areas will have to pay higher tax ***rates*** than residents of other areas to get the state's money and do what's required. That creates a taxpayer equity problem.

So how does the state solve that problem and ensure equity for residents across the state? By adjusting the local contribution paid by each local government to reflect the size of its tax base. This is where fiscal capacity comes in. Only if a way can be found to measure differences between local governments in their ability to raise revenue to match the state funding can the state ensure that all taxpayers are treated fairly. Tennessee has chosen to use a representative tax system model for that purpose. Initially adopted by the State Board of Education, TACIR's fiscal capacity model was used to allocate the local share of the state's previous funding formula—the Basic Education Program—across counties. Starting in the 2007-08 school year, the results of the TACIR model were averaged with those from the University of Tennessee's Center for Business and Economic Research (CBER) fiscal capacity model, which the state had adopted that same year. With the adoption of TISA in 2023, the state chose to continue using the

average of the results of TACIR and CBER's model to equalize base and weight funding.

Property Taxes

The ability to tax property in Tennessee is mainly restricted to cities and counties. The state does not directly tax property. Cities and counties tax both real and personal property. Most taxable property is real property (e.g., buildings and land), and though personal property that is used in business is taxed, other personal property (e.g., household personal property) is not. For more on personal property tax, see TACIR's 2022 report *Both Businesses and Local Governments Could Benefit from Improvements to Tennessee's Personal Property Tax*.

Property values are divided into several different classes and assessed at different rates. For example, only 25% of the fair market value of residential property is taxed, but 40% of the value of commercial property is taxed. The same tax rate is applied to all types of property, but those different assessment rates mean that the full value of residential property is not taxed as heavily as commercial property. These differences contribute to the differences across counties in the amount of revenue that can be raised by the same property tax rate.

When comparing the power of the local property tax base, people often speak in terms of what a penny will generate. That is because property tax rates in Tennessee are usually described in terms of dollars and cents per hundred dollars of taxable property value, and tax increases are usually described in cents. The amount of revenue a particular local government can raise with a penny on the property tax base varies considerably across Tennessee. These amounts are sometimes used to describe the relative wealth of the state's 95 counties, but they are only part of the story.

Counties that operate school systems must set a property tax rate for schools separate from the rate they set to fund the rest of county government. Cities that operate school systems typically do not. They may transfer money from the general fund for their schools. In that case, it is impossible to determine how much of the money is from property taxes or any other tax. There is no limit on the property tax rate local governments can set, but most range between two and four dollars per hundred dollars of assessed value.

Generally, property tax rates are set by the elected governing bodies of cities and counties (i.e., city councils and county commissions). Tennessee also has a number of special school districts that have been established by the state legislature. The elected boards of these districts can also impose property tax rates for schools, but only up to the limit set by the legislature.

Sales Taxes

Both the state and local governments can tax sales, but local governments cannot raise their rates above 2.75% or two-and-three-quarters cents per dollar of purchase price, and they can tax only the first $1,600 of the purchase price of any individual item. The $1,600 single article cap, as it is called, means that no matter the price, the most a local government with a tax rate of 2.75% can collect on the purchase of any one item, even an item as expensive as a car, is $44. If you buy a car that costs $5,000, you will pay the same $44 to the local government as someone who buys a car that costs $50,000. In contrast, if you buy $5,000 worth of building materials to build a house—so long as no single item costs more than $1,600—you will pay the local government $137.50; and if you buy $50,000 worth of building materials to build a house, you will pay $1,375.00.

The selection of things for sale varies greatly from county to county in Tennessee, and so people often cross county lines to find the things they want to buy, both goods and services. Some counties do not have large discount stores; some don't even have a single new car dealership. Because of this, just as with property, the amount of money that any particular county can raise through sales tax varies greatly. In fact, the amount that can be raised per citizen from sales taxes varies around the state more than the amount that can be raised from property taxes.

Local sales tax rates are set by referendum, so individual citizens get to vote on whether to approve increases. Proposals to increase sales tax rates often include information about how the local government intends to spend the additional money raised by the new rate. The most common reason given is to fund schools. As with property taxes, cities ordinarily do not set specific rates for schools, but transfer money from the general fund for them instead, so it is rarely possible to determine how much sales tax revenue cities use to support schools.

Other Local Taxes

One other tax is widely used by local government—counties in particular—to fund schools: the wheel tax. Wheel tax rates vary from county to county much more widely than property or sales tax rates but generate far less money. Local governments also use business taxes and other taxes and fees to support schools, but these typically generate even less revenue than wheel taxes.

What is TACIR's fiscal capacity model?

Tennessee's fiscal capacity model, developed by TACIR staff, was adopted by the State Board of Education in 1992 to fulfill the requirement of the Education Improvement Act for fiscal equalization in the Basic Education Program (BEP) funding formula. See appendix for a timeline of TACIR's

fiscal capacity model. The model was used to determine the local funding shares for each school system. Fiscal capacity is the potential ability of local governments to fund education from their own taxable sources, relative to their cost of providing services. The role of TACIR's fiscal capacity model—equalization—remains the same under the Tennessee Investment in Student Achievement Act for base and weight funding.

The TACIR formula estimates the dollar amount per pupil that each county area can afford to raise to fund its public schools. The dollar amount per pupil is multiplied by the number of students in each county to produce the total fiscal capacity for each county area. The total fiscal capacity for all 95 counties is summed, and the amount for each county is divided by the statewide total. This amount is called the *fiscal capacity index*. Converted to a percentage of the statewide total, this number constitutes the contribution that each county has of the total statewide capacity to fund education from local sources.

TACIR's fiscal capacity model continued to be used until 2007 when the General Assembly enacted BEP 2.0, which added a fiscal capacity model developed and calculated by the University of Tennessee's Boyd Center for Economic Research (CBER). Tennessee Code Annotated, Section 49-3-104(13) required the results of the two models to be averaged for use with the BEP funding formula. While BEP 2.0 required the phasing out of the use of the TACIR model, in 2016, the BEP Enhancement Act codified the continued use and averaging of the results of each model.

A Modified Representative Tax System Approach

TACIR uses a modified version of the representative tax system (RTS) approach to determine fiscal capacity developed by the US Advisory Commission on Intergovernmental Relations (ACIR). The original ACIR model estimated the fiscal capacity of states by applying uniform tax rates to a standard set of tax bases. The TACIR model enhances the basic RTS approach by using a common statistical method to expand the formula to include more measures of taxpayer equity and a measure of the local service responsibility.

The statistical method TACIR uses to compute each county's fiscal capacity is called multiple regression analysis. This method starts with the actual revenue raised by all 95 counties for education. It then takes each factor (variable) and compares it across all counties to produce a weight–called a coefficient—that represents the average contribution that factor makes to the amount raised by each county. A single weight is calculated for each factor included in the model. Each weight is multiplied by the value of the factor for each county and summed for that county to produce a dollar amount per pupil. That amount represents the fiscal capacity for

the county. These amounts vary county-by-county because the values of the factors are different for each county.

A Fiscal "Behavioral" Model

The TACIR fiscal capacity formula is called a "behavioral model" because it is based on the amount of revenue actually raised for education by local governments in Tennessee. It does not attempt to determine how much should be raised based on some external factor or policy, nor does it begin with a target amount and determine how to allocate it. It uses the actual amounts from all counties to estimate the amount that could be raised in each individual county based on the weights produced by comparing all the factors for all counties combined. Models based on some external determination of how much money should be raised are called "normative models."

A Pupil Equity Model

The TACIR model is called a "pupil equity model" partly because the revenue and tax base factors are expressed in terms of amounts per pupil and partly because it includes a separate factor to measure the service responsibility in each county. This factor is the ratio of public school students to the total population of the county. The student count used is called "average daily membership," which is the average number of students over the course of the year.

A Taxpayer Equity Model

TACIR's model is called a "taxpayer equity model" because it is designed to ensure that all taxpayers similarly situated are asked to pay the same amount. It does this by including tax base measures and a measure of the burden placed on residents by the tax structure. The primary tax bases for local governments in Tennessee are property and sales. The measure of the resident tax burden is the total taxable value of all residential and farm property divided by the total taxable value of all property in the county.

Three-year Moving Averages

The fiscal capacity formula uses three-year "moving" averages for each factor, including actual revenue, which means that three years of data are used and each year the oldest data dropped, and more recent data is added. This averaging helps "smooth out" major changes in the model's results and reduces volatility from year to year. However, using a three-year moving average increases the normal time lag that results because the fiscal capacity estimates must be produced in time to be used in the

TISA formula. Tennessee Code Annotated, Section 49-3-109(c), requires annual fiscal capacity calculations be complete no later than May 1 of each year. The most recent data is never more current than the year before the TISA is calculated, and because of the time it takes to collect and prepare data, the most current data used is often eighteen to twenty-four months old.

How are the components of fiscal capacity measured?

All the factors used in the TACIR fiscal capacity model are based on the most current three-year averages available. The local revenue and tax base factors are divided by the number of public school students—average daily membership—in each county. The student counts used for this purpose are the same as the counts used in the service responsibility component. The factors used in TACIR's fiscal capacity model and listed in the following table have remained the same since 1992.

Components		Factors
Local Revenue	⟷	Own-source Revenue per Pupil
Tax Base (Pupil Equity)	⟷	Taxable Sales per Pupil Property per Pupil
Ability to Pay (Taxpayer Equity)	⟷	Per Capita Income
Resident Tax Burden (Taxpayer Equity)	⟷	Ratio of Residential & Farm Assessment to Total Assessment
Service Responsibility (Pupil Equity)	⟷	Ratio of Average Daily Membership to Population
Methodology	⟷	Ordinary Least Squares Multiple Linear Regression
Output	⟷	Fiscal Capacity per Pupil

Local revenue in the fiscal capacity model includes all own-source revenue used by local governments to fund education. For county school systems, this includes mainly revenue from local sales and property taxes. Counties with more than one school system must share this revenue, as well as any other revenue from local sources, with the other school systems in the county. See TACIR's 2020 report, *Effects of Sharing of Revenue among School Systems in Counties with More than One School System*.

In addition, any special school districts in the county can levy their own property taxes; cities can either levy specific taxes or more commonly make appropriations for their schools from general fund monies. When cities make general fund transfers, it is impossible to determine the exact

source of funds, but they may include revenue from state-shared taxes, as well as from locally imposed taxes. The data is collected each year by the Tennessee Department of Education.

Own-source revenue per student is the actual amount of money local governments raise to fund their schools divided by enrollment (average daily membership (ADM)). It is the dependent variable in the regression and the factor that represents what local governments *actually* do.

The following local revenue sources are included in TACIR's fiscal capacity model:

- Property tax
- Sales tax
- Other local taxes (e.g., wheel tax, business tax, mixed drink tax, and hotel-motel tax)
- Local fees for marriage and mobile home licenses, cable TV franchises, and other permit fees
- Investment income
- General fund transfers

Tax Base components include the two main sources of local revenue for education:

- the equalized assessed value of all taxable real and personal property in each county and
- the local taxable sales in each county

Property values are obtained from the Comptroller of the Treasury, Division of Property Assessments. They are reported on a calendar year basis. The value of taxable sales is obtained from the Department of Revenue, and it is reported on a fiscal year basis.

Also included in the property tax base factor for each county is the latest data on tax equivalent payments from the Comptroller's Division of Local Finance. Tax equivalent payments are also called payments in lieu of taxes, which local governments often receive in exchange for special accommodations for new or expanded businesses. Unfortunately, the most current information available on these payments dates back to 1995. But the industrial development board assessment data, which is used in CBER's fiscal capacity model, could replace the 1993-1995 tax equivalent payment data in TACIR's model (see "Replacing 1993-1995 Tax Equivalent Payments with Industrial Development Board Assessments" on page 14).

Ability to pay is based on per capita personal income (PCPI). PCPI is provided by the US department of Commerce, Bureau of Economic Analysis (BEA). The BEA defines personal income as income received by

persons from all sources and is reported on a calendar year basis. PCPI also acts as a proxy for local revenue not derived from property or sales taxes, such as wheel taxes.

Resident Tax Burden is measured by dividing the combined value of residential and farm property by the value of all taxable property in the county. These values are included in the data set obtained from the Division of Property Assessment. The use of this factor to measure the resident taxpayer burden rests on the theory that taxes on residential and farm property are paid entirely by county residents, while taxes on commercial and industrial property may be recouped from non-county residents through the sale of products and services to customers outside the county, a concept known as tax exporting. A high ratio of residential and farm property to all property indicates a relatively low capacity to export taxes and, consequently, a relatively high resident tax burden. A low ratio indicates a relatively low resident tax burden and a higher capacity to export taxes.

Service Responsibility is measured by dividing the number of students in public schools by the entire population as reported by the US Census Bureau. The student count used is the average daily membership (ADM) obtained each year from the Department of Education. This component has long been included in TACIR's fiscal capacity model to reflect expenditure needs.

How are the factors combined to estimate fiscal capacity?

The TACIR fiscal capacity model is based on a commonly used statistical process called "ordinary least squares multiple linear regression," which sounds more intimidating than it is. In fact, it is built into the spreadsheet software included in the most commonly used office automation packages, even those sold for home use. Linear regression is a method used to compare two or more factors to determine the mathematical relationship between them. If one increases, does the other increase or decrease? If so, how much?

Multiple linear regression is a method for comparing a factor to two or more other factors. It is a complex formula that takes a set of data and produces a set of weights that can be multiplied by a set of factors to estimate another factor. These weights represent the amount by which each factor increases or decreases as the factor being estimated increases. This process also produces a set amount called a constant because it is the same for every observation—county in this case—that is included in each estimate.

In the case of education fiscal capacity, the factor being estimated is the amount of local revenue that could be raised in each Tennessee county

based on the actual revenue raised by all counties and the factors listed in the following table. The chart includes the state average for each factor and its weight based on the 2023-24 model.

County Fiscal Capacity Factors and Weights
Fiscal Year 2023-24

Average Actual Revenue Per Pupil: $2,971		
Factors	**Average County Value**	**Weights Produced by Model**
Constant Value to be Included in Each County's Estimate	n/a	$771
Taxable Property per Pupil	$188,198	0.005
Taxable Sales per Pupil	$75,724	0.0182
Per Capita Personal Income	$42,899	0.0375
Ratio of Residential and Farm Value to Total Taxable Property	68.15%	-2,551
Ratio of Average Daily Membership to Population	13.73%	$475
Average Local Revenue per Pupil	$2,971	n/a
Average Estimated Revenue Per Pupil: $2,971		

*Averages in this table are based on the values for each of the 95 counties.

The weights produced by the regression model are unique to a particular set of data. Each year as the data is updated and the values for each factor included in the model change, the weights, as well as the constant, will change. This happens because all the three-year-average values for each county change each year and they do not all change at the same rate for all counties. The expected effects of changes in the factors on estimates of fiscal capacity are shown in the following table:

Expected Effect of Changes in Fiscal Capacity Factors

The relationship between fiscal capacity and specific variables (other things being equal) is illustrated as follows:		
Factor Increases	**Effect of Fiscal Capacity**	
Property Assessment Increases	Fiscal Capacity Increases	↑
Taxable Sales Increase	Fiscal Capacity Increases	↑
Per Capita Income Increases	Fiscal Capacity Increases	↑
Tax Burden Ratio Increases	Fiscal Capacity Decreases	↓
ADM/Population Ratio Increases	Fiscal Capacity Decreases	↓

These changes are moderated by the use of three-year averages. To have the most current data possible for each factor in the fiscal capacity model, the model does not become available until about six months prior to the beginning of the fiscal year to which it applies. Moreover, to have the most

current values for use in the TISA formula, mainly the student counts on which the TISA funding is based, the Department of Education waits until July each year to make final funding determinations for school systems. The moderating effect of three-year averages makes it easier for local governments to deal with this timeline. But while it ensures against rapid increases in fiscal capacity, it also delays decreases. This is important to local governments because the Department uses a fiscal capacity index derived from the per pupil estimates produced by the model. The index form is necessary because the local contribution required by the TISA is distributed across counties based on each county's share of local fiscal capacity.

How is the fiscal capacity index computed?

The TISA formula, the state's primary method of funding public schools, requires an index expressed as a percent of total local revenue to allocate responsibility for the local contribution across Tennessee's ninety-five counties. But the regression model used by TACIR produces a dollar amount per pupil. The entire process, from fiscal capacity per pupil to a fiscal capacity index requires four basic steps:

Step 1. Calculate the county's fiscal capacity per pupil (determined by TACIR Model).

Step 2. Multiply the county's fiscal capacity per pupil from **Step 1** by the total number of students (ADM) in the county to get county total fiscal capacity.

Step 3. Add the total fiscal capacity determined in **Step 2** for all 95 counties together to get the total statewide fiscal capacity.

Step 4. Divide each county's total fiscal capacity from **Step 2** by the total statewide fiscal capacity from **Step 3** and multiply the result by 100 to get the fiscal capacity index.

The result is each county's percent of local fiscal capacity for education. It represents the share of local education revenue that each county can be expected to contribute and is applied to the aggregate or statewide local share required to fund the base and weights components of TISA. The percentages for fiscal year 2023-24 range from 0.0204% for Hancock County to 17.3950% for Davidson County. Most counties fall between 0.0403% and 5.9066%. The four counties above the range are Davidson, Shelby, Knox, and Williamson. The four below are Hancock, Van Buren, Lake, and Pickett.

How is the fiscal capacity index used in the TISA formula?

The TISA formula is designed to fund school systems. The TACIR fiscal capacity index is produced at the county level. With 141 school systems and ninety-five counties, the index cannot simply be applied directly to each school system. The TISA funding formula has four components: base, weights, outcome, and direct funding. The formula produces a dollar amount for each school system that represents the cost of the TISA base and weights components for each one based on its complement of students. The cost of the TISA base and weights components is shared by the state and local governments based on percentages set in law with the state paying 100% of direct and outcome funding. The state pays 70% of the statewide total for the base and weighted components of TISA. Local governments are required to make up the difference. The average of the TACIR and CBER fiscal capacity indexes is used to allocate that difference fairly across all counties. Computing the local requirement for each county is a simple process of multiplying three numbers:

Local Contribution	=	Statewide TISA Cost	X	Statewide Local Share	X	County Fiscal Capacity Index

*Calculations must be done for both the base and weight statewide TISA Cost.

The simple three-part calculation is all that is necessary for the 65 counties with only one school system. For the 30 counties with more than one school system, the local contribution is allocated based on how much funding each system's students generate toward the base and weighted funding of the county.

The state law that established TISA (Tennessee Code Annotated, Section 49-3-101 et seq.) requires fiscal capacity formulas to be evaluated by the Comptroller of the Treasury and to be approved by the State Board of Education. It also requires that the calculations and the underlying data be publicly reported. The latest fiscal capacity calculations and underlying data for TACIR's model are reported on the following website: https://www.tn.gov/tacir/fiscal-capacity-for-education/resources1.html.

Review of Fiscal Capacity

With the adoption of TISA, state law (Tennessee Code Annotated, Section 49-3-111) now requires the Tennessee Comptroller's Office of Research and Education Accountability to review TISA, including fiscal capacity:

> The comptroller of the treasury, through the comptroller's office of research and education accountability, shall review and study the TISA to determine the effectiveness of state expenditures on kindergarten through grade twelve (K-12) education. By December 31, 2024, the comptroller shall report the conclusions of the study and any legislative

> recommendations to the speakers of the senate and house of representatives and to the members of the education committee of the senate and the education administration committee of the house of representatives."

Process for Changing TACIR's Fiscal Capacity Model

Department of Education TISA Rule 0520-12-05-.08 provides that the Comptroller of the Treasury may make recommendations on any changes to the fiscal capacity formula to the State Board, and the State Board's process and timeline for approval of the formulas are in TISA Rule 0520-01-02-.33, which says in part that

> Upon receipt of the Comptroller's report evaluating the proposed change, the State Board may take no action on the report or may vote to approve the changes to the fiscal capacity formula.

According to the rule, any changes to fiscal capacity are not incorporated in the first fiscal year following the adoption of the changes. Instead, districts will be provided with preliminary estimates in the first year, and

> For the second fiscal year following adoption of the changes, the Department shall incorporate revised fiscal capacity estimates into final TISA allocations provided to districts.

Potential Changes to TACIR's Model

TACIR staff continually review the model looking for ways to improve it. Staff has identified potential changes to TACIR's model for consideration, which include replacing the 1993-1995 Tax Equivalent payment data with the updated industrial development boards (IDB) assessment data to account for local decisions to enter into payment in lieu of tax agreements, accounting for virtual school students, eliminating the service responsibility variable, and changing from a county level model to a system level model. TACIR is likely to pursue the first of these potential changes, the use of IDB assessment data, in the near future; the others remain under analysis.

Replacing 1993-1995 Tax Equivalent Payments with Industrial Development Board Assessments

Businesses in Tennessee make payments in lieu of ad valorem taxes (PILOTs) for tax exempt properties they lease from local IDBs. To account for local decisions to enter into PILOT agreements, TACIR's model, beginning in 1992, used the most recent PILOT payment data available from the Tennessee Comptroller of the Treasury, but these data have not been updated since 1995. In a 2005 presentation to the BEP Review Committee,

TACIR staff recommended removing outdated tax-equivalency-payment data from the property tax calculation used in the model, but new data soon became available. According to the Comptroller's 2023 report *Evaluation of the Fiscal Capacity formula applied to school district funding allocations*,

> Since at least 2011, the Comptroller's Office has been collecting industrial development boards' (IDB) property data. The data includes the estimated values of tax-exempt properties under IDB agreements, which can be used to determine potential tax revenues once these properties are transferred back to private entities that are required to pay property taxes. Estimates of IDB assessment values provided by the Comptroller's Office are used in the Boyd Center fiscal capacity model.

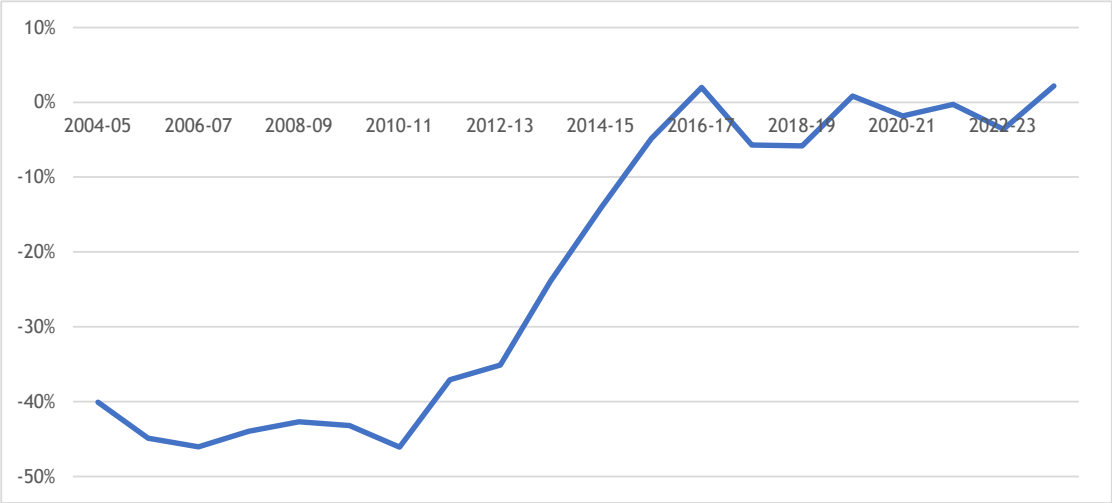
During Governor Haslam's 2014 Task Force on Education Funding, TACIR staff recommended that more current payment in lieu of tax data be substituted for the outdated tax-equivalency-payment data. In its January 2018 report, *Encouraging More Cooperation and Accountability in Payment in Lieu of Tax Agreements*, TACIR recommended updating TACIR's fiscal capacity calculation to include the new IDB assessment data rather than continuing to use the 1993-1995 PILOT data. No changes have been made to date.

CBER is required by Section 3 of Public Chapter 369, Acts of 2007, to use the IDB assessment data to use to ensure that "[n]o reduction shall be made in any calculation of a local jurisdiction's ability to raise local revenues from property taxes for agreements entered into by the local jurisdiction that result in payments in lieu of taxes being made to the local jurisdiction."

Eliminating the Service Responsibility Factor

The influence of the service responsibility variable—average daily membership divided by population—has decreased to the point where, in some years, it unintentionally increases fiscal capacity for counties with greater service responsibilities and decreases their state funding. Eliminating the service responsibility variable would eliminate this possibility.

Influence of the Service Responsibility Factor
Fiscal Years 2004-05 to 2022-23



Note: For the purpose of this figure, the coefficient value was normalized to a -100% to +100% scale.

Transitioning to a School-System-Level Model

Transitioning from calculating fiscal capacity at the county-level to calculating it at the system level would decrease disparities for students as well as taxpayers in counties with more than one school system. A system level model would take into account intra-county disparities, such as counties' relative lack of access to unshared tax bases and the concentration of commercial and industrial tax bases within cities, which leaves counties with less ability to raise local revenue for county school systems when compared with city school systems and special school districts in the same county. Both Former Governor Phil Bredesen's Task Force on Teacher Pay (2003) and the Basic Education Program (BEP) Review Committee (2005) have previously recommended that the state adopt a system-level fiscal capacity model. In 2004, the General Assembly asked the BEP Review Committee to give special consideration to "the development and implementation of a system-level fiscal capacity model." See TACIR's 2020 report, *Effects of Sharing of Revenue among School Systems in Counties with More than One School System.*

Accounting for Virtual School Students

According to Tennessee Code Annotated, Section 49-16-203(2), a virtual school is "a public school in which the school uses technology in order to deliver a significant portion of instruction to its students via the internet in a virtual or remote setting." School districts may establish virtual schools, and some accept students from across the state. The district that this county resides in is referred to as the host county. Virtual school students are treated for fiscal capacity and funding purposes as residents of the host

county, regardless of which county they actually reside in, which distorts TACIR's fiscal capacity calculation, either increasing or decreasing the host county's fiscal capacity. Including virtual school students in TACIR's fiscal capacity calculation can increase the fiscal capacity of a county that hosts a virtual school. Keeping all else the same, this decreases the fiscal capacity of the other 94 counties. Including virtual school students can also decrease the fiscal capacity of the host county, which increases the fiscal capacity of the other 94 counties. Whether a county's fiscal capacity increases or decreases depends on the effect of the virtual school students on that county's fiscal capacity variables. Consequently, the state share of funding and the local contribution can either increase or decrease for all counties. Taking the residency of virtual school students into account could reduce this effect.

Appendix A: Timeline

Below is a timeline of events related to TACIR's fiscal capacity model.

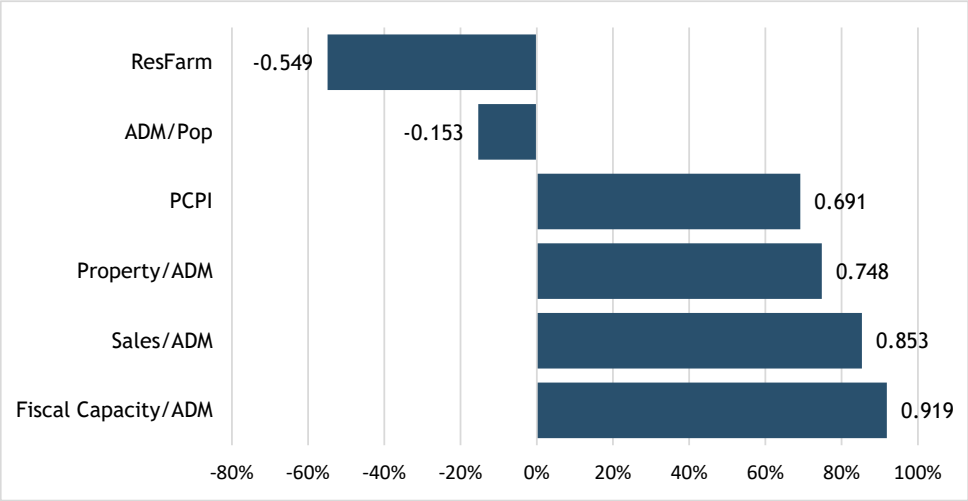
- 1992—Education Improvement Act of 1992 passed and adopted the Basic Education Program as the state's K-12 funding formula. The State Board of Education adopted TACIR's fiscal capacity model for equalizing funding.
- 1993—The Tennessee Supreme Court decided *Small School I* in favor of the plaintiffs on the equal protection clause.
- 1995—Tax equivalent payment data used in TACIR's property tax factor no longer updated.
- 2003—Governor Bredesen's Task Force on Teacher Pay recommended that the state adopt a system-level fiscal capacity model.
- 2004—The General Assembly asked the BEP Review Committee to give special consideration to "the development and implementation of a system-level fiscal capacity model."
- 2005—The BEP Review Committee recommended that the state adopt a system-level fiscal capacity model. Before the IDB assessment data was available, TACIR staff recommended removing outdated tax-equivalency-payment data from the property tax calculation used in the model.
- 2007—BEP 2.0 enacted including the addition of CBER's fiscal capacity model, requiring the TACIR fiscal capacity model to be phased out. Starting in the 2007-08 school year, the results of the TACIR and CBER models were averaged for use in the BEP.
- 2014—During Governor Haslam's 2014 Task Force on Education Funding, TACIR staff recommended that more current payment in lieu of tax data be substituted for the outdated tax-equivalency-payment data.
- 2016—The BEP Enhancement Act codified the 50-50 weighting of the TACIR and CBER models.
- 2018—TACIR published "Encouraging More Cooperation and Accountability in Payment in Lieu of Tax Agreements," recommending updating TACIR's fiscal capacity calculation to include the new IDB assessment data rather than continuing to use the 1993-1995 PILOT data.
- 2020—Tennessee Attorney General Opinion No. 20-01 says, "Changes to the data sources in the Tennessee Advisory Commission on Intergovernmental Relations fiscal-capacity model must be adopted by the State Board of Education and approved by the Commissioners of Education and Finance and Administration. Legislative approval is not required for such changes, nor is approval of the BEP Review Committee."
- 2022—TISA passes and retains the 50-50 weighting of the TACIR and CBER fiscal capacity models, which are used to equalize the base and weighted parts of TISA. The law requires the Tennessee Comptroller's Office of Research and Education Accountability to review TISA, including fiscal capacity. See "Process for Changing TACIR's Fiscal Capacity Model" on page 13.

Appendix B: Dispersion of Variables, Fiscal Year 2023-24

Coefficient of Variation

The coefficient of variation (COV) is a measure of the variation from the average value for a single variable or factor. Technically, it is the standard deviation expressed as a percent of the mean. The large COV for taxable sales indicates very large differences in taxable sales per pupil across the 95 counties. The COV for sales is greater than the COV for property, indicating considerably larger differences across counties in their sales tax bases than in their property tax bases. The small COV for residential and farm property indicates relatively small differences across the counties for this factor. As shown in the following figure, this comparison indicates that differences among counties in their sales tax bases are far more significant than differences in residential and farm property relative to their population.

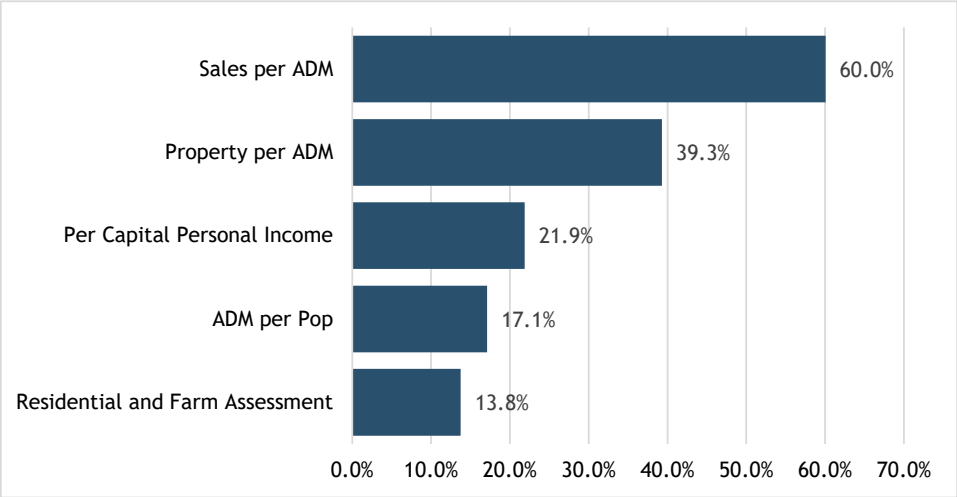
Relationship between Local Revenue per Pupil and Fiscal Capacity Variables for Fiscal Year 2023-24



Correlation Analysis

Correlation analysis is a descriptive technique used to measure the strength of the relationship between two variables. The statistic produced is called the coefficient of correlation. Values for the coefficient of correlation range from -1 for a perfect negative correlation up to +1 for a perfect positive correlation. *Perfect* means that if all the points of intersection between a pair of variables were plotted in a scatter diagram, all the points could be connected with a straight line. The closer the coefficient to either +1 or -1, the stronger the relationship. When the coefficient is near zero, little or no relationship exists. In the chart above, the longer the bars, the stronger the relationship. The factors are in order, top to bottom, from weakest to strongest. The factor with the strongest relationship to revenue per pupil is sales per ADM. The correlation coefficient for those two variables is 85.3% (fiscal capacity/ADM is not a factor but is included in the chart for illustrative purposes). Per capita income and property per ADM also have strong relationships to revenue per pupil (69.1% and 74.8%, respectively), as shown in the following figure. The existence of a strong correlation does not imply a causation effect; it only indicates the tendencies present in the data.

Dispersion of Variables for FY 2023-24 Coefficient of Variation



Appendix C: Frequently Asked Questions about Fiscal Capacity

1. **What is fiscal capacity?**
   Fiscal capacity is the potential ability of local governments to fund education from their own taxable sources, relative to the cost of their service responsibility.

2. **What factors determine fiscal capacity?**
   Essentially, fiscal capacity is determined by the following factors for each of the 95 counties: fiscal effort, tax capacity based on property and sales, ability to pay based on per capita income, tax burden, and service responsibility based on school population as a percent of total population.

3. **What is the actual output of TACIR's fiscal capacity formula?**
   The TACIR formula measures the per pupil dollar amount that each county—based on the characteristics explained in item 2 above—can afford to pay to fund education.

4. **What is the method for determining fiscal capacity?**
   Essentially, the fiscal capacity model is based on a set of averages. The method, which is called multiple regression analysis, takes one factor—variable—at a time and compares it for all counties. From this process, an average weight--called a coefficient—is calculated for each factor.

5. **What is multiple regression analysis?**
   This is a very common and useful statistical method for addressing a wide range of issues. This procedure is used to predict the value of fiscal capacity based on a number of factors that determine fiscal capacity.

6. **How is the per pupil fiscal capacity calculated?**
   As indicated above, the statistical method produces an average weight—called a coefficient—for each of the factors in the model. These averages are multiplied by the value of each factor for each county and summed. This produces a per pupil fiscal capacity amount. These per pupil amounts will vary county-by-county because the factor values are different for each county.

7. **How old is data that is used in the fiscal capacity model?**
   Because of a time lag in the collection and publication of official statistics, the data is frequently 18 to 24 months old. Moreover, the formula is based on a 3-year "moving" average of the data used. That means that each year the formula is calculated, the most current year is added, and the oldest year is dropped. Consequently, a current change in the tax base of any county will not be reflected in the most current fiscal capacity index.

8. **Will the fiscal capacity of each county change each year?**
   It is likely that there will be some change each year. However, experience shows that the changes are small for most counties. The influence of a change in the tax base in a specific county will be related to similar tax changes in other counties. A change in any specific fiscal capacity factor will not necessarily mean a change in fiscal capacity.

9. **What is the fiscal capacity index (FCI)?**
   The Department of Education uses a percent of total measure of fiscal capacity rather than a per pupil measure. Once TACIR determines per pupil capacity for each county, this value is multiplied by average daily membership. This produces a countywide measure of total fiscal capacity. The values of the 95 counties are summed, and each county is expressed as a proportion of the total. The fiscal capacity index for each county is this proportion. Results of the TACIR and CBER models are averaged.

10. **Is the fiscal capacity index (FCI) the same as my local TISA Match Rate?**
    No. In fact, the individual local contribution rates are calculated after the dollar amount each county area must contribute to TISA is determined. Although the individual match rates are interesting and useful for comparing how much each county has to pay, they are not used to determine that amount; they are derived from it.

11. **Can a county affect its own fiscal capacity?**
    One of the principles of fiscal capacity calculations is that they are not affected by local decisions. However, local officials do make decisions that affect local revenue like entering into payment in lieu of tax agreements, which affects TACIR's fiscal capacity calculation for all 95 counties.

12. **Can per pupil fiscal capacity change without affecting the index?**
    Yes. The per pupil capacity of a specific county can move up or down without necessarily causing a major change in the index. However, this depends on what changes occur in all 95 counties.

13. **How does the Fiscal Capacity Index influence the local contribution for the Tennessee Investment in Student Achievement Act (TISA)?**
    Fiscal Capacity is applied to the base and weight amounts in TISA. The base funding is a fixed dollar amount of funding per student. For fiscal year 2023-24, the amount was set to $6,860 per student. The weighted funding is based on students' characteristics. For example, students attending school districts with higher rates of property will generate an additional percentage of the base amount.

Appendix D: How Fiscal Capacity Works in the TISA Formula

For all School Systems

Step 1. Calculate the statewide base funding and multiply this amount by 30% to calculate the statewide local contribution.

Calculation of Statewide Local Share		Base
Statewide Total		$6,620,528,136.22
Local Share	x	30%
Statewide Local Share	=	$1,986,158,441

Step 2. Allocate the local contribution to each of the 95 counties according to each county's fiscal capacity index (50-50 TACIR-CBER).

Apply Fiscal Capacity		
Statewide Local Share	=	$ 1,986,158,441
Volunteer County Fiscal Capacity (TACIR&CBER)	x	0.005317768
Volunteer County Local Contribution		$ 10,561,930

Step 3. The state makes up the difference between the local contribution and the total base funding for each county.

Step 4. Repeat steps 1 through 3 for the weighted funding.

For School Systems in Counties with More than One School System

Step 5. Allocate state and local contributions in proportion to the TISA base and weight funding that they generate.

Multi-System County Calculation		Base Funds Generated		Weight Funds Generated
Volunteer County		$ 41,096,285.02		$ 11,282,511.60
All systems within County Total	\	$ 79,728,938.17	\	$ 18,685,299.77
Volunteer County Percent of County Total Funds	=	52%	=	60%
County Local Contribution (All Systems)	x	$ 8,283,437.39	x	$ 2,080,349.66
Volunteer County Local Contribution	=	$ 4,269,698.20	+	$ 1,256,151.60
Total	=	$ 5,525,849.80		
Note: Direct and outcome funding are 100% funded by the state, so fiscal capacity does not apply.				

When counties have multiple school systems, sum the total TISA funding [state and local combined] for each school system within the county, compute the percent of the county total for each system by dividing each system's total TISA funding by the county area total, and multiply the county area local share [i.e., the local funding requirement for the entire county] by each system's percent of the county total TISA funding.

The following example applies to single system counties.

Calculation of Statewide Local Share		Base		Weight
Statewide Total		$ 6,620,528,136		$ 1,662,717,155
Local Share	x	30%	x	30%
Statewide Local Share	=	$ 1,986,158,441	=	$ 498,815,147
Apply Fiscal Capacity				
Statewide Local Share	=	$ 1,986,158,441	=	$ 498,815,147
Volunteer County Fiscal Capacity (TACIR&CBER)	x	0.005317768	x	0.005317768
Volunteer County Local Contribution		$ 10,561,930	+	$ 2,652,583
Combined Local Contribution (Base and Weight)	=	**$ 13,214,513**		

Note: Numbers may not add up due to rounding.

The following example applies to multi system counties.

Calculation of Statewide Local Share		Base		Weight
Statewide Total		$ 6,620,528,136		$ 1,662,717,155
Local Share	x	30%	x	30%
Statewide Local Share	=	$ 1,986,158,441	=	$ 498,815,147
Apply Fiscal Capacity				
Statewide Local Share	=	$ 1,986,158,441	=	$ 498,815,147
Volunteer County Fiscal Capacity (TACIR&CBER)	x	0.004170582	x	0.004170582
Volunteer County Local Contribution		$ 8,283,437	+	$ 2,080,350
Combined Local Contribution (Base and Weight)	=	$ 10,363,787		
Multi-System County Calculation		**Base Funds Generated**		**Weight Funds Generated**
Volunteer County		$ 41,096,285		$ 11,282,512
All systems within County Total	\	$ 79,728,938	\	$ 18,685,300
Volunteer County Percent of County Total Funds	=	52%	=	60%
County Local Contribution (All Systems)	x	$ 8,283,437	x	$ 2,080,350
Volunteer County Local Contribution	=	$ 4,269,698	=	$ 1,256,151
Total Local Contribution				
Adding Local Contribution Totals		$ 4,269,698	+	$ 1,256,152
Combined Local Contribution (Base and Weight)	=	**$ 5,525,850**		

Note: Direct and outcome funding are 100% funded by the state, so fiscal capacity does not apply. Numbers may not add up due to rounding.

Appendix E: Glossary

Ability to Pay—the ability of individuals in a certain jurisdiction to pay taxes relative to those in other jurisdictions, generally based on a measure of income. The TACIR fiscal capacity model uses county per capita personal income to measure ability to pay.

Fiscal Capacity—the potential ability of local governments in a county to raise revenues from their own sources to pay for K-12 public education.

Fiscal Effort— The degree to which a local funding body (county, city, or special school district) uses the revenue bases available to it, typically measured by dividing the actual amount of revenues collected or used for a particular purpose (e.g., K-12 education) by a related measure of fiscal capacity.

Local Revenue—the amount of money, e.g., property, sales, and state-shared tax revenues, provided by local officials to support school systems in the county.

Ordinary Least Squares Multiple Linear Regression—a statistical process used to predict the values of a dependent variable, such as local revenue for education, based on the values of a set of explanatory variables, called independent variables.

Per Capita Personal Income—Personal income divided by the population of the area. Personal income is defined as income received by persons from all sources. It includes income received from participation in production as well as from government and business transfer payments. It is the sum of compensation of employees (received), supplements to wages and salaries, proprietors' income, rental income of persons, personal income receipts on assets, and personal current transfer receipts, less contributions for government social insurance.

Property per Pupil—the equalized assessed valuation of property subject to taxation by local officials divided by the number of students as measured by average daily membership.

Representative Tax System—as a measure of fiscal capacity, a method of calculating the amount of revenue that a region or government would collect if it were to exert average fiscal effort; hypothetical tax system that is representative or typical of all the taxes actually levied by the state and local governments of a federation intended to be descriptive of the state-local tax system.

Resident Tax Burden—the portion of property tax payments for which owners of homes and farms are responsible; the equalized assessed valuation of residential and farm property divided by the total taxable value of all property.

Sales per Pupil—the value of all sales subject to taxation by cities and counties divided by the number of students as measured by average daily membership.

Service Responsibility—the number of students as measured by average daily membership in a county as a percentage of its population.

Appendix F: Data Sources for TACIR's Fiscal Capacity Model, Fiscal Year 2023-24

Local Revenue

Tennessee Department of Education, Annual Financial Reports from public school systems, fiscal years 2019-20 through 2021-22.

Student Counts—Average Daily Membership

Tennessee Department of Education, Annual Statistical Reports for school years 2019-20 through 2021-22. https://www.tn.gov/education/districts/federal-programs-and-oversight/data/department-reports.html

County Population Estimates

US Census Bureau, Population Division, Tennessee County Population Estimates, 2019 through 2021. https://data.census.gov/

Per Capita Personal Income

US Bureau of Economic Analysis, Regional Economic Analysis Division, annual estimates for counties, metro, and BEA economic areas, including employment 2019 through 2021. https://apps.bea.gov/itable/?ReqID=70&step=1

Local Sales Tax Base

Tennessee Department of Revenue, fiscal years 2019-20 through 2021-22.

Property Tax Base, Appraisal Ratios and Ratio of Residential and Farm Assessment to Total Assessment

Tennessee Board of Equalization, *Tax Aggregate Report of Tennessee*, calendar years 2019 through 2021. https://comptroller.tn.gov/office-functions/pa/tax-resources/reports-handbooks-reference.html

Tax Equivalent Payments

County and Municipal Finances, Division of Local Finance, Comptroller of the Treasury, fiscal years 1992-93 through 1994-95.