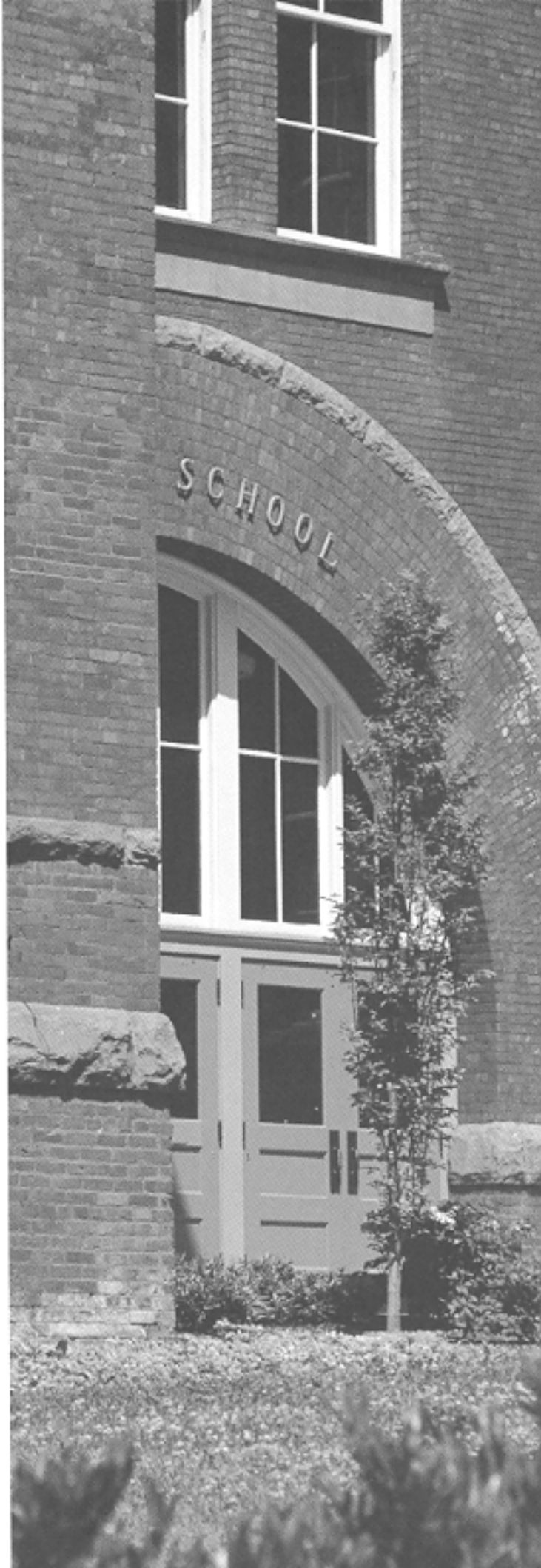
The Tennessee Advisory Commission
on Intergovernmental Relations



A Prototype Model for School-System-Level Fiscal Capacity in Tennessee: Why & How

Staff Information Report
October 2005

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A Prototype Model for School-System-Level Fiscal Capacity in Tennessee: Why & How

TACIR Staff Information Report

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If a county has a relatively low total assessed value of property and very little business activity, that county has, in effect, a stone wall beyond which it cannot go in attempting to fund its educational system regardless of its needs. In those cases, local control is truly a "cruel illusion" for those officials and citizens who are concerned about the education of the county's school children.

Tennessee Supreme Court
1993

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Forward

A series of events beginning with the Tennessee Supreme Court's third ruling in the small systems lawsuit (*Tennessee Small School Systems v. McWherter*) in October 2002 led to the development of a new fiscal capacity model for use in the state's formula for funding public schools. The prototype system-level model described here is in many respects a refinement of the current county-level model and builds on previous system-level models developed by TACIR staff. The prototype was requested first by Governor Bredesen's Task Force on Teacher Pay, appointed in February 2003, and later by the Basic Education Program (BEP) Review Committee. The BEP Review Committee was responding, in part, to legislation passed in 2004 asking that it "give special consideration to . . . the development and implementation of a system-level fiscal capacity model." The Review Committee endorsed the concept of a system-level fiscal capacity model and voted to recommend in its November 2005 report that Tennessee convert to a system-level equalization model.

TACIR staff pioneered the current county-level fiscal capacity model used in the BEP formula during the 1980s and published its first system-level model in 1990. The county model was adopted for the BEP formula in 1992 and has been in use ever since. However, as pointed out in *A Users' Guide to Fiscal Capacity in the Basic Education Program*, a TACIR staff information report published in November 2004, use of the county-level model in an education funding formula designed around school systems is problematic. The Tennessee Comptroller of the Treasury, in a July 2003 report entitled *Funding Public Schools: Is the BEP Adequate?*, noted that the use of a county fiscal capacity model in a system-level funding formula results in "funding inequities among LEAs within multi-LEA counties."

It was in the context of the three successive rulings against the state by the Supreme Court and the comments by the Comptroller that the Governor's task force and the BEP Review Committee asked TACIR staff to develop a system-level model. Staff and a small group of outside experts evaluated numerous options before selecting the new prototype. It is based on all the same principles as the county model and has the least overall adverse monetary effect on the city school systems and special school districts that currently benefit from the use of a county-based model. Nevertheless, the effects on many of those school systems are significant and should not be disregarded. Implementation of any system-level model would likely require some form of hold harmless provision as recommended by the Task Force in order to avoid serious adverse effects on cities and special school districts.

The overlapping fiscal structures of school systems in multi-system counties increase the difficulty of producing a system-level fiscal capacity model. Most states have fiscally independent school systems with a single source of local revenue: taxable property. Determining fiscal capacity in those states is simple, but provides no model for Tennessee. No other state has overlapping, interdependent school systems supported by cities and counties with multiple sources of revenue and intra-county sharing requirements. Consequently, no other state's method of equalizing education funding can provide a model from which to work. The prototype described here is unique to Tennessee, but its complexity is created by Tennessee's unique local education fiscal structure.

Executive Summary

In October 2002, the Tennessee Supreme Court issued its third ruling in what has come to be known as the Small Schools Lawsuit. Called Small Schools III, the decision found the state's method of equalizing teachers' salaries unconstitutional. Earlier rulings had found the public school funding scheme used by the state from the late 1970s through the early 1990s unconstitutional because it did not afford substantially equal educational opportunities to all Tennessee students, but allowed the state to phase in a new funding formula through the 1990s.

In April of the following year, Governor Bredesen appointed a task force to recommend a course of action to resolve the problem of equalizing teachers' salaries. The task force report, issued in October 2003, recommended several actions, including adoption of a system-level method of equalizing the local match required by the state's education funding formula, the Basic Education Program (BEP).

Staff of the Tennessee Advisory Commission on Intergovernmental Relations were asked to develop a system-level fiscal capacity model for the task force. The development of that model is the subject of this report. TACIR staff worked with staff of the Comptroller's Office of Education Accountability and outside consultants to develop and review four models. This team recommended a model patterned after the county-level fiscal capacity model that has been used to equalize funding through the BEP formula since its inception. This was not the first attempt to develop such a model. TACIR staff had developed a series of models since the late 1980s and had continued to revisit the issue and refine those models.

Any change in the equalization method will necessarily cause shifts in state funding across Tennessee's 136 public school systems and is, therefore, highly controversial. Still the current

method, in the words of the Comptroller's Office, creates a structural flaw because it attempts to equalize funding in a system-level formula at the county level. Correcting this flaw is particularly problematic in Tennessee because of the fiscal complexity of its local system for funding public schools. With three distinct types of school systems, each with authority to impose various taxes and subject to certain intra-county sharing requirements, **Tennessee has equalization challenges that other states do not.**

This report describes an approach to meeting those challenges in a manner consistent with basic principles of taxpayer and student equity. It also describes several alternatives, including two developed at the request of the State Board of Education. To the extent that any approach adopted causes shifts in state funding, staff recommend a phase in process and temporary hold harmless provisions to allow local governments adequate time to respond to those shifts.

TACIR staff developed a number of alternative system level models over the years, beginning with two based on taxable property values published in one of TACIR's earliest reports on fiscal capacity. The models were developed in the late 1980s and published in 1990, before the legislature changed the education funding formula, but neither model was considered satisfactory, and so the county-area fiscal capacity model currently in use was adopted in 1992 along with the BEP formula.

Background

Why does fiscal capacity matter? As noted in TACIR's *User's Guide to Fiscal Capacity in the Basic Education Program Formula* (November 2004), 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. 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 in order to get the state's money and do what is required. That creates a taxpayer equity problem.

Likewise, if the state requires each local government to impose the same tax rate,

Why Equalize Education Funding?

- Tennessee's Constitution requires substantially equal educational opportunity for all students.
- Different local governments cannot raise the same amount of revenue per student with the same tax rates.
- The state must make up the difference.

but gives each the same amount of funding per student, for example, that creates a pupil equity problem. This issue was first raised by Tennessee's Comptroller of the Treasury fifteen years ago.

Tennessee's Comptroller identified the problem in 1990. The first performance audit of the Board and Department of Education issued by the Tennessee Comptroller in February 1990 found that "[f]unds available for public education vary considerably from school district to school district in Tennessee." The Board and the Department concurred. The Department noted that a formula change was being studied and included the following comment in its response to the audit:

> *Possibilities for formula change include a mechanism to distribute state funding to systems based on their "ability to pay" which would better equalize funding statewide. . . . Multiple school districts will be examined with the possibility of incorporating funding disincentives to address funding disparities.*

The Board went further, commenting on the causes and noting that the proposed new funding formula would include a system-level gauge of ability to fund schools:

> *Independent taxing power of city and special school systems does contribute to the existing disparity in funding among the state's systems. Citizens of city and special school systems have the ability and usually the will to tax themselves for the purpose of investing more in their schools. County residents may have the will but typically not the ability to do the same, given their limited tax base. The Board's Basic Education Program proposal would resolve much of this problem by gauging state appropriations for schools to each system—county, city, or special—according to the ability of each to raise local tax revenue for schools. The result would both assure adequate resources in all systems and decrease the funding disparity among systems.*

Tennessee's Supreme Court agreed, finding the method described by the Comptroller unconstitutional.[1] Tennessee's Supreme Court first spoke to the issue in March 1993 in a case brought by the state's smaller and poorer school systems.[2] The Court described the problem clearly and vividly:

> *Property and local option sales tax revenues, which constitute a*

[1] The funding method at issue in this case was not the Basic Education Program formula now in place. The funding method found unconstitutional was the Tennessee Foundation Program, which was in place from 1978 through 1992.

[2] *Tennessee Small School Systems et al. v. McWherter et al.*, 851 S.W.2d 139 (Tenn. 1993).

> *substantial part of the total funds available to a district, are limited by the economic conditions of the county in which the district is located.* ***If a county has a relatively low total assessed value of property and very little business activity, that county has, in effect, a stone wall beyond which it cannot go in attempting to fund its educational system regardless of its needs. In those cases, local control is truly a "cruel illusion" for those officials and citizens who are concerned about the education of the county's school children.*** *In those circumstances, actual control is in the hands of those who have the constitutional power and duty to remove the obstacles to education, whether those obstacles be inability to raise additional funds locally or indifference to the quality of* education.

Fair treatment of all taxpayers cannot be assured unless a way can be found to measure differences between local governments in their ability to raise revenue to match the state funding.

The Court went on to find the state's method of funding public schools unconstitutional, plainly stating where the constitutional power and duty to fix it lay:

> *The constitutional mandate that the General Assembly shall provide for a system of free public schools guarantees to all children of school age in the state the opportunity to obtain*

The state constitution imposes on the General Assembly the obligation to maintain and support a system of free public schools that affords **substantially equal educational opportunities to all students.**

> *an education. The provisions of the constitution guaranteeing equal protection of the law to all citizens require that the educational opportunities provided by the system of free public schools be substantially equal.* ***The constitution, therefore, imposes upon the General Assembly the obligation to maintain and support a system of free public schools that affords substantially equal educational opportunities to all students.***

Emphasizing the responsibility of the legislature for the actions of the local governments it creates, the Court said,

> *the constitution does not permit the indifference or inability of [counties, municipalities, and school districts] to defeat the constitutional mandate of substantial equality of opportunity.*

So how does the State solve these problems and ensure equity for students and taxpayers across the state? By adjusting the share paid by each local government to reflect the size of its tax base and other related factors, a process called "equalization." This is where fiscal capacity comes in. Only if a way can be found to measure differences among local governments in their ability to raise revenue to match the state funding can the state ensure that all taxpayers are treated fairly.

The fiscal capacity model that is currently used for this purpose in the Basic Education Program (BEP) formula is the county model first produced by TACIR staff in the late 1980s. The use of a county-level fiscal capacity model to equalize funding in a system-based formula was considered problematic from the outset and has been called a structural flaw that contributes to continued equity problems, but county models had been used for that purpose for some time when this model was first adopted, and efforts to produce system-level models had not proved satisfactory.

Once the county model was adopted, the concept of a system-level model was set aside as a practical matter as the BEP formula was phased in. Nevertheless, anticipating that the time would come when a system-level model would be called for, TACIR staff continued to work on a prototype from time to time. As the Comptroller's Office of Education Accountability noted in its 2003 report on the BEP formula,

> ***[t]he fiscal capacity index estimates county-level fiscal capacity while the BEP allocates funds at the LEA level, resulting in funding inequities among LEAs within multi-LEA counties.*** *Among LEAs within the same county, the ability to raise local revenue through property and sales taxes may vary considerably. The Tennessee Advisory Commission*

on Intergovernmental Relations (TACIR) estimates fiscal capacity only at the county level, masking these variations. As a result, some LEAs receive a disproportionately high level of state support, and others receive a disproportionately low level. More LEA-level data are now available, and it may be possible to develop an LEA-level fiscal capacity index using the same methodology and similar variables.

Implementing an LEA-level index would not affect the BEP's total cost, nor would the state cost change. However, an LEA-level index would cause a redistribution of state dollars and local shares of the BEP either among LEAs within a multi-LEA county or among all LEAs statewide. TACIR has examined various ways to determine fiscal capacity at the LEA level and is refining a prototype LEA-level fiscal capacity model. Funding Public Schools: Is the BEP Adequate? (OREA 2003)

Previous Work on a System Model. TACIR staff began evaluating the challenges and the potential for a system-level fiscal capacity in the late 1980s, and preliminary work on a prototype model has been presented to the Commission on several occasions. Past system-level prototypes presented to the

TACIR staff first attempted a system-level model based solely on property tax bases fifteen years ago—before adoption of the BEP formula.

Early models did not accurately reflect the way local revenue is allocated among school systems within counties, but laid the groundwork for further work.

Commission, unlike the current county-level model, were based solely on tax base data because, until recently, data for measuring the ability of residents to pay taxes were not routinely available for school systems. That is no longer the case, and as a result, a system-level model based on the same principles as the current county model is now possible.

TACIR staff first noted the problems inherent in producing fiscal capacity estimates for Tennessee school systems fifteen years ago:

> *Ideally, the tax base for fiscal capacity should be defined as broadly as possible to compensate for relative differences in local taxable resources. 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, money income data and population data are not available for school districts. . . . 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.* Fiscal Capacity of Public School Systems in Tennessee *(TACIR 1990)*

As noted then, money income is not taxed by local governments, but is included in the TACIR fiscal capacity model

- as a proxy for all other local revenue,
- to provide balance among the tax bases, and
- to represent citizens' ability to pay taxes.

TACIR's 1990 effort to develop a system-level model was based solely on taxable property values. Two models were produced, neither of which was deemed workable. The main problem was the fiscal interrelationship of school systems in the same county. All systems in a single county receive revenue from the county property tax rate for public schools. In addition, city systems and special school districts can and do tax property within their borders and retain those funds for their own schools.

Neither 1990 model directly addressed this problem. Both treated each system in each county as if no sharing requirement were imposed on the county system and suggested that statutory changes could be made to accommodate that treatment. One presumed all property in the county would be taxable for the county school system; the other presumed that only property not taxed to fund a city system or a special school district would be taxable for the county system. These models could not be put into effect without the suggested statutory changes. Consequently, a county-level model was adopted for use in the BEP formula,

and all systems within each county had and still have identical state-local match rates.

Discussion of a system-level model resumed in 1995 when the Tennessee Supreme Court issued its second ruling in the small school systems lawsuit. The Court in Small Schools II expressed general approval of the BEP formula, including phasing it in over a six-year period; however, it found that

> *exclusion of teachers' salary increases from the equalization formula is of such magnitude that it would substantially impair the objectives of the plan; consequently, the plan must include equalization of teachers' salaries according to the BEP formula.*[3]

Shortly after the Court issued its ruling, the Executive Director of the State Board of Education and the Commissioner of Education appeared before the TACIR to request further study of a system-level model. They believed that a system-level model provided the only real hope of a permanent solution to the continuing problems with equalization. However, because the BEP was in the middle of its initial phase-in period, the Commission felt that that process should not be disrupted by a change in the fiscal capacity model. The legislature adopted a method to improve equalization of teachers' salaries outside of the BEP formula.

In April 2003, the Governor's Task Force on Teacher Pay asked TACIR to develop a system-level model.

Tennessee's General Assembly asked the BEP Review Committee to "give special consideration to

- costs of enhanced services to address the needs of at-risk children,
- the cost of educating English language learners (including teachers, translators and related professions), and
- the development and implementation of a system-level fiscal capacity model."

Public Acts 2004
Chapter 670

[3] *Tennessee Small School Systems et al. v. McWherter et al.*, 894 S.W.2d 734 (Tenn. 1995).

Circumstances Prompting Recent Work on a Prototype. Interest in a system-level model heightened again as the Task Force on Teacher Pay appointed by Governor Bredesen in April 2003 began its work. This broad group of stakeholders was formed in response to the October 2002 decision by the Tennessee Supreme Court holding that the method adopted by the legislature in 1995 to equalize teachers' salaries was unconstitutional.[4] The Task Force's final report, delivered to the Governor in November 2003, recommended resolution of the salary equity issue within the BEP formula and laid out ten principles to guide development of the Governor's teacher pay plan. Principle number four in that list of recommendations was to

> *[i]ntroduce a new district/system-level fiscal capacity model in order to provide a fairer method of determining local contribution. Currently, the model measures the fiscal capacity of 95 counties. A new district/system level will measure the capacity of 136 systems. (See Appendix A.)*

Final legislative action in April 2004 directed the BEP Review Committee "to give special consideration to . . . the development and implementation of a system-level fiscal capacity model" and more generally, to "prepare an annual report on the BEP and . . . provide such report, on or before November 1 of each year, to the governor, the state board of education, and the select oversight committee on education. This report shall include recommendations on needed revisions, additions, and deletions to the formula as well as an analysis of instructional salary disparity among local education agencies." (See Appendix B.)

The Review Committee included the following recommendation in its November 1, 2004, report:

> *The BEP Review Committee endorsed the concept of a 136 system-level prototype. The committee voted to recommend, in its November 1, 2005, report, that Tennessee convert from a 95 county to a 136 system-level equalization model.*
>
> *Future discussion will focus on issues related to local tax base and additional questions determined by the BEP Review Committee. An additional year will allow time for the committee to develop potential phase-in options and gain a better understanding of factors driving formula change. This review will facilitate the necessary conditions for BEP implementation.*

Appendix C presents a chronology for the prototype model.

[4] *Tennessee Small School Systems et al. v. McWherter et al.*, 91 S.W.3d 232 (Tenn. 2002).

Introduction

The prototype model described here reflects the best efforts of TACIR staff with assistance from staff of the Comptroller's Offices of Research and Education Accountability and outside experts to satisfy the need expressed in the recommendations of the Governor's Task Force on Teacher Pay and the BEP Review Committee.[5] This group of researchers evaluated several system-level alternatives to the current county model. The alternatives were of two basic types. Both types involved applying weights to the revenue sources available to fund schools at the discretion of local officials, but there were two key differences:

1. The weights for one type of model were determined by the same statistical process used to produce the current county model, which allows consideration of equity factors other than revenue sources.
2. The weights for the other type of model were calculated by dividing actual revenues for schools by the total amount available from each source—essentially, average tax rates. This latter method is not a statistical process and, therefore, has the advantage of being simpler to explain and the disadvantage of having no

[5] See Appendix D for descriptions of other models evaluated by TACIR and Comptroller staff and consultants.

Major Fiscal Capacity Principles

I

Fiscal capacity should be estimated from a comprehensive, balanced tax base.

II

Fiscal capacity should focus on economic bases rather than policy determined revenue bases.

III

Tax base estimates should be as current and accurate as possible.

IV

Similarly situated taxpayers should be treated similarly in terms of taxes paid and the services received.

V

Tax exportability should be measured—resident taxpayers in different jurisdictions should have similar fiscal burdens.

VI

Fiscal capacity measures should reflect service responsibilities that vary across jurisdictions.

VII

Estimates should be based on multi-year averages to mitigate data and statistical errors.

mechanism for considering equity factors other than revenue sources.

Both types of models are based on equally comprehensive, current, and accurate tax base estimates and are equally satisfactory with respect to the first and third major fiscal capacity principles (see the sidebar on the previous page). The second type is somewhat less satisfactory with respect to the second principle—focusing on economic rather than policy determined revenue bases—and fails with respect to the fourth and fifth principles.

Treating similar taxpayers similarly requires a measure of taxpayer well-being and an appropriate weight for that factor in the fiscal capacity model. Ensuring similar fiscal burdens for taxpayers in different jurisdictions also requires some mechanism for differentiating between the portion of taxes paid in each jurisdiction by residents and the portion paid by nonresidents. Appropriate weights for these two equity factors cannot be determined objectively without a statistical model.

The prototype presented to the Governor's Task Force and the BEP Review Committee falls into the first category. The statistically weighted model is superior to the average tax rate model both because it facilitates consideration of equity factors other than revenue and because its structure and effect are more similar to the current county model.

As shown in Table 1, the prototype produces results that, when summed for counties and evaluated based on the number of school systems per county, match actual revenue better than the results of either the county fiscal capacity model or the alternative system-level average tax rate model.

More than two-thirds of Tennessee counties have only one school system. Those sixty-seven counties account for just under 50% of local education revenue. Based on the current county-level fiscal capacity model, those counties are responsible for more than 52% of the BEP local matching requirement. Based on the system-level prototype, their share would drop to around 51% of the local match. The ratio between their share of the match and their share of actual revenue would change very little, from 1.05 to 1.03, which indicates that both models treat them collectively about the same. A model based on revenue from average rates would produce about the same result for these counties.

The twenty counties that have two school systems account for between 40% and 41% of actual local revenue, are currently responsible for slightly less of the local match, and would be treated about the same in the prototype model. A model based on average rates would require somewhat less. These twenty two-system counties have nearly a one-to-one ratio between their share of actual revenue and their share of the BEP match under the

current model and both system-level alternatives, which indicates that all models treat them collectively about the same.

In contrast, the six counties with three school systems now account for close to 9% of actual local education revenue, but closer to 7% of the current local matching requirement, giving them a match-to-revenue ratio far lower than the other groups of counties (0.83). Their share of the match moves up to 8% under the prototype model. Their match-to-revenue ratio remains below one, but at 0.93 moves much closer to one, which means that the prototype is better at predicting their collective revenue, but still treats them very favorably in comparison to the one- and two-system counties. A model based on average rates would require a higher local share, much closer to their actual share of average revenue.

The two counties with five and six systems account for a very small portion of revenue and a similarly small portion of the local match based on any fiscal capacity model. They have just under 1% of both actual revenue and the current match and 1% of the match based on either average rates or the prototype. This slight difference in the local match causes a relatively large change in the match-to-revenue ratio, which demonstrates how disproportionately large seemingly small changes in small numbers can appear. The local match would be higher with the average tax rate model as indicated by the match-to-revenue ratio of 1.11.

Table 1. Comparison of County-area Shares of BEP Match to Actual Shares of Local Education Revenue
Current 95-County Model versus Revenue from Average Rates and Prototype 136-System Model
by Number of Systems in County

			Share of Statewide BEP Local Match					
		Share of Actual Statewide Local Revenue	Current 95–County Model	Ratio of Match to Revenue	Revenue from Average Rates	Ratio of Match to Revenue	Prototype 136-System Model	Ratio of Match to Revenue
Counties with One School System	67	49.8%	52.3%	1.05	51.2%	1.03	51.3%	1.03
Counties with Two School Systems	20	40.5%	39.5%	0.97	39.2%	0.97	39.5%	0.98
Counties with Three School Systems	6	8.8%	7.3%	0.83	8.6%	0.98	8.2%	0.93
Counties with Five or Six School Systems	2	0.9%	0.9%	0.96	1.0%	1.11	1.0%	1.07
Total	95	100.0%	100.0%	1.00	100.0%	1.00	100.0%	1.00

Paraphrasing the authors of *Hard Choices, A Report on the Increasing Gap Between America's Infrastructure Needs and Our Ability to Pay for Them*[*],

> *a revenue estimate is conceptually different from a measure of fiscal capacity. Revenue estimates are generally based on the existing financing system and they accept the level of effort as given. Fiscal capacity refers to the strength of the underlying economy on which all revenue collections inevitably rest. A local city or county may have a relatively strong economy, and hence high capacity, but a low level of projected revenues if it has low tax rates and user charges or devotes a relatively small share of total revenues to education.*
>
> *Even though expected revenues may fall short of investment requirements in a county, it may be wrong to conclude that it has a more serious problem than a county with a smaller revenue gap. In other counties, however, there may not be excess capacity; even small revenue gaps may be difficult to close if the economy is weak and tax rates and debt levels are already high.*
>
> *While the concept of fiscal capacity is relatively clear, measurement is difficult and subject to controversy. Some analysts prefer to measure capacity in terms of per capita income. Others suggest that per capita income is an appropriate measure of residents' well-being, but not of the ability of governments to raise revenue. The Advisory Commission on Intergovernmental Relations developed an alternative state-level measure using a representative tax system (RTS) methodology. All of the tax bases typically used by state and local governments were identified and a national average tax rate was applied to a measure of those bases within each state. The RTS has also been criticized on a number of grounds.*

[*] U.S. Congress. Joint Economic Committee, Subcommittee on Economic Goals and Intergovernmental Policy. 1984. Washington, D.C.: U.S. Government Printing Office. 98th Cong., 2d sess.

Current County Model—
Starting Point for the Sub-county Prototype

Tennessee's current fiscal capacity model was developed by TACIR in the late 1980s and adopted in 1992 to fulfill the requirement of the Education Improvement Act for fiscal equalization in the Basic Education Program (BEP). Fiscal capacity is the potential ability of local governments to fund education from their own taxable sources, relative to their cost of providing services. TACIR's model is used to allocate responsibility for the local portion of the BEP among the state's public school systems, but it is calculated and applied at the county level.

Development of the county area fiscal capacity index is a three-step process:

- The TACIR model 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 ninety-five 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, the fiscal capacity index constitutes the share that each county area has of the total

The TACIR Fiscal Capacity Model

What is it?

- **A Modified Representative Tax System Approach** (Regression Weighted)
- **A Pupil Equity Model**— measured by the tax base per student
- **A Taxpayer Equity Model**— measured by
  - Ability to Pay
  - Resident Tax Burden/Tax Exportability
- **A Fiscal "Behavioral" Model**
  - Does not set normative standards for local revenue
  - Accepts revenue levels actually allocated by local governments as basis for measuring fiscal capacity
- **Three-year Moving Average**— mitigates both errors and volatility in the data

For more information about the TACIR county fiscal capacity model, see "A User's Guide to Fiscal Capacity in the Basic Education Program Formula" (2004). www.state.tn.us/tacir/PDF_FILES/Education/Users Guide to Fiscal Capacity.pdf

statewide capacity to fund education from local sources. For counties with more than one school system, it is the share for all systems within the county combined. When it is applied to the BEP formula to determine the local matching requirement for each individual school system, the systems' BEP formula costs must be aggregated to the county level.

All systems within the county are treated the same in the current formula despite the fact that counties must share the revenue they raise with any other school systems within the same county, but cities and special school districts can supplement those county funds with their own taxes without sharing them. It is impossible to incorporate these very significant fiscal differences among systems into a county-area fiscal capacity model. Because the county area fiscal capacity model cannot distinguish systems that can supplement county revenues without sharing from those that cannot, in most counties with more than one school system, the county system's fiscal capacity is overstated, and the fiscal capacity for cities and special school districts is understated. Despite this structural flaw, the county model has many strong points that should be preserved in any alternative model.

A Modified Representative Tax System Approach

TACIR uses a modified version of the representative tax system (RTS) approach to determining fiscal capacity developed by the U.S. Advisory Commission on Intergovernmental Relations (ACIR). Three decades ago, the original ACIR model estimated the fiscal capacity of states by applying uniform average 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 burden. This method also makes it possible to incorporate all relevant and measurable revenue sources and equity factors.

The method TACIR uses to estimate each county's fiscal capacity is based on a statistical process called multiple regression analysis. Statistical formulas such as this one are widely used in business and research and taught at the undergraduate level, but they are not something the average person encounters regularly or intuitively understands. This makes them somewhat difficult to explain. Nevertheless they are often desirable, as in this case, because they can be used to balance a wide array of factors to produce a more accurate result. That advantage is the main reason they are so widely used.

TACIR's method is called a "behavioral" model because it is designed to describe what school systems on the whole actually do rather than to set standards for them based on some external notion of what they should do.[6] Considering all systems together

[6] The latter is called a "normative" model, which is akin to norm-referenced tests in that the standard of performance is not derived from the group to which it is applied, but rather from a separate control group or by some other external standard-setting process.

ensures that variations in fiscal effort that might account for differences in the amount of revenue raised do not work to the individual benefit or detriment of any particular system.

This TACIR method starts with the actual revenue raised in all ninety-five counties for education as a point of reference for calculating the weight of each factor used to estimate fiscal capacity. The model 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. Weights for each factor are calculated simultaneously and relative to each other. The calculation actually balances each factor against all others to determine the set of weights that produces the best approximation of the actual revenue per student for all of the counties.

Each weight produced by the regression formula is multiplied by the value of the corresponding factor for each county, and the products summed for each county to produce a dollar amount per pupil. The resulting 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. The weights are recalculated each year based on the most current available data in order to reflect changes as accurately as possible.

The TACIR models—both county- and system-level—measure fiscal capacity based on total fiscal effort. Total fiscal effort for all systems combined equals total fiscal capacity for all systems combined.

Basic Structure of the Current County Model

The current county model was the starting point for development of the new system-level model. The current model is based on five key components, all measured by using three-year moving averages of the most recent data available:

- Local Revenue, measured by own-source revenue per pupil
- Tax Base, a measure of pupil equity based on two revenue sources:
  - local taxable sales per pupil
  - equalized assessed property valuation per pupil
- Ability to Pay, a measure of taxpayer equity based on per capita income
- Resident Tax Burden, a measure of taxpayer equity based on the ratio of residential and farm assessments to total assessments
- Service Responsibility, a measure of pupil equity based on the ratio between the number of public school students (average daily membership) and the county population

This approach was initially described in a 1988 TACIR information bulletin[7] as a basis for discussion and future debate and included only the property and sales tax bases and personal income "as a proxy for a multiplicity of local taxes and fees." That model was not developed for use in equalizing education funding; however, a similar model for measuring fiscal capacity for education was described in a 1989 TACIR staff paper. The first fully fleshed out education model was published the following year and was the basis of the current county model.[8] That 1990 publication contained the first exposition of a system-level model. Like the first attempt at a county model, the first system-level model was based solely on tax base data and included no measures of ability to pay, resident tax burden, or service responsibility.

The equation for the county model is included in Appendix E-1.

Problems with the County Model

Several problems with the current county model were described in TACIR's *User's Guide to Fiscal Capacity* (2004). They are listed at right. These issues were reviewed in preparation for development of the prototype, and staff identified several opportunities to improve specific components:

Local Revenue Component—inclusion of state-shared tax revenue used to fund schools. Based on a recent analysis by TACIR staff of state revenue sharing in Tennessee, some local governments use

[7] TACIR. 1988. *Fiscal Effort, Fiscal Capacity and Fiscal Disparities among Local Governments in Tennessee.*
[8] TACIR. 1990. *Fiscal Capacity of Public School Systems in Tennessee.*

revenues from state-shared taxes in place of higher local tax rates. To the extent that these revenues are unrestricted, this funding stream is interchangeable with local revenue, and it is treated as such. **TACIR staff's current work on fiscal capacity confirms that revenue from certain state-shared taxes is often used by local governments to fund schools and is a quite substantial source of revenue for some systems.** Many school systems report these revenues explicitly, often from sources other than the portion of the mixed drink tax that is earmarked for schools.[9] While the county model has always included general fund transfers—which may include revenue from state-shared taxes—in the local revenue component, it has never included state-shared tax revenues explicitly reported as used by cities and counties to fund their schools. This creates an inconsistency and an inequity between those systems that receive this revenue in general fund transfers and those that receive it directly.

General fund transfers are included in the revenue component of the current fiscal capacity model because they are often the sole source of revenue from cities. While it is impossible to determine the actual source of revenue for general fund transfers, by law, they must include the half of the mixed drink tax revenue that is earmarked for education, and they may include revenue from

[9] All public school systems in Tennessee must provide annual financial reports to the Department of Education. This data forms the basis of TACIR's current county fiscal capacity model and all alternatives evaluated by staff.

A number of issues arise with the current county model:

1. It is a county model used in a funding formula for school systems—twenty-eight Tennessee counties have more than one school system.
2. The most current data for the tax equivalent payments included in the property tax base factor are for 1995 and clearly out of date.
3. Revenue from state-shared taxes is used to fund some cities' general fund transfers and, therefore, is included for them, but the same source of revenue is not included for other school systems.
4. The income data used to measure taxpayer equity—per capita personal income—includes residents in group quarters, such as college dormitories and prisons, and 'outliers', residents with unusually high, atypical incomes.
5. The service burden factor should be reconsidered in light of changes that have made the BEP formula itself a better measure of the public schools' service burden.

A User's Guide to Fiscal Capacity in the Basic Education Program Formula TACIR 2004

unrestricted state-shared tax revenues as well. Given that the general fund transfers that are part of the revenue component of the fiscal capacity model include state-shared tax revenue, in order to ensure consistency across school systems in the prototype model, staff concluded that explicitly reported state-shared tax revenues used by local governments to fund schools must be included in the local revenue component.

Tax Base Component—inclusion of state-shared tax revenue available to fund schools; exclusion of outdated tax equivalent payments. Ideally, each revenue stream included in the local revenue component of any fiscal capacity model will have a corresponding revenue base in the tax base component so that the capacity to generate that revenue can be properly measured and accounted for. With state-shared tax revenues used by local governments for schools in the local revenue component, the revenue streams from which they are drawn should likewise be included as part of the local tax base component. The data is readily available; therefore, in order to ensure consistency between the local revenue and the tax base components of the model—as well as consistency across counties and school systems—revenue from state-shared taxes must be included along with taxable sales and property values as a tax base factor. Of course, state-shared revenues earmarked for other purposes, such as local roads, must be excluded.

Staff found no entirely satisfactory resolution to the other tax-base-component problem described in the *User's Guide*: the use of outdated tax equivalent payments (TEPs). These values are included in the property tax base for the county model because they represent the ability of local governments to raise revenue by leasing government-owned property to businesses. This is usually done in order to attract new or expanding businesses that might not be interested in locating in the area otherwise. Including the equivalent tax-base value of TEPs is desirable in order to achieve equity across jurisdictions, some of which may use TEPs and some of which may not. However, the most current data is from 1995, which no longer represents current economic bases. Therefore, these values were not included in the property tax bases in the system-level models.

"Ability to Pay" Component—minimizing bias in the county-area income measure by substituting median household income. Another problem described in the *User's Guide* is bias in the county-level measure of the ability to pay taxes, one of two taxpayer equity components in the current county model. The county model has historically used per capita personal income (PCI) to measure ability to pay. Personal income is a broad measure based mainly on administrative data sources, which means that they are related to place of work and must be adjusted to produce place of residence estimates. Estimates are produced annually and lag about two years (e.g., estimates for

2002 were not published until May 2004). PCI is a long-standing, highly regarded and widely used measure of individual wealth and ability to pay taxes; however, it presents two problems that led staff to recommend substituting median household income as the county-area measure of ability to pay taxes.

First, the U.S. Bureau of Economic Analysis (BEA) uses population figures from the U.S. Census Bureau that include residents in group quarters, such as college students and prison inmates, in the population numbers used to compute per capita income; therefore, the measure tends to underestimate what we would consider true per capita income for some counties. The BEA notes that this lower per capita income is not indicative of the economic well-being of most residents of the area or even the institutional populations themselves because some of them, such as college students, typically receive support from their families who may live in other areas. Work was already underway to estimate and control for that problem, but staff had not yet found a satisfactory and timely source of data for residents in group quarters.

Second, measures of per capita income can be heavily influenced by outliers, small numbers of residents with extraordinarily high income, especially in small counties. Similarly, the BEA warns that their income figures may be overstated for a particular area from time to time because of temporary conditions, such as major construction projects. The smaller the county, the larger

Revenue from state-shared taxes is widely used by local governments to fund Tennessee's 136 school systems.

How many school systems?

108 for the three-year period of 2001 through 2003.

How much revenue?

An average of $28.2 million total per year for 2001 through 2003.

From what sources?

Mostly TVA payments in lieu of taxes ($20.9 billion), but also the mixed drink tax, the beer tax and the Hall income tax.

Plus revenue from state-shared taxes can be used by cities to support the appropriations they make to fund their schools. That amount cannot be determined.

the effect. Such an effect was evident in sales tax receipts for Pickett County during the mid-1990s when a particularly large road project was under construction. It is not known whether or how that project affected per capita income for Pickett County, and it would not have been possible to determine how to adjust for it.

For these reasons, TACIR staff looked again for alternatives that might be more consistent across counties, and two were found: poverty rates and median household income. The U.S. Census Bureau produces both measures, which like PCI, are estimates. These measures became available for counties on an annual basis in 1995 and now have only a two-year time lag (e.g., estimates for 2003 will be published in November 2005). Unlike PCI, poverty rates and median household income are not derived from administrative data based on place of work, but rather come mainly from Census and IRS data that are based on residence. All are highly correlated (see Table 2). Neither of these measures is affected by group quarters or by extreme values in the population. Median household income was chosen because it represents the mid-point for all households and does not depend on poverty levels, which change from time to time and vary with household size. Moreover, it is more closely correlated to PCI than are poverty rates as shown in Table 2, which means its substitution for PCI will cause less of a change in the distribution of fiscal capacity estimates across counties than would poverty.

Service Burden Component—eliminating double counting between the fiscal capacity model and the BEP formula. As noted in the *User's Guide*, the county fiscal capacity model that has been used in the BEP formula was developed before that formula was adopted. Prior to the BEP,

Table 2. Correlation Coefficients for Alternative County-level Measures of Income and Poverty in Tennessee
Based on Most Current Three-year Averages

	Per Capita Personal Income *1999-2001*	Median Household Income *1998-2000*	Poverty Rate for All Ages *1998-2000*	Poverty Rate for Ages 5-17 *1998-2000*
Per Capita Personal Income	1.0000			
Median Household Income	0.8258	1.0000		
Poverty Rate for All Ages	(0.7341)	(0.8411)	1.0000	
Poverty Rate for Ages 5-17	(0.7087)	(0.8799)	0.9409	1.0000

there was widespread agreement that the state's funding formula for education was seriously inadequate. The county model was developed in this context, and it has always included a measure of the education service burden as a component. The service burden is the ratio of public school students to total county population. The number of students plays a broader role in the model, as well, in that both the revenue and the tax base values are divided by it as a way to ensure equity in terms of students.

Inclusion of the service burden variable in the fiscal capacity model used in the BEP formula has long been somewhat controversial because the same number of students is used in the BEP to generate total cost estimates. The BEP cost estimates are expressly and carefully designed to directly measure the education service burden for each school system. Increased funding is provided for students in costlier programs, such as special education and vocational instruction, as well as English language learners and a portion of 'at risk' students.

Arguably, including a service burden measure in the fiscal capacity model double counts the burden already accounted for by the BEP formula itself. With respect to this issue, the Comptroller's Office of Education Accountability noted in its 2003 report on the BEP formula that

> ***[t]he fiscal capacity index may at least partially "double-count" the effects of differing educational service burdens borne by counties.*** *One factor in the BEP's statistical estimation*

[T]he presence of a large institutional population—such as that of a college or a prison—will tend to keep the per capita personal income of an area at a lower level because the residents of these institutions have little income attributable to them at these institutions.

This lower per capita personal income is not indicative of the economic well–being of most of the residents of the area

(or, in some cases, of the institutional populations, because some of these populations, such as college students, typically receive support from their families living in other areas).

http://www.bea.doc.gov/bea/regional/articles/lapi2001/technote.cfm

> *of fiscal capacity is the number of students per capita in the county. Taxpayers in counties with relatively high numbers of students must spend more on educational services than those in counties with relatively low numbers of students. This factor was included in the model to represent differences in educational service burdens. However, the BEP accounts in other ways for differences in the education services school systems must provide. The formula generates dollars for most components based on the number of students in a system, and some components (K-3 at risk, ELL, special education) provide additional dollars based on the number of students with particular needs. Thus, it may be redundant to include the number of students in the county as part of the fiscal capacity estimation. Removing the students-per-capita variable from the statistical estimation of fiscal capacity would tend to shift local responsibility for the BEP away from the larger LEAs.* Funding Public Schools: Is the BEP Adequate? *(OREA 2003)*

The OREA report went on to suggest removing the service burden factor from the fiscal capacity model.[10] If all of the principles adopted by the Governor's Task Force were incorporated in the BEP, then the BEP formula itself would become an even more comprehensive measure of education service burden, raising even more questions about inclusion of an education-service-burden component in the fiscal capacity model. If, on the other hand, the BEP does not adequately meet the need, for example, of disadvantaged students, then the fiscal capacity model should include a factor that captures the effort of local governments to meet that need on their own.

Ideally, all need factors would be fully accounted for in the main education funding formula, and equalization of the local matching requirement would be based solely on differences in ability to pay for education. The two complementary functions of determining how much money is needed and determining where those funds should come from should be kept separate in order to ensure that each is properly calculated and neither is influenced by the other. But if the funding formula itself does not adequately account for differences in need, then it is difficult to ensure equity across school systems without incorporating some measure for determining the effect of that inadequacy on local revenue into the fiscal capacity formula.

The current BEP formula has a component to generate funds for 20% of students in the federally funded Free or Reduced-price Lunch Program. Aside from this component, the cost of programs for these

[10] The report also suggested inclusion of a factor to measure the non-education service burden on local taxpayers, but no such factor has ever been developed. The research team that worked on the system-level models was unable to identify a source or sources of data for an acceptable measure despite considerable effort to do so. While there is general agreement that such a factor should be included, no one has identified one. This remains an unresolved issue with respect to both the county and the system-level models.

students is paid entirely out of local funds with limited supplemental support through the federal Title 1 program. Such local funds are less an indicator of fiscal capacity and more an indicator of need. In the absence of direct provision in the BEP for that need, the fiscal capacity model needs a factor to measure revenue currently raised locally for that purpose so that that revenue can be factored out of fiscal capacity. A satisfactory method for doing this has not yet been found.

Figure 1. Tennessee's Unique Challenge
How to Handle Disparate Fiscal Entities in a Single Model

- **Measuring fiscal capacity for Tennessee's 136 school systems presents**

  Two Significant Challenges
  different authority to tax and raise revenue
  different fiscal relationships among systems

- **County Governments***
  - Must levy county-wide tax for schools if operating a county system
    - May tax property
    - May tax sales
    - May tax other activities or items (e.g., wheel tax)
  - Must share school taxes with other systems in county
  - May use revenue from state-shared taxes for schools without sharing

- **City Governments**
  - May make general fund transfers for schools or establish school tax rates
    - May tax property
    - May tax sales
    - May tax other activities or items
  - Not required to share school funds with any other system
  - May use revenue from state-shared taxes for schools without sharing
  - Receive share of county governments' school revenue

- **Special School Districts**
  - May only tax property
  - Need not share school funds with any other system
  - Receive share of county governments' school revenue

**County governments are not required to operate schools (if all students in the county can attend a city system or special school district), but if they do so, must establish education taxes for them.*

Meeting the Challenges of Producing a System-level Fiscal Capacity Model

TACIR staff, working with staff from the Office of the Comptroller and other consultants to develop a model for Governor Bredesen's Task Force on Teacher Pay, considered a wide range of models. They began by reviewing the actual statutory funding scheme for Tennessee schools with special attention to funding sources available to local governments and restrictions placed on them. The objectives for all models were

- first, to account for major statutory sources and any restrictions placed on them,
- second, to mirror the collective behavior of local officials in allocating funds for schools,
- third, to account for equity factors affecting local tax rates, and
- fourth, to resolve as many of the issues raised with respect to the county model as possible.

Two basic methods were identified: the regression-based approach used for the current county model, which includes factors designed to meet all four objectives, and a simpler approach based solely on revenue sources and average rates, which addresses only the first two. This latter approach does not meet the third and fourth objectives, but was evaluated because of its relative simplicity and similarity to methods used in other states.

Prior efforts to develop a system-level model focused on two-tier models with the county model as tier one in order to preserve the advantages and the integrity of the county model. The second tier divided the results of the county model among the systems within multi-system counties. Two-tier models are based on the assumption that the local economies of sub-county systems have no effect beyond county boundaries, an assumption that does not withstand scrutiny. This was one of the limitations of the previous system-level models. Nevertheless, the research team working to develop a prototype for the Task Force evaluated both one-tier and two-tier models, but found that the two-tier models also had the disadvantage of producing more extreme reallocations within the multi-system counties than those produced by the one-tier models. The results of alternative models are presented in Appendix E-4.

Other states' methods were reviewed, but no state has a comparable system for funding public schools at the local level. Most states have a single type of school system, typically all county systems or all special school districts. Many states that appear to have a mix of system types, on closer inspection, have only one type in terms of funding. No state has the interrelated system of local funding that Tennessee has in its multi-system counties. (See Appendix F.)

Matching Data in the Model to School Systems' Tax Structures—

Understanding Shared and Unshared Revenue

Tennessee has three distinct types of school systems–city, county, and special school district–each type with its own unique tax structure. See Figure 1 on page 27. All school systems receive revenue from county tax bases because of a provision in the law that requires counties to share all school funds collected by the county with all other systems within the county based on the number of students attending each system (see Tennessee Code Annotated §49-3-315).[11] City school systems receive those county funds plus revenue or appropriations from city taxes or fees, which are not subject to sharing requirements. The third type of system, special school districts, also receives shared funds from the county plus revenue from their own property taxes as authorized by the state legislature, which are not subject to sharing requirements. In addition, cities and counties receive revenue from state-shared taxes, which are not subject to the sharing requirement that applies to county imposed taxes. These primary revenue sources are summarized in Figure 2.

Each school system relies more or less heavily on each source of revenue, except counties, which do not have the ability to tax property or sales to support their schools without sharing the proceeds with other

All school funds for current operation and maintenance purposes collected by any county, except the funds raised by any local special student transportation tax levy as authorized in this subsection, shall be apportioned by the county trustee among the [school systems] therein on the basis of the [weighted full-time equivalent average daily attendance] maintained by each, during the current school year.

Tennessee Code Annotated §49-3-315(a)

[11] Except in very limited circumstances (i.e., to support countywide transportation fund or to repay rural education debt).

Figure 2. Sources of Shared and Unshared Revenue by Type of School System

Revenue Source	County School Systems	City School Systems	Special School Districts
Taxable Property			
♦ Shared	Yes—retain portion of county taxes based on share of WFTEADA*	Yes—receive from county based on share of WFTEADA*	Yes—receive from county based on share of WFTEADA*
♦ Unshared	No—county revenue for education must be shared[12]	Yes—at individual city's discretion or through general fund transfer	Yes—based on rate established by legislature
Taxable Sales			
♦ Shared	Yes—retain portion of county taxes based on share of WFTEADA*	Yes—receive from county based on share of WFTEADA*	Yes—receive from county based on share of WFTEADA*
♦ Unshared	No—county revenue for education must be shared[12]	Yes—at individual city's discretion or through general fund transfer	No—not authorized by legislature
State-shared Tax Revenue	Yes—no sharing requirement	Yes—no sharing requirement	No—not eligible to receive

*Weighted full-time equivalent average daily attendance, a count of students weighted according to grade levels and programs (special education and vocational education).

systems in the same county[12], and special school districts, which cannot tax sales. In order to reflect those differences and account for the disparate tax structures of the three types of systems, a system-level model must include a separate factor for each of these five separate funding sources regardless of whether a regression approach or an average rate approach is used.

All systems receive funding from the shared county education taxes, and all systems in the same county receive exactly the same amount of funding per student from each of those taxes; therefore, the model includes county tax base values for every system, and those values are the same for all systems in the same county.[13] In contrast, each system has a unique value for the unshared funding sources based on its own unique revenue base, and systems that do not have access to any particular unshared source will have a zero for that factor. ***These zeros are neither missing values nor are they assigned. They are the actual value of that tax base to the system.***

[12] Except in very limited circumstances (i.e., to support a countywide transportation fund or to repay rural education debt).

[13] County values are adjusted for systems that cross county lines and for which the Department of Education collects county-based student counts (weighted full-time equivalent average daily attendance, which is the measure used to allocate county education revenue among systems in multi-system counties). Other systems may cross county lines, but if they do not report these figures to the Department of Education, they cannot be used to weight those systems county variables.

Alternative Sub-county Models—
Choosing an Approach

The Average Rate Approach

Past sub-county prototypes have taken an average-tax-rate approach to creating a representative-tax-system model based on revenue and tax base data.[14] This approach, sometimes referred to as an algebraic approach, requires matching particular revenue collections to specific revenue bases in order to compute average rates. The average rates are then applied to the revenue base values for each school system. The only readily available revenue base data that can be matched to specific local education revenues in Tennessee are property, sales, and state-shared taxes.

The average rate approach seems straightforward at first because these tax bases generate most of the local revenue for public schools, but it presents several problems to which no satisfactory solutions were found:

- Calculating average rates for school systems is challenging because the majority of cities use general fund transfers to fund their schools and do not identify the source of the revenues transferred (e.g., property tax base, sales tax base, state-shared tax revenues).
- Accounting for taxpayer equity is impossible in this type of model

The average tax rate approach is based on the representative tax system (RTS) developed in 1960 by the U.S. Advisory Commission on Intergovernmental Relations for evaluating the tax capacity of states:

> Average rates are derived separately from actual revenues relative to the corresponding tax bases, incurring the deficiencies of ignoring the interconnectedness of different rates and bases, as well as elements that are altogether missing.
>
> The defense of this procedure is that it comprehensively disaggregates the taxable resources of a jurisdiction into tax bases as typically defined by all jurisdictions and makes a modest, uncomplicated assumption about the significance of the base for revenue-raising capacity.

Federal-State-Local Fiscal Relations: Report to the President and the Congress (U.S. Department of the Treasury 1985)

[14] See Appendix E-4 for descriptions and results of past models.

because there is no effective or objective way to determine how much weight to give factors that measure tax burden or ability to pay to appropriately balance the tax base values against the tax equity variables without using some kind of statistical process.

- Likewise, it is impossible to adjust for the service burden that is not accounted for directly in the BEP formula without using a statistical process to determine the appropriate weight to be given to such a variable.

The average rate approach includes all of the revenues shown in Figure 2 on page 30. All school systems have values for the revenues that are raised by counties and shared. The amount of revenue attributable to each system is the statewide average tax rate multiplied by the county tax base. In multi-system counties, the product of this calculation is divided among the systems using the same student counts that are used to divide actual local revenue among them.

In addition to these shared amounts, each system also has values for its own, unshared revenues. These values are calculated in the same manner: the average tax rate (or usage rate in the case of state-shared tax revenues) is multiplied by the system's own tax base (or the amount of state-shared taxes available to it).

The average rate in each case is based on actual revenues used to fund local schools divided by the base to which they are applied. This calculation is straightforward when applied to county and special school district revenues because these amounts are included in the annual financial reports submitted by school systems to the Department of Education.

One of the difficulties with the average rate approach is deriving rates for city revenues. Cities often use general fund transfers instead of identifying discrete sources of revenue for schools. The real sources are impossible to determine. Money is fungible: one dollar in the general fund is indistinguishable from any other; the source is impossible to track.

Making the average rate approach work requires making assumptions about where the money for general fund transfers comes from. TACIR staff and consultants chose to assume that the few cities that reported discrete sources of revenue (sales taxes, property taxes and state-shared taxes) were typical. This sounds simple, but because cities use every conceivable combination of general fund transfers and specific revenues to fund their schools, the calculations were actually very complex. Developing average rates involved assuming that

1. if a city used only general fund transfers to supplement the funds it received from the county, then those transfers were supported by all three major types of revenue available to it: property taxes, sales taxes, and revenue from state-shared taxes; but

2. if a city used general fund transfers, but reported specific amounts from one or more of the three major sources, then the transfers were supported by the remaining sources; and
3. in either case, the cities making general fund transfers used the revenues available to them at the same rates as cities reporting those revenues explicitly.

The difficulty with these assumptions is that so few cities report specific revenues by source that it cannot be said with confidence that the rate at which they use those sources is typical. Rates based on these assumptions are shown in Table 3.

With few exceptions, the average rate approach produced fiscal capacity values for cities and special school districts that were larger than those produced by the regression-based prototype, which heightened concern about the importance of these three issues. Given that most cities use transfers rather than specific tax rates to fund schools, is it really possible to calculate accurate tax rates? Similarly, is it possible to weight county versus city versus special school district revenue sources appropriately without a statistical approach? And how does the absence of any measure of taxpayer equity bias the results of this approach? The results indicate that it may.

Results from the average rate model by school system are included in Table 4. Fifty-seven systems would see their state funding decrease, and seventy-nine systems would see their funding increase compared to the prior year based on the two years in this comparison. The cost of holding the systems harmless for the decreases in funding would be $75 million. As we shall see, the regression-based model is more favorable to more school systems and less costly to implement.

Table 3. Average Rates Based on Actual Revenue by Source

Source of Revenue	Average Effective Tax Rate
Shared Revenue from County Sales Taxes	1.40%
Shared Revenue from County Property Taxes	$1.35 *per $100 assessed value*
Unshared Revenue from Sales Taxes (Cities Only)	0.29%
Unshared Revenue from Property Taxes	
◆ City School Systems	$0.75 *per $100 assessed value*
◆ Special School Districts	$0.66 *per $100 assessed value*
Unshared Revenue from State-shared Taxes	
◆ County School Systems	31.51% *of amount available*
◆ City School Systems	0.33% *of amount available*

Table 4. One-year Change in State Funding with System-level Average-Tax-Rate Model
2004-05 and 2005-06 School Years

System Name	2004-05 State Funding	2005-06 BEP State Funding w/ATR Model	Increases	Decreases
Anderson County	$22,233,000	$25,219,000	$2,986,000	
Clinton City	3,024,000	2,093,000		(931,000)
Oak Ridge City	13,781,000	11,430,000		(2,351,000)
Bedford County	23,181,000	25,473,000	2,292,000	
Benton County	8,699,000	9,277,000	578,000	
Bledsoe County	8,227,000	8,170,000		(57,000)
Blount County	33,372,000	36,069,000	2,697,000	
Alcoa City	3,794,000	1,451,000		(2,343,000)
Maryville City	13,353,000	10,297,000		(3,056,000)
Bradley County	26,795,000	29,929,000	3,134,000	
Cleveland City	12,707,000	9,476,000		(3,231,000)
Campbell County	22,436,000	22,531,000	95,000	
Cannon County	8,512,000	8,708,000	196,000	
Carroll County	1,492,000	1,782,000	290,000	
H Rock-Bruceton SSD	2,658,000	2,787,000	129,000	
Huntingdon SSD	4,528,000	4,388,000		(140,000)
McKenzie SSD	4,575,000	4,707,000	132,000	
South Carroll Co SSD	1,551,000	1,579,000	28,000	
West Carroll Co SSD	3,861,000	3,855,000		(6,000)
Carter County	22,335,000	24,461,000	2,126,000	
Elizabethton City	7,307,000	6,063,000		(1,244,000)
Cheatham County	24,900,000	26,082,000	1,182,000	
Chester County	9,299,000	9,640,000	341,000	
Claiborne County	18,239,000	19,198,000	959,000	
Clay County	4,994,000	4,997,000	3,000	
Cocke County	16,909,000	18,069,000	1,160,000	
Newport City	2,395,000	1,538,000		(857,000)
Coffee County	12,554,000	14,809,000	2,255,000	
Manchester City	3,827,000	3,491,000		(336,000)
Tullahoma City	10,509,000	9,603,000		(906,000)
Crockett County	6,775,000	7,032,000	257,000	
Alamo City	1,898,000	1,864,000		(34,000)
Bells City	1,586,000	1,617,000	31,000	
Cumberland County	22,420,000	20,608,000		(1,812,000)
Davidson County	140,628,000	153,789,000	13,161,000	
Decatur County	5,628,000	5,856,000	228,000	
DeKalb County	9,352,000	9,047,000		(305,000)
Dickson County	25,905,000	26,790,000	885,000	
Dyer County	10,741,000	12,476,000	1,735,000	
Dyersburg City	10,707,000	9,532,000		(1,175,000)
Fayette County	12,432,000	11,204,000		(1,228,000)
Fentress County	8,809,000	9,316,000	507,000	
Franklin County	20,748,000	21,088,000	340,000	
Humboldt City	5,354,000	4,834,000		(520,000)
Milan SSD	6,828,000	6,792,000		(36,000)

Table 4. One-year Change in State Funding with System-level Average-Tax-Rate Model
2004-05 and 2005-06 School Years (cont.)

System Name	2004-05 State Funding	2005-06 BEP State Funding w/ATR Model	Increases	Decreases
Trenton SSD	4,887,000	4,900,000	13,000	
Bradford SSD	2,206,000	2,222,000	16,000	
Gibson County SSD	9,078,000	9,200,000	122,000	
Giles County	13,755,000	16,001,000	2,246,000	
Grainger County	13,734,000	14,031,000	297,000	
Greene County	23,037,000	24,978,000	1,941,000	
Greeneville City	9,081,000	6,684,000		(2,397,000)
Grundy County	9,353,000	10,210,000	857,000	
Hamblen County	25,229,000	28,343,000	3,114,000	
Hamilton County	83,241,000	96,474,000	13,233,000	
Hancock County	4,819,000	4,620,000		(199,000)
Hardeman County	18,342,000	18,173,000		(169,000)
Hardin County	12,299,000	12,107,000		(192,000)
Hawkins County	26,354,000	28,433,000	2,079,000	
Rogersville City	2,236,000	1,557,000		(679,000)
Haywood County	13,247,000	13,281,000	34,000	
Henderson County	11,717,000	13,134,000	1,417,000	
Lexington City	3,576,000	2,781,000		(795,000)
Henry County	10,054,000	10,609,000	555,000	
Paris SSD	4,731,000	4,601,000		(130,000)
Hickman County	15,623,000	15,741,000	118,000	
Houston County	6,059,000	6,036,000		(23,000)
Humphreys County	10,503,000	10,642,000	139,000	
Jackson County	6,759,000	6,816,000	57,000	
Jefferson County	24,995,000	24,534,000		(461,000)
Johnson County	9,758,000	9,269,000		(489,000)
Knox County	109,940,000	127,008,000	17,068,000	
Lake County	3,830,000	3,628,000		(202,000)
Lauderdale County	17,809,000	18,276,000	467,000	
Lawrence County	22,832,000	24,987,000	2,155,000	
Lewis County	7,584,000	7,410,000		(174,000)
Lincoln County	13,806,000	14,791,000	985,000	
Fayetteville City	3,463,000	2,600,000		(863,000)
Loudon County	15,458,000	15,071,000		(387,000)
Lenoir City	6,380,000	5,319,000		(1,061,000)
McMinn County	18,199,000	18,084,000		(115,000)
Athens City	5,369,000	3,314,000		(2,055,000)
Etowah City	1,341,000	1,149,000		(192,000)
McNairy County	14,766,000	16,190,000	1,424,000	
Macon County	13,642,000	14,464,000	822,000	
Madison County	33,478,000	38,845,000	5,367,000	
Marion County	14,117,000	14,360,000	243,000	
Richard City SSD	1,200,000	1,141,000		(59,000)
Marshall County	15,089,000	16,825,000	1,736,000	
Maury County	35,688,000	39,429,000	3,741,000	

Table 4. One-year Change in State Funding with System-level Average-Tax-Rate Model
2004-05 and 2005-06 School Years (cont.)

System Name	2004-05 State Funding	2005-06 BEP State Funding w/ATR Model	Increases	Decreases
Meigs County	7,890,000	7,354,000		(536,000)
Monroe County	18,666,000	18,676,000	10,000	
Sweetwater City	5,182,000	4,312,000		(870,000)
Montgomery County	76,527,000	92,872,000	16,345,000	
Moore County	3,847,000	3,628,000		(219,000)
Morgan County	13,858,000	14,021,000	163,000	
Obion County	12,498,000	14,203,000	1,705,000	
Union City	4,354,000	3,527,000		(827,000)
Overton County	13,057,000	13,459,000	402,000	
Perry County	4,570,000	4,507,000		(63,000)
Pickett County	2,923,000	2,735,000		(188,000)
Polk County	9,743,000	9,705,000		(38,000)
Putnam County	27,547,000	30,158,000	2,611,000	
Rhea County	13,935,000	14,317,000	382,000	
Dayton City	2,533,000	1,669,000		(864,000)
Roane County	25,766,000	25,940,000	174,000	
Robertson County	33,048,000	35,648,000	2,600,000	
Rutherford County	84,520,000	101,350,000	16,830,000	
Murfreesboro City	17,745,000	9,615,000		(8,130,000)
Scott County	9,931,000	10,684,000	753,000	
Oneida SSD	4,715,000	4,765,000	50,000	
Sequatchie County	7,874,000	7,923,000	49,000	
Sevier County	29,317,000	21,558,000		(7,759,000)
Shelby County	122,229,000	156,746,000	34,517,000	
Memphis SSD City	330,341,000	357,321,000	26,980,000	
Smith County	11,079,000	12,127,000	1,048,000	
Stewart County	8,681,000	8,203,000		(478,000)
Sullivan County	33,728,000	35,982,000	2,254,000	
Bristol City	9,592,000	7,547,000		(2,045,000)
Kingsport City	16,621,000	9,865,000		(6,756,000)
Sumner County	78,163,000	84,395,000	6,232,000	
Tipton County	43,576,000	45,416,000	1,840,000	
Trousdale County	5,656,000	5,881,000	225,000	
Unicoi County	9,255,000	9,769,000	514,000	
Union County	13,569,000	13,283,000		(286,000)
Van Buren County	3,676,000	3,447,000		(229,000)
Warren County	19,736,000	21,488,000	1,752,000	
Washington County	23,141,000	24,901,000	1,760,000	
Johnson City	18,061,000	9,643,000		(8,418,000)
Wayne County	10,827,000	10,476,000		(351,000)
Weakley County	16,485,000	17,706,000	1,221,000	
White County	14,431,000	14,863,000	432,000	
Williamson County	54,739,000	67,208,000	12,469,000	
Franklin SSD	10,083,000	6,501,000		(3,582,000)
Wilson County	37,514,000	39,970,000	2,456,000	
Lebanon SSD	9,421,000	7,311,000		(2,110,000)
Statewide	**$2,701,172,000**	**$2,859,960,000**	**$233,747,000**	**($74,959,000)**

The Regression-based Approach

The main reason all previous system-level models used an average tax rate approach despite its deficiencies instead of the method used to produce the current county model is that there was no system-level measure of taxpayer equity. Without a measure of taxpayer equity, there is little reason to consider the statistical approach, but there is also no way to adjust for individuals' or households' ability to pay taxes. Fortunately, the U.S. Census Bureau now produces annual poverty estimates for school districts, which can be used as a proxy for taxpayer well-being. This data makes a system-level model that, like the current county model, includes ability to pay as a measure of taxpayer equity possible. And as in the county model, inclusion of taxpayer equity in the system-level model requires a statistical formula, which based on the results, appears to be an advantage.

Measuring Ability to Pay at the System Level—child poverty rates for Title 1. The primary impediment to using the modified representative tax system approach, the current county method, at the school system level has been the lack of a suitable system-level measure of ability to pay. **Neither per capita income nor median household income has ever been available for Tennessee school districts, and it is not likely that either will become available.** Searching for a substitute, TACIR staff worked with the Comptroller's staff to develop a process for creating an income data set for school systems using geographic information system (GIS) technology and income data made available by the IRS to the Department of Revenue. However, because of the lack of staff resources, confidentiality concerns, and the difficulty of matching taxpayer addresses to school district boundaries, staff eventually determined that such a process was neither practical on an annual basis nor sufficiently reliable.

Interest in a system-level model intensified as state policy makers began seeking a solution to the October 2002 ruling by the Tennessee Supreme Court in the Small Systems Lawsuit. Anticipating the need for an improved model, TACIR staff renewed the search for a system-level measure of ability to pay. Since the last major effort by staff to update the prototype model, the U.S. Census Bureau had produced a third year of school district poverty data for use by the U.S. Department of Education in allocating funds under Title 1 of the Elementary and Secondary Education Act (recently reauthorized and called No Child Left Behind). This data is developed by the same office that produces county-level median household income and poverty data—the Census Bureau's Housing and Household Economics Statistics Division, Small Area Estimates Branch—and is a comparable measure of household wealth in that it is based on a broad definition of income and a similar estimation process. Child poverty is highly correlated with median household income at the county level (see Table 2 on page 24), which indicates that it is a reasonable measure of

ability to pay. For more information about the child poverty estimates, see Appendix G.

When system-level child poverty rates are included in a modified representative tax system model along with county median household income, the poverty rates function as a measure of ability to pay at the system level. Inclusion of district poverty rates works in this manner because poverty rates are based on income levels. **Higher poverty rates indicate lower income for families living within a district's boundaries; lower rates indicate higher incomes.** This is demonstrated at the county level by the relatively high inverse correlation coefficient (-0.8622) for child poverty and median household income.

Estimates are available on an annual basis beginning with 1999 and have a two-year time lag (estimates for 2003 will be published in November 2005). The availability of three-year averages has finally made it possible to adequately account for taxpayer equity in a system level model.

Figure 3. OVERVIEW—Prototype Model versus Current Model

Variables	Current Model	New Model
Local Revenue	Does not include state-shared tax revenue except in City General Fund Transfers	Includes state-shared tax revenues used to fund all school systems
Property per Pupil	County area	County area & school systems
Sales per Pupil	County area	County area & school systems
State-shared Tax Revenue per Pupil	Does not include	Includes state-shared tax revenues available to fund school systems
Ability to Pay	County-area Per Capita Income	■ County-area Median Household Income ■ System Child Poverty Rate
Resident Tax Burden/Tax Exportability	County-area residential & farm assessment divided by total assessment	Business-related[15] assessment divided by total assessment for ■ County-area ■ School systems
Service Burden	Public school students (ADM) divided by population	Omitted to eliminate redundancy with BEP itself, which directly funds higher service burdens

[15] Commercial, industrial, utility, and personal property.

Constructing the Prototype System-level Fiscal Capacity Model

With these issues resolved and appropriate data sources identified, it is possible to construct a system-level model that applies the same basic modified representative-tax-system approach to account for student and taxpayer equity. This model includes the following components and factors:

- Local Revenue, measured by own-source revenue per pupil
- Tax Base, a measure of pupil equity based on three revenue sources:
  - *local taxable sales per pupil*
  - *equalized assessed property valuation per pupil*
  - *state-shared tax revenues per pupil*
- Ability to Pay, a measure of taxpayer equity based on two income measures:
  - *median household income*
  - *child poverty rates, which are based on income levels*
- Tax Exportability, a measure of taxpayer equity based on the ratio of business-related property[16] assessments to total assessments—the theory behind this component

Citizens subject to very different fiscal systems fall prey to this circumstance:

> Individuals in different taxing jurisdictions but at the same income level paying about the same in taxes could receive widely disparate public services. The two causes of this 'horizontal inequity' are
>
> - divergent per capita incomes of individual residents and
> - geographically divergent abilities of governments to export tax burdens.

Measuring State Fiscal Capacity (ACIR 1987)

[16] Commercial, industrial, utility, and personal property.

is that by selling products and services to non-residents, businesses can export the cost of the taxes they pay local governments

- *for all systems, county-area ratios representing the shared tax base*
- *for all cities and special school districts, system-level ratios representing their unshared tax bases (county systems have no unshared tax base and, therefore, have zeros for this factor)*

The prototype model uses tax exportability ratios in place of the tax burden ratio used in the county model. These concepts are opposite sides of the same coin: the resident tax burden ratio is the percentage of the property tax base that is residential or agricultural; the exportability ratio is the percentage attributable to businesses, including commercial, industrial and utility property and businesses' taxable personal property. Together these ratios equal 100% of the property tax base. They are essentially two ways of describing one phenomenon, one focused on the portion of local taxes paid by local residents and the other focused on the portion of local taxes paid by non-residents. The prototype uses the exportability ratio in order to place the county systems on the correct end of the scale for the ratio based on the unshared tax base.

- All school systems have ratios greater than zero for the exportability ratio that is based on the shared tax base; each one is based on the county area property tax base for the county in which the system is located.
- All city systems and special school districts have ratios greater than zero for the exportability ratio that is based on their unshared tax bases. County systems have zeros for this variable because they have no unshared tax base.

Figure 4. Summary of Differences between Current Prototype Models

- Provides system-level fiscal capacity for use in equalizing system-level funding formula
- Retains regression-based modified representative tax system approach
- Retains and enhances pupil and taxpayer equity measures
  - Tax base variables include state-shared tax revenue available to fund school systems
  - Per Capita Income replaced by
    - ✓ *Median Household Income for county area—eliminates problem of group quarters and outliers in smaller counties*
    - ✓ *Child Poverty Rate for school systems—only income-related data available at that level*
- Remains a fiscal behavioral model—does not set normative standards for local revenue
- Own-source revenue includes state-shared tax revenue used to fund school systems
    - ✓ *More comprehensive—state-shared tax revenue substitutes for local revenues*
    - ✓ *Improves data integrity—state-shared tax revenue cannot be separated out of city general fund transfers*
- Service Burden (public school students divided by population) omitted*

**The measure used in current county model criticized as redundant: the BEP formula itself provides additional funds for higher service burdens based on number of students and differences in the cost of programs provided to different groups of students (e.g., special education, vocational instruction, English Language learners and a portion of 'at risk' students). See discussion beginning on page 24.*

Structure of the Prototype Model

The system-level model uses nine independent variables to measure these components and factors and to predict fiscal capacity based on their relationship to the dependent variable, local revenue, as indicated in Figure 5.

- Each system has its own unique, own-source revenue per student. This factor includes all local sources of current revenue, including the general fund transfers commonly used by cities to fund their systems and the state-shared tax revenue explicitly reported as used to fund schools.
- Systems in the same county have exactly the same values for the four factors related to shared revenue sources, including county property and sales tax bases per student and the ability to pay and tax exportability variables related to those tax bases. Use of the same values for each system within a county reflects the sharing requirement imposed on the use by counties of revenue from these tax bases.
- Every system has unique values for the other five factors, those related to unshared revenue sources, including city and special school district property tax bases, city sales tax bases, state-shared tax revenues, school district child poverty rates, and tax exportability ratios for cities and special school districts. Use of these unique

Figure 5. Prototype System Fiscal Capacity Model Components and Factors

Components	Factors	Variables: County Area	Variables: School System
Local Revenue	Own-source Revenue per Pupil		☑
Tax Base (Pupil Equity)	▪ Taxable Sales per Pupil	☑	☑
	▪ Property per Pupil	☑	☑
	▪ State-shared Taxes per Pupil		☑
Ability to Pay (Taxpayer Equity)	▪ Median Household Income	☑	
	▪ Child Poverty Rate		☑
Tax Burden/Exportability (Taxpayer Equity)	Ratio of Business-related[17] Assessment to Total Assessment	☑	☑

[17] Commercial, industrial, utility, and personal property.

values for each system within a county reflects the fact that revenue from these sources is not subject to the sharing requirement imposed on counties.

Values for the Factors in the Prototype Model

All systems have values greater than zero for the county property and sales tax bases, the revenues from which must be shared among all school systems in the county. Whether they have values greater than zero for the system-level data elements depends on whether their funding bodies can tax that base (or in the case of state-shared taxes, is eligible to receive those revenues) and whether they can retain the revenue for their own systems (i.e., state law does not require that the funding body share the revenue with any other school system) as indicated in Figures 5 and 6 and as shown in Table 5. As noted previously, ***zeros are not assigned and do not represent missing values, but rather the actual value of the tax base to the systems that cannot tax it.***

The model includes county-area median household income for all systems as a measure of the ability to pay shared county education taxes and the system-level child poverty rate as a separate measure of ability to pay the system's unshared taxes. Finally, every school system has a value greater than zero for the tax exportability ratio based on the county-area shared tax base, and cities

Every school system has a value greater than zero for the county-area shared tax bases and the tax exportability ratio based on them.

In addition, cities and special school districts have values greater than zero for the bases they can tax without sharing the proceeds and the tax exportability variable based on them.

County school systems have zeros for these variables because they cannot levy taxes without sharing them; their tax rates for these variables are effectively zero.

Table 5. Volunteer County Example*

Fiscal Capacity Measurement	School Systems in Volunteer County		
	Volunteer County	Polk City	Best SSD
Revenue per Pupil	$1,617	$2,669	$1,919
Shared Property per Pupil	$86,645	$866,453	$86,645
Unshared Property per Pupil	$0	$125,537	$84,197
Shared Taxable Sales per Pupil	$40,258	$40,258	$40,258
Unshared Taxable Sales per Pupil	$0	$129,067	$0
State-shared Tax Revenue per Pupil	$169	$572	$0
Shared Tax Exportability Ratio	34.08%	34.08%	34.08%
Unshared Tax Exportability Ratio	0.00%	60.91%	38.19%
County Median Household Income	$33,066	$33,066	$33,066
System Child Poverty Rate	17.45%	21.06%	17.22%
System-level Fiscal Capacity per Pupil	$1,614	$2,458	$2,048
Old County-area Fiscal Capacity	$1,635	$1,635	$1,635

* Based on averages for each type of school system.

and special school districts have values greater than zero for the tax exportability variable based on their unshared tax bases. As with the tax base factors, whether a system has a value greater than zero for the system-level measure of tax exportability depends on whether the system has a tax base that generates unshared revenues. Therefore, county school systems have zeros for this system-level factor.

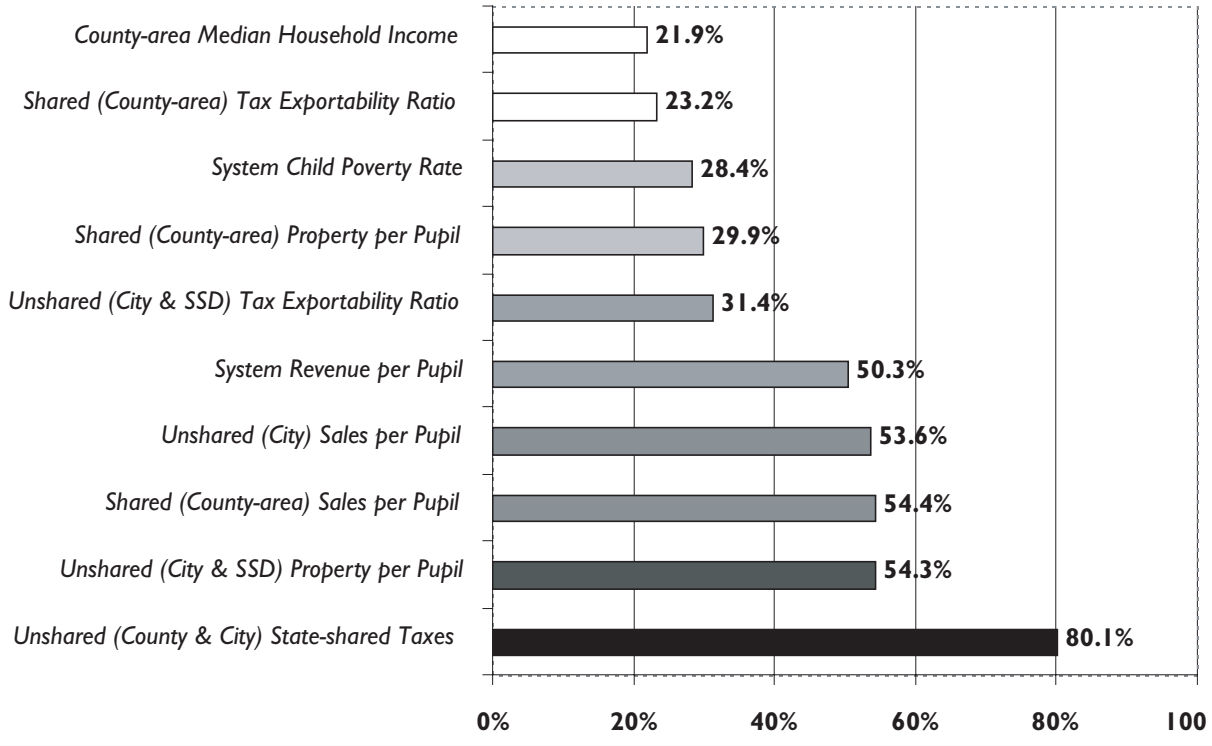
Comparing the Variability of the Factors. The factors that go into fiscal capacity vary considerably across school systems, and understanding that variability is essential to constructing and understanding the fiscal capacity model. One measure that can be used to compare how much the different factors used in the fiscal capacity model vary across school systems is called the coefficient of variation. This coefficient compares two figures computed from the values for each factor: the average of the values for all school systems and the average difference between the value for each school and the average of all of them. Dividing the average difference by the average of the values for each produces percentages that make it possible to compare the variability in the factors. Only systems with values greater than zero are included in this calculation.

Figure 6 is a graph of the coefficient of variation for each of the factors used in the model to measure fiscal capacity—the longer the bar, the more the factor varies across the state. The factor that varies the most is state-shared tax revenue per student. This is the case even though special school districts, which do not receive state-shared tax revenue, are not included in the calculation. The extreme variability is the

result of the different formulas used to distribute each revenue stream. This revenue source for schools includes TVA payments in lieu of taxes, which are concentrated in the areas where TVA owns land. The factor that varies the least is county-area median household income. The coefficient of variation for actual revenue per student is 50.3%, which means the amount of variation in that factor is closest to the amount of variation in unshared (city and special school district) taxable property per student and unshared (city) and shared (county area) taxable sales per pupil. A similar degree of variation does not necessarily mean a similar distribution pattern. For that, we need a different statistical measure, one called a correlation coefficient.

Comparing the Distribution Pattern of the Factors. The variability of the factors is only one aspect that affects the weight given to them by the regression process. Another aspect determining their weight is how well the pattern of their variability follows the pattern of the factor the regression model is designed to predict or estimate: local revenue per pupil. One measure of the degree to which one factor follows the variability of another is the correlation coefficient. The coefficient can be positive—indicating that as one factor increases, so does the other—or negative—indicating

Figure 6. Relative Dispersion of Fiscal Capacity Factors—Coefficient of Variation

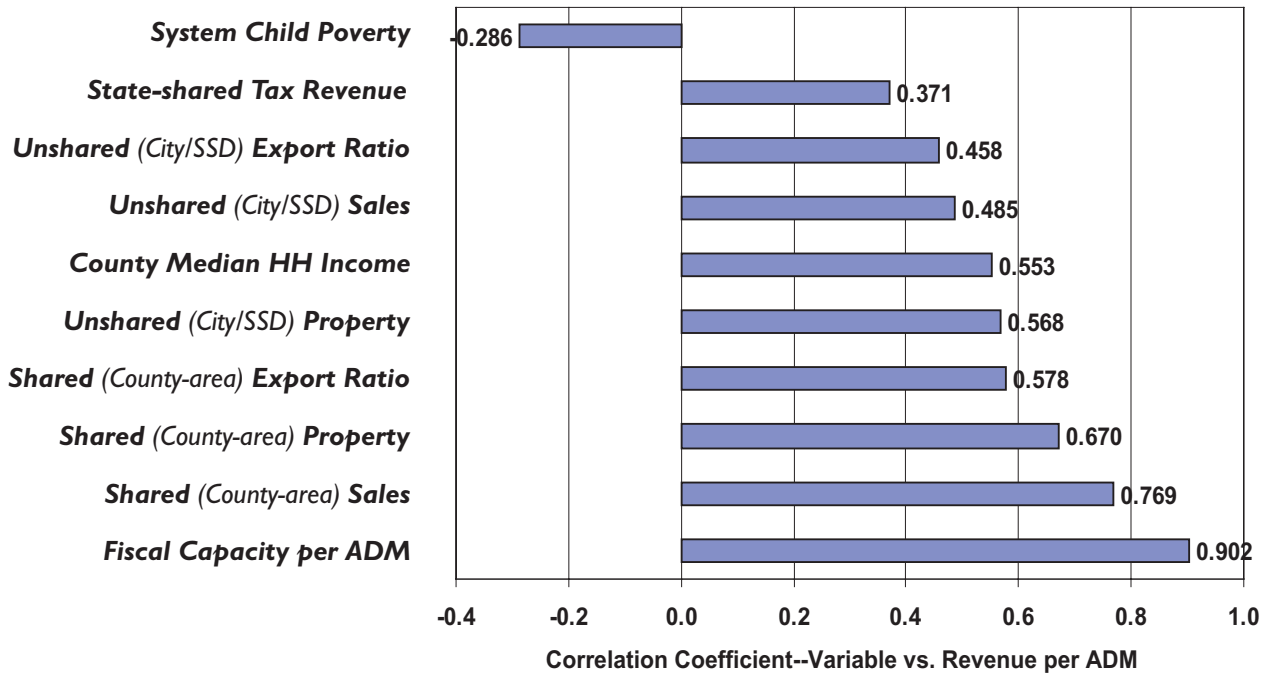


that as one factor increases, the other one decreases. A perfect correlation between two factors would have a coefficient of one or negative one. The closer a coefficient is to either one or negative one, the stronger the correlation of the factors being compared.

Figure 7 is a graph of the correlation coefficients for each factor in the fiscal capacity model compared with actual revenue per student—the longer the bar, the stronger the relationship between the factor and actual revenue per student. The graph also includes the correlation between actual revenue per student and the estimated revenue per student produced by the fiscal capacity model. The coefficient for the actual and the estimated revenue per student is very high, indicating that the regression model used to produce the estimate is quite good.

Of the factors used in the model to estimate revenue per student, the one with the strongest relationship to revenue per student is shared (county area) taxable sales. Next is shared (county area) taxable property, which is followed by the factor used to measure exportability for the shared tax bases. The strength of these relationships is to be expected, considering that county property and sales taxes account for most of the local revenue used to fund public schools in Tennessee.

Figure 7. Strength of Relationship between Fiscal Capacity Factors and Actual Revenue per Student—Correlation Coefficients



These measurements of the variability of the factors that go into fiscal capacity and comparing their distribution patterns to the variability and distribution pattern of local revenue tend to confirm our understanding both of where the local funds for public schools come from and of which sources play a larger role in the variability of local funding across the state. However, a means of combining all of them to produce estimates that reflect realistic and fair expectations for all school systems is required. The current county-level model for fiscal capacity uses multiple linear regression for that purpose. The prototype system-level model, which is based on the same set of principles, uses the same statistical process. (See Appendix H for an explanation of multiple regression analysis.)

One measure that can be used to compare how much the different factors used in the fiscal capacity model vary across school systems is called the coefficient of variation.

The closer a correlation coefficient is to either one or negative one, the stronger the correlation of the factors being compared.

Combining the Factors to Estimate Fiscal Capacity—Multiple Regression Analysis

The TACIR fiscal capacity model uses multiple linear regression to produce a set of weights that can be multiplied by the factors to estimate the amount of revenue per pupil each school system should be able to raise based on the system's value for each of those factors. These weights represent the amount by which each factor increases or decreases on average as actual revenue per pupil increases and how consistently it follows the variation in actual revenue per pupil across Tennessee's school systems. The weight given each factor is influenced by the weight given all others, as well as by differences in how much they vary across

all school systems. Some of the factors in the fiscal capacity model vary less across school systems, and some vary more. Presumably, those whose variability follows a pattern that is most similar to the variability in revenue per student will be given more weight in the model, and those whose variability differs the most will be given less weight.

The regression process also produces a set amount, called a constant because it is the same for every observation (school system in this case), that is included in each estimate. Table 6 shows the state average for each factor and its weight based on the prototype model. Actual values for each school system, including its estimated fiscal capacity, are included in Appendix E-2.

Calculation of the fiscal capacity per pupil for each school system is a simple matter of multiplying the weights produced by the model by the corresponding values for each factor for that system. When the weights are multiplied by the average system values, the result equals the actual average revenue per student as shown in Table 6. Applying the weights to the variables for any particular system may produce a value above or below its average revenue per pupil, but the average of the fiscal capacity estimates for

Table 6. Prototype System-level Fiscal Capacity Factors and Weights

Average Actual Revenue per Pupil: $1,864		
Factors Used to Estimate Revenue per Pupil	**Average System Value**	**Weights Produced by Model**
Constant Value to be Included in Each System's Estimate	n/a	-$22
Taxable Property per Pupil		
▪ Shared	$86,017	+0.0047
▪ Unshared	$34,926	+0.0048
Taxable Sales per Pupil		
▪ Shared	$41,253	+0.0204
▪ Unshared	$26,573	+0.0010
State-shared Tax Revenue per Pupil (Unshared)	$234	+0.1714
Tax Exportability Ratios		
▪ Shared	35.21%	+$570
▪ Unshared	16.68%	+$152
County Median Household Income	$33,508	+0.0130
System Child Poverty Rate	18.17%	-$1,399
Average Estimated Revenue per Pupil: $1,864		

all systems equals the average revenue per pupil for all systems. Consequently, consistent with the theory of multiple regression analysis, **the total education fiscal capacity per student for the state equals the total local education revenue per student.**

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 of 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 Figure 8.

The direction of change depicted for each factor in Figure 8 is based on the assumption that all values for all other factors remain unchanged for all systems. In reality, values change throughout the model from one year to the next as they are updated for all systems. Whether fiscal capacity actually increases or decreases depends on the changes and interaction of all values for all systems. Moreover, the effect for an individual system depends on the interaction of changes in its own values. For example, if both the property assessment and the child poverty rate increase, the effect could be mixed.

Changes from year to year are moderated by the use of three-year averages. In order 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. More information about data sources and availability is included in Appendix I.

Figure 8. Effect of Changes in Fiscal Capacity Factors

The relationship between fiscal capacity and specific factors (other things being equal) is illustrated as follows:

Property Assessment Increases	↑	Fiscal Capacity Increases	↑
Taxable Sales Increase	↑	Fiscal Capacity Increases	↑
State-shared Tax Revenue Increases	↑	Fiscal Capacity Increases	↑
Tax Exportability Ratio Increases	↑	Fiscal Capacity Increases	↑
Median Household Income Increases	↑	Fiscal Capacity Increases	↑
Child Poverty Rate Increases	↑	Fiscal Capacity Decreases	↓

Effect of the Prototype System-level Fiscal Capacity Model—
Comparing What Is To What Might Be

The Tennessee Supreme Court's admonition, "substantially equal educational opportunity for all students," is the principle that guides all efforts to equalize education funding. The Basic Education Program (BEP) formula is based on that principle, but the county area fiscal capacity model used to allocate responsibility for the local share of the formula falls short. It treats all systems within a county the same and ignores the different revenue sources available to each type of school system, county, city and special school district, and the constraints placed on them by current law. These differences have been fully described in this report. No process that fails to account for them can truly equalize funding.

Changing formulas is a difficult process because either it shifts state funding and puts local governments in the awkward and difficult position of raising additional funds locally, or cutting back services, or it requires the state to raise additional revenue. Given the fiscal constraints all levels of government now face, neither is an attractive option, and yet doing nothing leaves inequities among schools—and students—in place and the state's education funding scheme vulnerable to another constitutional challenge.

Before any formula is changed, all those affected should be afforded an opportunity to understand and question any proposal and its effects. Changing from the county-area fiscal capacity model to the prototype system-level model without any change in the BEP formula would reduce funding for some school systems and increase funding for others. In general, as indicated by Table 1 on page 15, responsibility for the local share of the formula would shift from counties with only one school system to those with more than two. The local share for counties with two school systems would remain about the same. Consequently, state funding would increase for single system counties, decrease for those with three or more, and remain about the same for the two-school-system counties.

Past changes that required additional state or local funding were phased in and were often coupled with a provision for holding systems harmless for any loss of state funds. The effect on any particular school system has varied depending on year-to-year changes in other factors that affect funding, including changes in student counts. Trends in county area fiscal capacity under the current model would be reflected to some extent in any system-level model. These trends would affect funding changes during any phase-in period.

The one-year effects of changing from the current county-area fiscal capacity model to the prototype system-level model are presented by school system in Table 7 starting on page 52. Thirty-five systems would see their state funding decrease, and

101 systems would see their funding increase compared to the prior year based on the two years in this comparison. The cost of holding the systems harmless for the decreases in funding would be $48 million.

While state funding for most school systems would increase compared with the prior year, eighty-four systems would receive less than they would if the county model were retained. (See Appendix E-3.) The fifty-two systems receiving more if the prototype system-level model were used instead of the county model represent 69% of the students in Tennessee's public schools.

More than two-thirds of Tennessee's pubic school students are enrolled in systems that would benefit from a change to the prototype system-level fiscal capacity model.

Table 7. One-year Change in State Funding with Prototype System-level Model
2004-05 and 2005-06 School Years

System Name	2004-05 State Funding	2005-06 BEP State Funding w/Prototype	Increases	Decreases
Anderson County	$22,233,000	$25,081,000	$2,848,000	
Clinton City	3,024,000	2,371,000		(653,000)
Oak Ridge City	13,781,000	12,329,000		(1,452,000)
Bedford County	23,181,000	25,432,000	2,251,000	
Benton County	8,699,000	9,559,000	860,000	
Bledsoe County	8,227,000	8,731,000	504,000	
Blount County	33,372,000	36,260,000	2,888,000	
Alcoa City	3,794,000	2,449,000		(1,345,000)
Maryville City	13,353,000	11,254,000		(2,099,000)
Bradley County	26,795,000	29,469,000	2,674,000	
Cleveland City	12,707,000	10,960,000		(1,747,000)
Campbell County	22,436,000	23,704,000	1,268,000	
Cannon County	8,512,000	9,003,000	491,000	
Carroll County	1,492,000	2,001,000	509,000	
H Rock-Bruceton SSD	2,658,000	2,749,000	91,000	
Huntingdon SSD	4,528,000	4,365,000		(163,000)
McKenzie SSD	4,575,000	4,664,000	89,000	
South Carroll Co SSD	1,551,000	1,568,000	17,000	
West Carroll Co SSD	3,861,000	3,918,000	57,000	
Carter County	22,335,000	24,705,000	2,370,000	
Elizabethton City	7,307,000	6,620,000		(687,000)
Cheatham County	24,900,000	25,507,000	607,000	
Chester County	9,299,000	9,605,000	306,000	
Claiborne County	18,239,000	20,221,000	1,982,000	
Clay County	4,994,000	5,304,000	310,000	
Cocke County	16,909,000	18,619,000	1,710,000	
Newport City	2,395,000	1,863,000		(532,000)
Coffee County	12,554,000	13,879,000	1,325,000	
Manchester City	3,827,000	3,543,000		(284,000)
Tullahoma City	10,509,000	9,646,000		(863,000)
Crockett County	6,775,000	7,305,000	530,000	
Alamo City	1,898,000	1,936,000	38,000	
Bells City	1,586,000	1,696,000	110,000	
Cumberland County	22,420,000	22,370,000		(50,000)
Davidson County	140,628,000	155,200,000	14,572,000	
Decatur County	5,628,000	6,081,000	453,000	
DeKalb County	9,352,000	9,982,000	630,000	
Dickson County	25,905,000	26,055,000	150,000	
Dyer County	10,741,000	12,071,000	1,330,000	
Dyersburg City	10,707,000	9,955,000		(752,000)
Fayette County	12,432,000	12,850,000	418,000	
Fentress County	8,809,000	9,859,000	1,050,000	
Franklin County	20,748,000	21,524,000	776,000	
Humboldt City	5,354,000	5,102,000		(252,000)
Milan SSD	6,828,000	6,888,000	60,000	

Table 7. One-year Change in State Funding with Prototype System-level Model
2004-05 and 2005-06 School Years (cont.)

System Name	2004-05 State Funding	2005-06 BEP State Funding w/Prototype	Increases	Decreases
Trenton SSD	4,887,000	4,933,000	46,000	
Bradford SSD	2,206,000	2,262,000	56,000	
Gibson County SSD	9,078,000	9,245,000	167,000	
Giles County	13,755,000	15,986,000	2,231,000	
Grainger County	13,734,000	14,629,000	895,000	
Greene County	23,037,000	25,377,000	2,340,000	
Greeneville City	9,081,000	8,209,000		(872,000)
Grundy County	9,353,000	10,754,000	1,401,000	
Hamblen County	25,229,000	28,197,000	2,968,000	
Hamilton County	83,241,000	95,054,000	11,813,000	
Hancock County	4,819,000	5,070,000	251,000	
Hardeman County	18,342,000	18,506,000	164,000	
Hardin County	12,299,000	13,258,000	959,000	
Hawkins County	26,354,000	28,941,000	2,587,000	
Rogersville City	2,236,000	1,749,000		(487,000)
Haywood County	13,247,000	14,014,000	767,000	
Henderson County	11,717,000	12,954,000	1,237,000	
Lexington City	3,576,000	2,935,000		(641,000)
Henry County	10,054,000	10,992,000	938,000	
Paris SSD	4,731,000	4,644,000		(87,000)
Hickman County	15,623,000	16,285,000	662,000	
Houston County	6,059,000	6,165,000	106,000	
Humphreys County	10,503,000	10,934,000	431,000	
Jackson County	6,759,000	7,219,000	460,000	
Jefferson County	24,995,000	25,751,000	756,000	
Johnson County	9,758,000	10,008,000	250,000	
Knox County	109,940,000	117,559,000	7,619,000	
Lake County	3,830,000	3,866,000	36,000	
Lauderdale County	17,809,000	18,341,000	532,000	
Lawrence County	22,832,000	24,729,000	1,897,000	
Lewis County	7,584,000	7,531,000		(53,000)
Lincoln County	13,806,000	14,723,000	917,000	
Fayetteville City	3,463,000	2,927,000		(536,000)
Loudon County	15,458,000	15,894,000	436,000	
Lenoir City	6,380,000	6,306,000		(74,000)
McMinn County	18,199,000	18,600,000	401,000	
Athens City	5,369,000	4,126,000		(1,243,000)
Etowah City	1,341,000	1,243,000		(98,000)
McNairy County	14,766,000	16,492,000	1,726,000	
Macon County	13,642,000	14,484,000	842,000	
Madison County	33,478,000	36,253,000	2,775,000	
Marion County	14,117,000	14,669,000	552,000	
Richard City SSD	1,200,000	1,141,000		(59,000)
Marshall County	15,089,000	16,515,000	1,426,000	
Maury County	35,688,000	38,145,000	2,457,000	

Table 7. One-year Change in State Funding with Prototype System-level Model
2004-05 and 2005-06 School Years (cont.)

System Name	2004-05 State Funding	2005-06 BEP State Funding w/Prototype	Increases	Decreases
Meigs County	7,890,000	7,868,000		(22,000)
Monroe County	18,666,000	19,359,000	693,000	
Sweetwater City	5,182,000	4,661,000		(521,000)
Montgomery County	76,527,000	86,640,000	10,113,000	
Moore County	3,847,000	3,930,000	83,000	
Morgan County	13,858,000	14,391,000	533,000	
Obion County	12,498,000	13,782,000	1,284,000	
Union City	4,354,000	3,870,000		(484,000)
Overton County	13,057,000	13,875,000	818,000	
Perry County	4,570,000	4,847,000	277,000	
Pickett County	2,923,000	3,014,000	91,000	
Polk County	9,743,000	10,306,000	563,000	
Putnam County	27,547,000	29,223,000	1,676,000	
Rhea County	13,935,000	14,757,000	822,000	
Dayton City	2,533,000	1,931,000		(602,000)
Roane County	25,766,000	26,080,000	314,000	
Robertson County	33,048,000	34,953,000	1,905,000	
Rutherford County	84,520,000	93,965,000	9,445,000	
Murfreesboro City	17,745,000	11,347,000		(6,398,000)
Scott County	9,931,000	10,908,000	977,000	
Oneida SSD	4,715,000	4,791,000	76,000	
Sequatchie County	7,874,000	8,256,000	382,000	
Sevier County	29,317,000	21,342,000		(7,975,000)
Shelby County	122,229,000	146,578,000	24,349,000	
Memphis SSD City	330,341,000	359,621,000	29,280,000	
Smith County	11,079,000	12,198,000	1,119,000	
Stewart County	8,681,000	8,597,000		(84,000)
Sullivan County	33,728,000	36,035,000	2,307,000	
Bristol City	9,592,000	8,384,000		(1,208,000)
Kingsport City	16,621,000	12,742,000		(3,879,000)
Sumner County	78,163,000	83,684,000	5,521,000	
Tipton County	43,576,000	44,126,000	550,000	
Trousdale County	5,656,000	5,907,000	251,000	
Unicoi County	9,255,000	10,112,000	857,000	
Union County	13,569,000	13,949,000	380,000	
Van Buren County	3,676,000	3,738,000	62,000	
Warren County	19,736,000	21,628,000	1,892,000	
Washington County	23,141,000	24,521,000	1,380,000	
Johnson City	18,061,000	11,801,000		(6,260,000)
Wayne County	10,827,000	10,848,000	21,000	
Weakley County	16,485,000	17,879,000	1,394,000	
White County	14,431,000	15,111,000	680,000	
Williamson County	54,739,000	63,142,000	8,403,000	
Franklin SSD	10,083,000	6,442,000		(3,641,000)
Wilson County	37,514,000	39,347,000	1,833,000	
Lebanon SSD	9,421,000	7,618,000		(1,803,000)
Statewide	**$2,701,172,000**	**$2,859,972,000**	**$206,706,000**	**$(47,906,000)**

Analysis of Alternative Models Requested by the State Board of Education

Two additional fiscal capacity models were requested for review by the chairman and staff of the State Board of Education. The first was a variation of the prototype fiscal capacity model presented here. The second was a variation of the average tax rate model presented here.

The prototype variation requested combined the shared and unshared tax base variables so that the model included only one factor for property, one for sales, and one for tax exportability. These factors are separated into shared and unshared amounts in the prototype model because they are separately taxed by counties and by cities and special school districts. The rationale for combining them was, in part, to remove the zero values for the county school systems. The zeros in the prototype are not missing values, the presence of which is a concern for statisticians, but rather the true values of the variables for the county systems. Nevertheless, State Board staff were concerned that the zeros created problems with the statistical process (multiple regression analysis) used to produce the fiscal capacity estimates.

TACIR staff tried three different variations of the system-level model combining the six variables (shared and unshared property, shared and unshared sales, and the exportability ratios for the shared and unshared tax bases) into three:

- The shared and unshared property tax base variables were combined into one by allocating the shared variable based on weighted full-time equivalent average daily attendance (WFTEADA) and adding it to the unshared base for each school system before dividing by average daily membership (ADM).
- The shared and unshared sales tax base variables were combined into one by allocating the shared variable based on WFTEADA and adding it to the unshared base for each school system before dividing by ADM.
- The shared and unshared exportability variables were combined into one by allocating the tax base data for the shared variable to each school system based on WFTEADA and adding it to the unshared base data for that system before computing the ratio between business-related property[18] and total property tax base.

The result in each case was a weaker model statistically, which was not surprising because the factors used in the models did not account for the differences in the fiscal structure of the three different types of school systems. A more detailed explanation of these calculations and the results are included in Appendix D-2.

[18]Commercial, industrial, utility and personal property.

The second model requested by the chairman and staff of the State Board was a variation of the average-tax-rate model based on changing the fiscal structure of Tennessee's school systems to eliminate the sharing requirements placed on counties and restricting county taxes to areas outside the borders of special school districts and cities that operate school systems so that each school system would have its own discrete (non-overlapping) tax bases. Producing this model required not only subtracting the city and special school district tax bases from the county tax bases, but also estimating the revenue each system would have received from each of those tax bases in order to derive the average rates required for the model. Otherwise, the model was identical to the average-tax-rate model presented in Tables 3 and 4 and described in the related text.

Not surprisingly, the results of this model are dramatically different from the average-tax-rate model based on the current fiscal structures of the three types of school systems. Implementing this alternative would require statutory changes to remove the sharing requirement and to remove counties' ability to tax the property within the borders of special school districts and cities with school systems and the sales inside the cities. The average tax rates are presented in Table 8, and the effect on state funding through the BEP formula is presented in Table 9. Sixty-five systems would see their state funding decrease, and seventy-one systems would see their funding increase compared to the prior year based on the two years in this comparison. The cost of holding systems harmless for these decreases in funding would be $132 million. Some of these decreases could be offset for cities and special school districts by raising tax rates to replace the rates that would no longer be applied within their borders by counties. Obviously, while state funding would increase for most counties, in some cases substantially, the counties that could no longer tax countywide to support their schools might lose more in local funding than they would gain in state funding. Predicting those effects is beyond the scope of this report.

Table 8. Average Rates Based on Estimated Revenue by Source in the Alternative Model Based on Discrete Tax Bases

Source of Revenue	Average Effective Tax Rate	
Revenue from Sales Taxes	1.45%	
Revenue from Property Taxes	$1.49	*per $100 assessed value*
Revenue from State-shared Taxes	15.88%	*of amount available*

Table 9. One-year Change in State Funding with Alternative Average-Tax-Rate Model Based on Discrete Tax Bases

2004-05 and 2005-06 School Years

System Name	2004-05 State Funding	2005-06 BEP State Funding w/Alt. ATR	Increases	Decreases
Anderson County	$22,233,000	$30,711,000	$8,478,000	
Clinton City	3,024,000	1,113,000		(1,911,000)
Oak Ridge City	13,781,000	9,562,000		(4,219,000)
Bedford County	23,181,000	24,696,000	1,515,000	
Benton County	8,699,000	9,140,000	441,000	
Bledsoe County	8,227,000	8,009,000		(218,000)
Blount County	33,372,000	41,966,000	8,594,000	
Alcoa City	3,794,000	(2,294,000)		(6,088,000)
Maryville City	13,353,000	11,535,000		(1,818,000)
Bradley County	26,795,000	36,335,000	9,540,000	
Cleveland City	12,707,000	6,071,000		(6,636,000)
Campbell County	22,436,000	21,918,000		(518,000)
Cannon County	8,512,000	8,530,000	18,000	
Carroll County	1,492,000	526,000		(966,000)
H Rock-Bruceton SSD	2,658,000	3,208,000	550,000	
Huntingdon SSD	4,528,000	4,940,000	412,000	
McKenzie SSD	4,575,000	5,265,000	690,000	
South Carroll Co SSD	1,551,000	1,775,000	224,000	
West Carroll Co SSD	3,861,000	4,392,000	531,000	
Carter County	22,335,000	25,547,000	3,212,000	
Elizabethton City	7,307,000	5,438,000		(1,869,000)
Cheatham County	24,900,000	25,434,000	534,000	
Chester County	9,299,000	9,442,000	143,000	
Claiborne County	18,239,000	18,782,000	543,000	
Clay County	4,994,000	4,901,000		(93,000)
Cocke County	16,909,000	19,958,000	3,049,000	
Newport City	2,395,000	28,000		(2,367,000)
Coffee County	12,554,000	17,066,000	4,512,000	
Manchester City	3,827,000	2,643,000		(1,184,000)
Tullahoma City	10,509,000	10,143,000		(366,000)
Crockett County	6,775,000	7,077,000	302,000	
Alamo City	1,898,000	1,928,000	30,000	
Bells City	1,586,000	1,653,000	67,000	
Cumberland County	22,420,000	19,394,000		(3,026,000)
Davidson County	140,628,000	131,923,000		(8,705,000)
Decatur County	5,628,000	5,698,000	70,000	
DeKalb County	9,352,000	8,653,000		(699,000)
Dickson County	25,905,000	25,710,000		(195,000)
Dyer County	10,741,000	13,293,000	2,552,000	
Dyersburg City	10,707,000	9,814,000		(893,000)
Fayette County	12,432,000	10,577,000		(1,855,000)
Fentress County	8,809,000	9,112,000	303,000	
Franklin County	20,748,000	20,437,000		(311,000)
Humboldt City	5,354,000	4,923,000		(431,000)
Milan SSD	6,828,000	7,928,000	1,100,000	

Table 9. One-year Change in State Funding with Alternative Average-Tax-Rate Model Based on Discrete Tax Bases
2004-05 and 2005-06 School Years (cont.)

System Name	2004-05 State Funding	2005-06 BEP State Funding w/Alt. ATR	Increases	Decreases
Trenton SSD	4,887,000	5,800,000	913,000	
Bradford SSD	2,206,000	2,647,000	441,000	
Gibson County SSD	9,078,000	10,760,000	1,682,000	
Giles County	13,755,000	15,498,000	1,743,000	
Grainger County	13,734,000	13,842,000	108,000	
Greene County	23,037,000	27,318,000	4,281,000	
Greeneville City	9,081,000	5,566,000		(3,515,000)
Grundy County	9,353,000	10,066,000	713,000	
Hamblen County	25,229,000	26,820,000	1,591,000	
Hamilton County	83,241,000	87,539,000	4,298,000	
Hancock County	4,819,000	4,548,000		(271,000)
Hardeman County	18,342,000	17,818,000		(524,000)
Hardin County	12,299,000	11,567,000		(732,000)
Hawkins County	26,354,000	29,081,000	2,727,000	
Rogersville City	2,236,000	847,000		(1,389,000)
Haywood County	13,247,000	12,938,000		(309,000)
Henderson County	11,717,000	14,964,000	3,247,000	
Lexington City	3,576,000	1,603,000		(1,973,000)
Henry County	10,054,000	9,701,000		(353,000)
Paris SSD	4,731,000	5,704,000	973,000	
Hickman County	15,623,000	15,437,000		(186,000)
Houston County	6,059,000	5,945,000		(114,000)
Humphreys County	10,503,000	10,321,000		(182,000)
Jackson County	6,759,000	6,687,000		(72,000)
Jefferson County	24,995,000	23,647,000		(1,348,000)
Johnson County	9,758,000	9,048,000		(710,000)
Knox County	109,940,000	115,810,000	5,870,000	
Lake County	3,830,000	3,556,000		(274,000)
Lauderdale County	17,809,000	17,933,000	124,000	
Lawrence County	22,832,000	24,324,000	1,492,000	
Lewis County	7,584,000	7,252,000		(332,000)
Lincoln County	13,806,000	16,327,000	2,521,000	
Fayetteville City	3,463,000	1,475,000		(1,988,000)
Loudon County	15,458,000	13,662,000		(1,796,000)
Lenoir City	6,380,000	6,541,000	161,000	
McMinn County	18,199,000	21,265,000	3,066,000	
Athens City	5,369,000	1,419,000		(3,950,000)
Etowah City	1,341,000	1,120,000		(221,000)
McNairy County	14,766,000	15,837,000	1,071,000	
Macon County	13,642,000	14,186,000	544,000	
Madison County	33,478,000	36,221,000	2,743,000	
Marion County	14,117,000	13,482,000		(635,000)
Richard City SSD	1,200,000	1,540,000	340,000	
Marshall County	15,089,000	16,250,000	1,161,000	
Maury County	35,688,000	37,850,000	2,162,000	

Table 9. One-year Change in State Funding with Alternative Average-Tax-Rate Model Based on Discrete Tax Bases
2004-05 and 2005-06 School Years (cont.)

System Name	2004-05 State Funding	2005-06 BEP State Funding w/Alt. ATR	Increases	Decreases
Meigs County	7,890,000	7,217,000		(673,000)
Monroe County	18,666,000	18,128,000		(538,000)
Sweetwater City	5,182,000	4,735,000		(447,000)
Montgomery County	76,527,000	90,155,000	13,628,000	
Moore County	3,847,000	3,496,000		(351,000)
Morgan County	13,858,000	13,838,000		(20,000)
Obion County	12,498,000	15,897,000	3,399,000	
Union City	4,354,000	2,429,000		(1,925,000)
Overton County	13,057,000	13,180,000	123,000	
Perry County	4,570,000	4,410,000		(160,000)
Pickett County	2,923,000	2,657,000		(266,000)
Polk County	9,743,000	9,493,000		(250,000)
Putnam County	27,547,000	28,594,000	1,047,000	
Rhea County	13,935,000	15,453,000	1,518,000	
Dayton City	2,533,000	854,000		(1,679,000)
Roane County	25,766,000	26,038,000	272,000	
Robertson County	33,048,000	34,442,000	1,394,000	
Rutherford County	84,520,000	118,327,000	33,807,000	
Murfreesboro City	17,745,000	(2,462,000)		(20,207,000)
Scott County	9,931,000	9,807,000		(124,000)
Oneida SSD	4,715,000	5,591,000	876,000	
Sequatchie County	7,874,000	7,733,000		(141,000)
Sevier County	29,317,000	17,709,000		(11,608,000)
Shelby County	122,229,000	143,750,000	21,521,000	
Memphis SSD City	330,341,000	411,238,000	80,897,000	
Smith County	11,079,000	11,813,000	734,000	
Stewart County	8,681,000	8,169,000		(512,000)
Sullivan County	33,728,000	46,194,000	12,466,000	
Bristol City	9,592,000	8,833,000		(759,000)
Kingsport City	16,621,000	5,091,000		(11,530,000)
Sumner County	78,163,000	81,142,000	2,979,000	
Tipton County	43,576,000	44,605,000	1,029,000	
Trousdale County	5,656,000	5,783,000	127,000	
Unicoi County	9,255,000	9,497,000	242,000	
Union County	13,569,000	13,111,000		(458,000)
Van Buren County	3,676,000	3,380,000		(296,000)
Warren County	19,736,000	20,769,000	1,033,000	
Washington County	23,141,000	34,109,000	10,968,000	
Johnson City	18,061,000	5,808,000		(12,253,000)
Wayne County	10,827,000	10,317,000		(510,000)
Weakley County	16,485,000	17,201,000	716,000	
White County	14,431,000	14,510,000	79,000	
Williamson County	54,739,000	63,801,000	9,062,000	
Franklin SSD	10,083,000	8,907,000		(1,176,000)
Wilson County	37,514,000	39,254,000	1,740,000	
Lebanon SSD	9,421,000	8,303,000		(1,118,000)
Statewide	**$2,701,172,000**	**$2,859,968,000**	**$291,039,000**	**($132,243,000)**

Appendices

APPENDIX A - Recommendations of the Governor's Task Force on Teacher Pay

Ten Principles

1. **Select a Cost-Driven Salary Component**—Select a cost-driven component in the BEP formula for salaries that reflects a real-world average salary cost.
2. **Spend the New Funds on Salaries**—Systems below a specified instructional salary level should provide a minimum level of expenditures earmarked for instructional salaries in order to reduce disparity.
3. **Ensure a Hold Harmless Provision**—Funds should be provided to ensure that no system receives less state money than it currently does.
4. **Introduce a New District-Level Fiscal Capacity Model**—Introduce a new district/system-level fiscal capacity model in order to provide a fairer method of determining local contribution. Currently, the model measures the fiscal capacity of 95 counties. A new district/system level will measure the capacity of 136 systems.
5. **Adjust State/Local Split**—State and local shares for salaries should be adjusted to reflect fiscal realities of infusing additional state dollars and to ensure a greater degree of equalization.
6. **Require Local Responsibility**—Local systems should be required to fund their matching share of the BEP formula cost-driven salary component.
7. **Adjust the Cost Differential Factor (CDF)/At-Risk/English Language Learners (ELL) Components**—The CDF for instructional salaries should be replaced or readjusted provided that additional funds will be available to address the issue of equality of educational opportunity, including funds for students in families with low incomes (e.g., students eligible for free and reduced price lunch) and English language learners. This will have the effect of targeting funds to both rural and urban systems based on educational needs.
8. **Maintain a State Salary Schedule**—A revised state salary schedule should remain in place to ensure that there is a floor below which salaries may not fall. The schedule should be recommended by the Commissioner of Education and approved by the State Board of Education annually.
9. **Institute an Annual Watchdog/Review Component**—Charge the BEP Review Committee with annually reviewing two aspects of the teacher pay equity solution:
   - Identify any warning signs of increased disparity levels
   - Review and recommend adjustments to the BEP salary component based on recognized inflationary indices
10. **Provide a Phased-in, Multi-Year Approach**—The solution should incorporate a phased multi-year approach based upon fiscal realities and should provide local systems and local governments the opportunity to adjust to the impact.

Appendix B - Legislation

CHAPTER NO. 670

HOUSE BILL NO. 3510

By Representatives McMillan, Winningham, Maddox, Fitzhugh, Shepard, Pinion, McDaniel, Harmon, Borchert, Shaw, Buck, Tidwell, Litz, Yokley, Walker, Bone, Head, Hensley, Hood, Towns, Coleman and Mr. Speaker Naifeh

Substituted for: Senate Bill No. 3397

By Senators Crutchfield, Graves, Kurita, Norris, Burks, Herron

AN ACT to amend Tennessee Code Annotated, Title 49, relative to instructional salaries.

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF TENNESSEE:

SECTION 1. Tennessee Code Annotated, Section 49-3-356, is amended by inserting the words and punctuation ", sixty-five percent (65%) in the instructional positions component" between the words "classroom components" and the words "and fifty percent".

SECTION 2. Tennessee Code Annotated, Section 49-3-366, is amended by deleting the section in its entirety and substituting instead the following:

Section 49-3-366

(a) Notwithstanding any other law to the contrary, effective with the 2004-2005 fiscal year, the dollar value of the BEP instructional positions component shall be thirty-four thousand dollars ($34,000) per instructional position. In subsequent fiscal years, the dollar value of the instructional positions component in the BEP shall be set in accordance with the provisions of Section 49-3-351.

(b) No local education agency shall receive from the BEP in fiscal year 2004-2005 and in subsequent fiscal years a lesser amount of state funds for instructional salaries, benefits, insurance, and unit costs adjusted for any mandatory increases in these categories and adjusted for any changes in average daily membership, than it received for such purposes in the 2003-2004 fiscal year.

(c) The commissioner shall provide to each local education agency, as appropriate, a state funding plan to transition from prior appropriations pursuant to Section 11, Items 4(a) and 4(b) of Chapter 356 of the Public Acts of 2003, to funding under the BEP for the instructional positions component. In developing such plan, the commissioner shall consider the applicable local salary schedules for instructional positions, the fiscal capacity of the local education agency and the local effort in raising revenue. The department shall provide each local education agency notice of its obligations and anticipated revenues under such transition plan.

SECTION 3. Tennessee Code Annotated, Section 49-1-302(a)(4) is amended by deleting the following language and punctuation:

The board shall establish a review committee for the Tennessee basic education program. The committee shall include the commissioners of education and finance and administration, or their designees. Others may be appointed by the board as determined by the board.

SECTION 4. Tennessee Code Annotated, Section 49-1-302(a)(4), as amended by Section 3, is further amended by designating the amended subdivision as (a)(4)(A) and by adding the following language as a new subdivision (a)(4)(B):

(B) The board shall establish a review committee for the Tennessee basic education program. The committee shall include the executive director of the state board of education, the commissioner of education, the commissioner of finance and administration, the comptroller of the treasury, the director of the Tennessee Advisory Commission on Intergovernmental Relations, the chairs of the standing committees on education of the senate and house of representatives, and the director of the office of legislative budget analysis, or their designees. The board shall appoint at least one member from each of the following groups: teachers, school boards, directors of schools, county governments, municipal governments which operate local education agencies, finance directors of urban school systems, finance directors of suburban school systems, and finance directors of rural school systems. The BEP review committee shall meet at least four times a year and shall regularly review the BEP components, as well as identify needed revisions, additions, or deletions to the formula. The committee shall annually review the BEP instructional positions component, taking into consideration factors including, but not limited to, total instructional salary disparity among local education agencies, differences in benefits and other compensation among local education agencies, inflation, and instructional salaries in states in the southeast and other regions. The committee shall prepare an annual report on the BEP and shall provide such report, on or before November 1 of each year, to the governor, the state board of education, and the select oversight committee on education. This report shall include recommendations on needed revisions, additions, and deletions to the formula as well as an analysis of instructional salary disparity among local education agencies.

SECTION 5. Tennessee Code Annotated, Section 49-3-354(b), is amended by adding the following language at the end of the subsection:

BEP funds earned in the instructional positions component must be spent for instructional positions.

SECTION 6. Tennessee Code Annotated, Section 49-3-306(a), is amended by designating the existing language as subdivision (a)(1) and by adding the following language to be designated as subdivision (a)(2):

(a)

(2) In addition to the state salary schedule developed by the commissioner for fiscal year 2004-2005 pursuant to subdivision (a)(1), the commissioner shall develop a local salary schedule for each local education agency for fiscal year 2004-2005. Notwithstanding the provisions of this section or any other law to the contrary, such local salary schedule shall provide that the local education agency adopt a local salary supplement for fiscal year 2004-2005 that is lower than the supplement paid in fiscal year 2003-2004, so long as any

such reduction by a local education agency in the local salary supplement is not larger in amount than any increase in the state minimum salary for that local education agency for fiscal year 2004-2005 resulting from appropriations made pursuant to this act. Any reduction by a local education agency of the local salary supplement for fiscal year 2004-2005 shall be subject to existing collective bargaining agreements to which such local education agency is a party. In the event such agreement bars a reduction in local salary supplements and the local education agency is unable to reach an agreement permitting such reduction, the commissioner shall reduce the state minimum salary for that local education agency in an appropriate amount for fiscal year 2004-2005. Nothing in this subsection shall be construed to diminish or in any way serve to reduce any general state salary schedule increase that may be provided outside the parameters of this act. Nothing in this subdivision (a)(2) shall be construed to prohibit or modify the mandatory nature of negotiations of salary for fiscal year 2004-2005 where such supplements or improvements in salary are implemented subsequent to the commissioner's re-calibration or possible reduction of some local salary supplements as they existed on the 2003-2004 local salary schedules.

SECTION 7. Tennessee Code Annotated, Subsection 49-3-306(b), is amended by adding the following language at the end of the subsection:

The provisions of the foregoing sentence shall not prohibit a reduction in local salary supplements pursuant to subsection (a)(2).

SECTION 8. Tennessee Code Annotated, Subsection 49-3-306(e), is amended by adding the following language at the end of the subsection:

For fiscal year 2004-2005, such schedule shall include, as a minimum, the schedule recommended by the commissioner for salary equalization purposes under subsection (a)(2).

SECTION 9. In reviewing the basic education program for fiscal year 2005-2006, the BEP review committee is requested to give special consideration to costs of enhanced services to address the needs of at-risk children, the cost of educating English language learners (including teachers, translators and related professions) and the development and implementation of a system-level fiscal capacity model.

SECTION 10. If any provision of this act or the application thereof to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications of the act which can be given effect without the invalid provision or application, and to that end the provisions of this act are declared to be severable.

SECTION 11. This act shall take effect upon becoming law, the public welfare requiring it.

Chapter No. 670] **PUBLIC ACTS, 2004** **4**

PASSED: April 29, 2004

APPROVED this 14th day of May 2004

Appendix C - Historical Time Line

- October 1979: *State Equalization Plan for Financing the Public Schools in Tennessee* issued by the Tennessee School Finance Equity Study identifies the need to "utilize an equitable measure of the relative tax-paying abilities of the local education agencies" in order to "determine the sharing of educational costs between the state and the local education agencies." The study was commissioned by the Joint Legislative Committee on Elementary and Secondary School Finance established by the General Assembly in 1976.

- February 1990: Performance Audit of Board and Department of Education finds that "[f]unds available for public education vary considerably from school district to school district in Tennessee." Board and Department concur. Department notes that a formula change is being studied and includes the following comment in its response to the audit:

  > *Possibilities for formula change include a mechanism to distribute state funding to systems based on their "ability to pay" which would better equalize funding statewide. . . . Multiple school districts will be examined with the possibility of incorporating funding disincentives to address funding disparities.*

  Board goes further, commenting on the causes and noting that the proposed new funding formula would include a system-level gauge of ability to fund schools:

  > *Independent taxing power of city and special school systems does contribute to the existing disparity in funding among the state's systems. Citizens of city and special school systems have the ability and usually the will to tax themselves for the purpose of investing more in their schools. County residents may have the will but typically not the ability to do the same, given their limited tax base. The Board's Basic Education Program proposal would resolve much of this problem by gauging state appropriations for schools to each system—county, city, or special—according to each's ability to raise local tax revenue for schools. The result would both assure adequate resources in all systems and decrease the funding disparity among systems.*

- August 1990: TACIR staff's initial exposition of the difficulties of determining fiscal capacity for school systems in Tennessee was published in a staff report titled *Fiscal Capacity of Public School Systems in Tennessee*; work on the concept had begun in the 1980s. This was the first report that presented a model to measure fiscal capacity at the school district level.

- February 16, 1995: Supreme Court of Tennessee finds for the smalls schools plaintiffs that

  > *exclusion of teachers' salary increases from the equalization formula is of such magnitude that it would substantially impair the objectives of the plan; consequently, the plan must include equalization of teachers'* salaries according to the BEP formula.

- February 27, 1995: Brent Poulton, Executive Director of the State Board of Education, writes expressing concern about the use of a county fiscal capacity model and suggesting that the overall BEP funding formula would be improved "if we could establish an index for each of the 139 school systems."

- March 8, 1995: Jane Walters, Commissioner of Education, writes in relation to the department's review of teachers' salary equalization, asking Dr. Green to "review the issue [of fiscal capacity] and make a proposal on how [it] can be done at the school system level."

- June 1995: Requests to revise the TACIR fiscal capacity formula are brought before the Commission. Commissioner Walters notes that

  > *if the department could distribute BEP funds on a fiscal capacity index that more accurately reflected the situation in each district, it would aid in the quest for equalization, be as fair as possible, and help the department in its continual battle over salaries and other issues where there is such great disparity.*

  Dr. Poulton notes that

  > *the original premise of the BEP was that the responsibility for funding schools was split between the state and local governments. Given that local governments had different abilities to pay, local responsibility would be divided according to ability to pay. Conceptually at least, the notion was that there were 139 school systems and there would be 139 splits of that local responsibility.*

  Chairman Bragg asks TACIR staff to meet with department and board staff to discuss the issue further and report back at the next meeting.

- June 1997: With full funding of the BEP formula set for the upcoming year, at the Commission's request, Asst. Commissioner Roehrich-Patrick, Department of

Education, presents information to the Commission as evidence of real differences in ability to pay between counties and other systems within counties. With few exceptions, city systems and special school districts have higher salaries and expenditures per student. Chairman Rochelle responds that TACIR will review the fiscal capacity model, but notes that the lack of data for income at the city and special school district level limits the effort.

- June 1998: Intent to develop sub-county model included in TACIR work program.
- Summer/Fall 1998: Development of one-tier and two-tier sub-county models. Staff proceeds with development of two-tier model.
- Summer/Fall 2000 through Fall 2002: Discussion of municipal overburden as it relates to sub-county model; significant cross-research with Comptroller's Office of Education Accountability (OREA).
- September 2001: Prototype two-tier model presented to Commission.
- Fall 2001: Favorable review of draft model by outside experts in school finance and statistics, including OREA staff.
- October 2002: Supreme Court of Tennessee strikes down current funding scheme for funding/establishing teachers' salaries; work on sub-county fiscal capacity model begins again in earnest.
- Fall 2002: First one-tier algebraic prototype developed by TACIR staff.
- Winter 2003: TACIR staff explore alternatives to sub-county model at request of Comptroller of the Treasury.
- June 2003: Commission updated on development of prototype model; concern about developing income measure at the sub-county level highlighted.
- June 2003: OREA staff experimenting with two-tier, regression based, sub-county model; request feedback.
- July 2003: OREA publishes *Funding Public Schools: Is the BEP Adequate?* noting that funding inequities result from use of a county-level fiscal capacity model in the Basic Education Program formula because the formula is designed to fund school systems.

- September 2003: OREA and TACIR staff begin working in concert on sub-county prototype; develop four basic alternatives:
  - *two two-tier models, both w/regression-based county tier*
    - one w/algebraic second tier based on property and sales tax bases plus revenue available from state-shared taxes
    - one w/regression second tier
  - *two one-tier models*
    - one algebraic based solely on property and sales tax bases plus revenue available from state-shared taxes
    - one full regression
- October 2003: Four basic alternatives submitted to external reviewers for comments; one-tier regression version most favored; submitted to Governor's office.
- October 7, 2003: Governor's salary equity task force drafts framework for recommendation of ten principles including this one: "The proposal will include a new district-level fiscal capacity model in order to provide a fairer method of determining local contribution."
- October 30, 2003: TACIR submits a consensus (TACIR and the comptroller's office) prototype system-level model to Governor's office.
- Winter 2004: Governor's office submits salary equity proposal to legislature that does not include prototype model.
- Spring 2004: General Assembly enacts and Governor signs salary equity bill that includes request that BEP Review Committee give special consideration to, among other things, a system-level fiscal capacity model; requires annual report each November 1.
- Summer/Fall 2004: BEP Review Committee establishes subcommittees to prepare proposal for, among other things, a system-level fiscal capacity model in order to comply with legislation.
- October 2004: BEP Review Committee votes to recommend, in its November 1, 2005, report, that Tennessee convert from a 95 county to a 136 system-level equalization model. BEPRC issues November 1, 2004, report with that recommendation in it.

Appendix D-1
Previous Alternative System-level Models Evaluated

First models described in 1990 TACIR Staff Report

***Normative Representative Tax Model* (developed by Don Thomas, consultant to Governor McWherter)**

- Assumed all local revenue for public schools came from property and sales taxes—59% from property and 41% from sales.
- Estimated average tax rates for property and sales based on those proportions.
- Applied average tax rates to property and sales tax bases for each county area.
- Divided results within each county among school systems based on weighted full-time-equivalent average daily membership.

Problems—ignored other sources of revenue, ability to pay; different tax bases of counties, cities and special school districts.

***Property Tax Base Approach*—two variations**

Both assumed all local revenue for public schools came from property.

- Unique Property Tax Base—treated all school systems as if they were special school districts.
- Overlapping Property Tax Base—treated county systems in multi-system counties as if they were not subject to sharing requirements.

Problems—ignored other sources of revenue, ability to pay; different fiscal structures of county and city school systems and special school districts.

1998 model presented by TACIR staff to the Commission

Two-tier model with

- current county model as tier one and
- tier two splits tier one for multi-system counties based on property and sales.

2001 TACIR staff refines two-tier model:

Two-tier model with

- current county model as tier one and
- tier two splits tier one for multi-system counties based on property, sales and income (as proxy for other taxes).

Four Alternative Models Evaluated for Task Force

Two two-tier models, both w/regression-based county tier

both with modified county model as tier one

- property and sales tax bases combined into a single variable
- median household income as measure of taxpayer equity
- school-age child poverty as measure of service burden

Algebraic (average tax rates) tier two based on property and sales tax bases plus revenue available from state-shared taxes

Regression-based tier two

- shared and unshared combined property and sales tax base variables
- system-level tax exportability
- system-level school-aged child poverty

Two one-tier models

Algebraic (average tax rates) model based on property and sales tax bases plus revenue available from state-shared taxes

- average tax and usage[19] rates calculated from actual revenue for schools divided by tax base or available state-shared tax revenue
- separate calculations for shared and unshared tax bases

Full regression model based on same components as current county model

[19]Usage rate applies to state-shared tax revenue.

Appendix D-2
Alternative System-level Models Evaluated for State Board of Education

A. Regression-based Model with Combined Tax Bases

Three versions were produced at the request of the chairman and staff of the State Board of Education:

- The **first version** was a regression based on these three collapsed variables and the remaining variables. The result was a much lower r-squared (coefficient of multiple determination), which means that this modified model does not explain as much of the variation as the current prototype. The values are 0.6578 and 0.7574 for comparison. The property and sales variables and median household income were significant at $p < 0.05$. However, the total fiscal capacity value for the Carroll County system is negative.

  Because of that system's relative negligible ADM, its tax base variables per pupil are extreme; therefore, we use its county-area values in the regression model and then subtract the results for the other systems in Carroll County to arrive at a total fiscal capacity for the Carroll County system. That is the only method we could identify that would produce a reasonable figure for that system. If we treat it as a stand-alone system in this model and enter its extremely large values per ADM, the statistical results are weaker: the r-squared falls to 0.6127 and only property and median household income are significant.

- The **second version** was identical except that it used the base ten logarithm[20] of the two collapsed tax base variables (property and sales). The result was a slightly higher r-squared, still well below the current prototype model at 0.6805. The intercept, as well as the property and the sales variables and median household income, were significant at $p < 0.05$. However, the total fiscal capacity value for the Carroll County system remained negative. Again, treating Carroll County as a stand-alone system weakens the results, producing an r-squared of 0.6583.

- The **third version** was identical to the first except that statistical outliers were removed before re-running the regression. Outliers removed were those with residual values in the first model that were more than 1.96 standard deviation units away from the mean of the residuals (zero). They included:
  Davidson County, Dayton City, Franklin SSD, Greeneville City, Kingsport City, Lexington City, Murfreesboro City, Newport City, and Oak Ridge City.

[20] The number of times a base must be multiplied by itself to equal a given number. For example, the logarithm of eight with a base of two is three because 2^3 (two cubed or two times itself three times) is eight.

The r-squared, at 0.7167, was higher than the second version, but still below the prototype. The intercept and the sales and median household income variables were significant at $p < 0.05$ and the total fiscal capacity for the Carroll County system is positive. Like the other two versions, this one would be weaker (r-squared of 0.6707 and only property and median household income significant) if Carroll County were treated as a stand-alone system.

The output summary for each model is attached along with a table comparing the predicted fiscal capacity for each version and the prototype. Considering all four strictly from a statistical point of view, the current prototype is superior despite the insignificance of most of the t-statistics. Considering the models from a fiscal capacity point of view, the factors used in the prototype more accurately represent the actual fiscal structure of Tennessee's school systems. This does not mean that there might not be a better model out there. We are continuing to review the current prototype in an effort to improve on it.

Combined Variable Methodology

Combined Property Tax Base per Pupil: a combination of the system's share of the shared county area property tax base and its unshared property tax base.

- The system's share of the county area base is calculated by multiplying the county area property tax base by the system's weighted full-time equivalent average daily attendance (WFTEADA). This is the same calculation mandated by *Tennessee Code Annotated* § 49-3-315 for the distribution of county property taxes collected for education. Special care is taken to ensure that bases for systems that cross county borders are properly attributed.
- In addition to this share of the county base, city systems and SSDs are able to raise revenue from their own property taxes. They are not required to share revenue from this base with other systems in the county. Thus, this is referred to as their unshared property tax base. County school systems do not have an unshared base.
- The system's share of the county area base is added to any unshared base to arrive at a total system property tax base. The system's total property tax base is then divided by average daily membership (ADM) to arrive at a per-pupil share.

Combined Sales Tax Base per Pupil: a combination of the system's share of the shared county area sales tax base and its unshared sales tax base.

- The system's share of the county area base is calculated by multiplying the county area sales tax base by the system's WFTEADA. This reflects the requirement in *Tennessee Code Annotated* § 67-6-712 that one half of all revenue raised by the local sales tax in a county be distributed based upon WFTEADA. Special care is taken to ensure that bases for systems that cross county borders are properly attributed.
- In addition to this share, city systems receive the revenue from their own local option sales tax situs collections. They are not required to share revenue from this base with other systems in the county. Thus, this is referred to as their unshared sales tax base. County systems and special school districts do not have an unshared base.
- The system's share of the county area base is added to any unshared base to arrive at a total system sales tax base. The system's total sales tax base is then divided by average daily membership (ADM) to arrive at a per-pupil share.

Combined Exportability: the ratio of business-related property[21] to the total property tax base for a combination of shared and unshared property tax bases.

- The system's share of the county area base is calculated by multiplying the county area residential and farm property tax bases by the system's WFTEADA.
- The system's share of the county area base is calculated by multiplying the county area total property tax bases by the system's WFTEADA.
- The system's share of the farm and residential property tax base is subtracted from the system's share of the total property tax base to arrive at the system's share of business-related property. Special care is taken to ensure that bases for systems that cross county borders are properly attributed.
- For city systems and special school districts, their unshared farm and residential property tax base is subtracted from the unshared total property tax base to arrive at their unshared base for business-related property.
- For each system, the shared and unshared tax bases for business-related property are added together and divided by the shared and unshared total tax bases to arrive at the exportability ratio.

[21] Commercial, industrial, utility and personal property.

B. Average Tax Rate Model Based on Discrete Tax Bases

This model was described as based on county school systems in multi-system counties taxing only the property and sales outside the legal boundaries of any city systems or special school districts within its borders. Producing this model was not the simple process anticipated. It was not just a matter of subtracting the city and special school district tax bases from the county tax bases to get "discrete" tax bases. It also required estimating the revenue each system would have received from these discrete bases in order to calculate average rates. This part of the process exacerbated the usual formula construction challenges posed by the three cross-border systems, which require separate calculations for each county they cross into;[22] in fact, accurate tax rates for these cities and their respective counties could not be calculated because the data available does not break the county revenue for these cities down by source county.

The steps below are all based on three-year averages, the same revenue and tax base figures used for other alternative system-level models presented.

Step 1. Divide actual revenue from the county tax bases by the bases to produce average tax rates for each county.

Step 2. Subtract the tax bases (taxable property value and taxable sales) of any city systems and special school districts from the tax bases of the county to produce discrete (non-overlapping) tax bases for each school system.

Step 3. Multiply the rates from Step 1 by the tax bases from Step 2 to determine the amount of revenue each system would have received from property and sales inside its borders at those rates.

Step 4. Add the revenue cities and special school districts received from their own tax rates and bases to the figures from Step 3.

Step 5. Divide the statewide total revenue for each tax base from Step 4 by the statewide total tax bases to produce an average rate for each revenue source (property, sales and state-shared tax revenues).

Step 6. Multiply the rates calculated in Step 5 by the discrete tax bases calculated in Step 2 to produce the amount of revenue expected from average rates.

[22] The Department does not make the same distinction in applying the fiscal capacity index from the county model to the BEP formula, but treats each cross-border city as though it were located entirely in the one county in which most of the city is located.

Step 7. Divide the revenue figures for each system from Step 6 by the total for all systems to produce a fiscal capacity index for use in the BEP formula to allocate responsibility for the local share of each of the three segments of the formula (instruction positions, other classroom and non-classroom).

The revenue figures from Step 6 were also divided by the student counts for each system for comparative purposes. The tax rates produced by this process are included in Table 8 of this report, and the effect on state funding is presented in Table 9.

Appendix E-1
County and System-level Model Equations

95-County Fiscal Capacity Model

Local Revenue per Pupil = y-Intercept
+ β_1 x Property per Pupil
+ β_2 x Sales per Pupil
+ β_3 x Per Capita Income
+ β_4 x [Residential and Farm Assessment ÷ Total Assessment]
+ β_5 x [ADM ÷ Population]

136-School-System Prototype Fiscal Capacity Model

Local Revenue per Pupil = y-Intercept
+ β_1 x County-area Property per Pupil
+ β_2 x System Unshared Property per Pupil
+ β_3 x County-area Sales per Pupil
+ β_4 x System Unshared Sales per Pupil
+ β_5 x System State-shared Taxes per Pupil
+ β_6 x [County-area Commercial, Industrial, Utility and Business Personal Property Assessment ÷ Total Assessment]
+ β_7 x [System Commercial, Industrial, Utility and Business Personal Property Assessment ÷ Total Assessment]
+ β_8 x County-area Median Household Income
+ β_9 x System Child Poverty Rate

County and System-level Model Equations with Regression-generated Weights (Coefficients)[23]

95-County Fiscal Capacity Model

Estimated Local Revenue per Pupil (fiscal capacity)	=	$1,252		
	+	-0.0005	x	Property per Pupil
	+	0.0140	x	Sales per Pupil
	+	0.0812	x	Per Capita Income
	+	-$1,772	x	[Residential and Farm Assessment ÷ Total Assessment]
	+	-$4,650	x	[ADM ÷ Population]

136-School-System Prototype Fiscal Capacity Model

Estimated Local Revenue per Pupil (fiscal capacity)	=	-$22		
	+	0.0047	x	County-area Property per Pupil
	+	0.0048	x	System Unshared Property per Pupil
	+	0.0204	x	County-area Sales per Pupil
	+	0.0010	x	System Unshared Sales per Pupil
	+	0.1714	x	System State-shared Taxes per Pupil
	+	$570	x	[County-area Commercial, Industrial,Utility and Business Personal Property Assessment ÷ Total Assessment]
	+	$152	x	[System Commercial, Industrial, Utility and Business Personal Property Assessment ÷ Total Assessment]
	+	0.0130	x	County-area Median Household Income
	+	-$1,399	x	System Child Poverty Rate

[23] Coefficients are from models produced for fiscal year 2004-05.

Appendix E-2
Prototype Variables and Results

Summary Output From the Prototype System-level Fiscal Capacity Model[24]

Regression Statistics	
Multiple R	0.9021
R Square	0.8138
Adjusted R Square	0.8005
Standard Error	419
Observations	136

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	9	96,804,874	10,756,097	61	0
Residual	126	22,147,438	175,773		
Total	135	118,952,312			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-22	476	-0.0462	0.9632	-963	919
Shared Prop	0.0047	0.0025	1.8803	***0.0624***	-0.0002	0.0097
Unshared Prop	0.0048	0.0015	**3.1284**	**0.0022**	0.0018	0.0078
Shared Sales	0.0204	0.0029	**6.9419**	**0.0000**	0.0146	0.0262
Unshared Sales	0.0010	0.0013	0.7773	0.4384	-0.0016	0.0037
StSharedTaxes	0.1714	0.2883	0.5944	0.5533	-0.3992	0.742
County Export	570	604	0.9435	0.3472	-625	1,764
City/SSD Export	152	328	0.4639	0.6435	-497	801
MHI	0.0130	0.0091	1.4277	0.1559	-0.005	0.031
Child Poverty	-1,399	1,146	-1.2208	0.2245	-3,667	869

[24] See Appendix G for an explanation of the variables and their sources.

Prototype System-level Fiscal Capacity Model Variables and Results by School System Based on Three-year Averages for BEP Funding Year 2005-06

School Systems	System Revenue Per Pupil	Property per Pupil		Sales per Pupil		System State-shared Taxes
		Shared (County)	Unshared (City/SSD)	Shared (County)	Unshared (City)	
Anderson County	$2,568	$88,029	$0	$54,429	$0	$126.86
Clinton City	$2,640	$88,029	$214,749	$54,429	$129,309	$782.59
Oak Ridge City	$4,684	$89,084	$131,814	$53,862	$121,575	$551.62
Bedford County	$1,358	$84,123	$0	$37,783	$0	$88.67
Benton County	$2,029	$66,246	$0	$37,451	$0	$440.55
Bledsoe County	$893	$82,024	$0	$15,856	$0	$195.03
Blount County	$2,097	$115,708	$0	$62,082	$0	$127.43
Alcoa City	$4,521	$115,708	$242,280	$62,082	$351,879	$460.60
Maryville City	$3,583	$115,708	$116,554	$62,082	$91,838	$471.54
Bradley County	$1,809	$98,410	$0	$55,602	$0	$108.89
Cleveland City	$2,780	$98,410	$164,125	$55,602	$147,229	$741.88
Campbell County	$1,181	$74,166	$0	$38,407	$0	$151.74
Cannon County	$1,012	$69,254	$0	$17,409	$0	$122.95
Carroll County	$1,622	$56,125	$56,087	$27,021	$0	$128.23
Hollow Rock-Bruceton SSD	$1,276	$56,125	$44,136	$27,021	$0	$0.00
Huntingdon SSD	$1,584	$56,125	$61,124	$27,021	$0	$0.00
McKenzie SSD	$1,423	$56,125	$61,260	$27,021	$0	$0.00
South Carroll Co SSD	$1,224	$56,125	$53,580	$27,021	$0	$0.00
West Carroll Co SSD	$1,405	$56,125	$53,552	$27,021	$0	$0.00
Carter County	$1,233	$62,701	$0	$30,422	$0	$119.04
Elizabethton City	$2,333	$62,701	$73,247	$30,422	$89,525	$539.37
Cheatham County	$1,185	$71,028	$0	$19,841	$0	$61.94
Chester County	$883	$61,264	$0	$27,435	$0	$114.77
Claiborne County	$1,514	$73,386	$0	$24,974	$0	$152.45
Clay County	$1,307	$68,554	$0	$25,278	$0	$174.13
Cocke County	$1,276	$66,614	$0	$38,683	$0	$122.46
Newport City	$1,943	$66,614	$150,906	$38,683	$246,847	$844.95
Coffee County	$1,893	$71,880	$0	$59,143	$0	$171.51
Manchester City	$2,716	$71,880	$108,087	$59,143	$146,136	$575.63
Tullahoma City	$3,062	$72,506	$77,472	$58,555	$80,147	$422.83
Crockett County	$972	$67,915	$0	$14,619	$0	$167.55
Alamo City	$812	$67,915	$59,065	$14,619	$30,922	$367.47
Bells City	$916	$67,915	$80,489	$14,619	$23,063	$433.15
Cumberland County	$1,521	$121,086	$0	$64,442	$0	$128.28
Davidson County	$4,689	$197,750	$0	$136,609	$0	$656.84
Decatur County	$1,561	$86,395	$0	$45,023	$0	$279.35
DeKalb County	$1,104	$115,811	$0	$33,702	$0	$127.26
Dickson County	$2,071	$89,396	$0	$51,410	$0	$79.74
Dyer County	$2,341	$74,755	$0	$45,715	$0	$170.99
Dyersburg City	$2,281	$74,755	$71,359	$45,715	$78,024	$400.72
Fayette County	$1,575	$148,000	$0	$30,851	$0	$195.80
Fentress County	$1,208	$71,190	$0	$37,022	$0	$198.62
Franklin County	$1,789	$92,425	$0	$39,851	$0	$163.64
Humboldt City	$1,682	$72,278	$81,291	$30,439	$53,796	$463.63
Milan SSD	$2,175	$72,278	$77,339	$30,439	$0	$0.00
Trenton SSD	$1,481	$72,278	$66,980	$30,439	$0	$0.00
Bradford SSD	$1,337	$72,278	$56,436	$30,439	$0	$0.00
Gibson County SSD	$1,328	$72,278	$70,479	$30,439	$0	$0.00

(Continued)

Tax Exportability*		County Median House-hold	System Child Poverty	Fiscal Capacity Per Pupil	Pupils (average daily member-	Total Fiscal Capacity	Percent of Total Fiscal Capacity	School Systems
Shared County	Unshared City/SSD							
42.42%	0.00%	$36,941	15.19%	$2,032	6,916	$ 14,050,864	0.63%	Anderson County
42.42%	63.48%	$36,941	18.87%	$3,347	917	3,068,217	0.14%	Clinton City
41.02%	48.58%	$36,669	14.22%	$2,928	4,371	12,798,803	0.58%	Oak Ridge City
40.61%	0.00%	$36,338	16.39%	$1,633	6,547	10,690,175	0.48%	Bedford County
27.02%	0.00%	$28,745	21.84%	$1,350	2,470	3,333,964	0.15%	Benton County
24.55%	0.00%	$28,740	21.08%	$939	1,789	1,679,937	0.08%	Bledsoe County
37.08%	0.00%	$38,784	12.16%	$2,354	10,909	25,678,727	1.16%	Blount County
37.08%	76.18%	$38,784	13.97%	$4,021	1,315	5,287,542	0.24%	Alcoa City
37.08%	52.35%	$38,784	11.41%	$3,154	4,461	14,069,051	0.63%	Maryville City
41.60%	0.00%	$35,910	12.54%	$2,120	9,090	19,274,270	0.87%	Bradley County
41.60%	60.70%	$35,910	18.99%	$3,166	4,334	13,721,764	0.62%	Cleveland City
32.45%	0.00%	$25,794	26.62%	$1,283	6,173	7,918,916	0.36%	Campbell County
18.00%	0.00%	$33,753	16.35%	$992	2,120	2,103,100	0.09%	Cannon County
27.98%	27.98%	$30,850	17.54%	$1,440	4,888	104,576	0.00%	Carroll County
27.98%	30.21%	$30,850	14.95%	$1,400	767	1,074,007	0.05%	Hollow Rock-Bruceton SSD
27.98%	32.75%	$30,850	17.82%	$1,445	1,317	1,902,566	0.09%	Huntingdon SSD
27.98%	40.99%	$30,850	16.40%	$1,478	1,301	1,922,879	0.09%	McKenzie SSD
27.98%	10.41%	$30,850	12.99%	$1,443	397	572,622	0.03%	South Carroll Co SSD
27.98%	11.96%	$30,850	21.30%	$1,329	1,099	1,460,005	0.07%	West Carroll Co SSD
29.38%	0.00%	$28,233	18.88%	$1,183	5,929	7,016,586	0.32%	Carter County
29.38%	52.27%	$28,233	22.57%	$1,725	2,154	3,716,855	0.17%	Elizabethton City
20.68%	0.00%	$46,536	9.81%	$1,313	6,880	9,032,059	0.41%	Cheatham County
28.03%	0.00%	$34,349	16.82%	$1,216	2,464	2,995,603	0.13%	Chester County
31.79%	0.00%	$26,563	23.69%	$1,053	4,621	4,866,241	0.22%	Claiborne County
26.63%	0.00%	$24,423	25.83%	$953	1,185	1,129,188	0.05%	Clay County
37.65%	0.00%	$25,883	26.42%	$1,282	4,682	5,999,847	0.27%	Cocke County
37.65%	69.87%	$25,883	27.08%	$2,478	693	1,718,050	0.08%	Newport City
43.01%	0.00%	$35,486	10.93%	$2,103	4,157	8,744,635	0.39%	Coffee County
43.01%	63.40%	$35,486	21.12%	$2,793	1,209	3,378,364	0.15%	Manchester City
42.52%	50.41%	$35,491	22.26%	$2,505	3,604	9,028,870	0.41%	Tullahoma City
32.38%	0.00%	$30,423	17.52%	$959	1,745	1,673,220	0.08%	Crockett County
32.38%	60.00%	$30,423	21.83%	$1,338	513	685,722	0.03%	Alamo City
32.38%	68.10%	$30,423	23.85%	$1,427	394	561,844	0.03%	Bells City
27.93%	0.00%	$30,638	20.75%	$2,149	6,863	14,749,580	0.66%	Cumberland County
56.06%	0.00%	$39,885	16.74%	$4,406	68,679	302,615,209	13.63%	Davidson County
28.88%	0.00%	$28,956	19.20%	$1,622	1,515	2,456,926	0.11%	Decatur County
31.28%	0.00%	$30,826	19.46%	$1,538	2,599	3,997,118	0.18%	DeKalb County
38.63%	0.00%	$38,797	13.85%	$1,990	8,013	15,945,140	0.72%	Dickson County
42.50%	0.00%	$33,307	12.18%	$1,795	3,178	5,703,274	0.26%	Dyer County
42.50%	60.43%	$33,307	25.65%	$2,159	3,552	7,666,498	0.35%	Dyersburg City
23.49%	0.00%	$40,303	14.91%	$1,786	3,433	6,129,449	0.28%	Fayette County
29.12%	0.00%	$23,739	28.19%	$1,181	2,292	2,706,532	0.12%	Fentress County
26.70%	0.00%	$35,660	15.15%	$1,656	5,793	9,594,818	0.43%	Franklin County
39.08%	60.29%	$31,457	22.19%	$1,874	1,562	2,927,301	0.13%	Humboldt City
39.08%	52.72%	$31,457	16.45%	$1,789	1,994	3,567,151	0.16%	Milan SSD
39.08%	32.82%	$31,457	14.55%	$1,735	1,448	2,512,447	0.11%	Trenton SSD
39.08%	15.65%	$31,457	19.43%	$1,591	637	1,013,138	0.05%	Bradford SSD
39.08%	20.20%	$31,457	13.02%	$1,754	2,639	4,630,220	0.21%	Gibson County SSD

Prototype System-level Fiscal Capacity Model Variables and Results by School System (cont.)
Based on Three-year Averages for BEP Funding Year 2005-06

School Systems	System Revenue Per Pupil	Property per Pupil		Sales per Pupil		System State-shared Taxes
		Shared (County)	Unshared (City/SSD)	Shared (County)	Unshared (City)	
Giles County	$1,746	$83,814	$0	$39,795	$0	$146.77
Grainger County	$817	$56,640	$0	$14,324	$0	$198.89
Greene County	$1,318	$95,477	$0	$44,607	$0	$128.73
Greeneville City	$3,535	$95,477	$130,312	$44,607	$129,760	$550.01
Grundy County	$850	$54,605	$0	$19,362	$0	$145.86
Hamblen County	$2,404	$108,969	$0	$68,082	$0	$85.05
Hamilton County	$3,367	$137,899	$0	$91,420	$0	$74.97
Hancock County	$730	$64,042	$0	$12,402	$0	$174.49
Hardeman County	$1,397	$61,993	$0	$25,468	$0	$127.97
Hardin County	$1,799	$108,209	$0	$46,293	$0	$196.94
Hawkins County	$1,609	$86,955	$0	$28,272	$0	$131.24
Rogersville City	$1,861	$86,955	$112,766	$28,272	$161,762	$589.70
Haywood County	$1,482	$83,119	$0	$24,208	$0	$194.12
Henderson County	$1,316	$66,930	$0	$39,314	$0	$176.82
Lexington City	$1,689	$66,930	$150,560	$39,314	$142,597	$586.82
Henry County	$2,413	$90,282	$0	$55,506	$0	$392.05
Paris SSD	$2,513	$90,282	$100,914	$55,506	$0	$0.00
Hickman County	$976	$67,630	$0	$18,136	$0	$146.00
Houston County	$958	$58,451	$0	$19,039	$0	$183.28
Humphreys County	$1,347	$98,659	$0	$35,032	$0	$332.08
Jackson County	$1,150	$69,161	$0	$15,388	$0	$162.82
Jefferson County	$1,274	$94,914	$0	$35,648	$0	$115.16
Johnson County	$1,352	$80,833	$0	$27,373	$0	$189.34
Knox County	$3,615	$127,355	$0	$106,564	$0	$87.26
Lake County	$1,308	$68,657	$0	$25,247	$0	$173.22
Lauderdale County	$1,163	$56,977	$0	$24,926	$0	$98.93
Lawrence County	$1,250	$68,177	$0	$38,912	$0	$95.41
Lewis County	$752	$62,146	$0	$26,815	$0	$120.20
Lincoln County	$1,390	$73,356	$0	$37,643	$0	$144.85
Fayetteville City	$1,965	$73,356	$110,890	$37,643	$161,601	$590.93
Loudon County	$1,790	$126,831	$0	$41,778	$0	$194.38
Lenoir City	$2,732	$126,831	$55,487	$41,778	$95,847	$285.97
McMinn County	$1,692	$107,318	$0	$46,396	$0	$106.65
Athens City	$2,805	$107,318	$179,433	$46,396	$167,266	$656.70
Etowah City	$1,697	$107,318	$110,415	$46,396	$92,250	$709.10
McNairy County	$1,191	$69,791	$0	$27,975	$0	$168.07
Macon County	$1,096	$60,403	$0	$30,832	$0	$145.23
Madison County	$3,174	$112,729	$0	$94,894	$0	$58.05
Marion County	$1,495	$87,708	$0	$45,503	$0	$199.91
Richard City SSD	$1,541	$87,708	$25,433	$45,503	$0	$0.00
Marshall County	$2,079	$88,544	$0	$35,817	$0	$120.23
Maury County	$2,120	$92,814	$0	$54,279	$0	$72.71
Meigs County	$912	$74,874	$0	$17,710	$0	$263.84
Monroe County	$1,527	$88,002	$0	$40,538	$0	$223.50
Sweetwater City	$1,469	$88,002	$59,706	$40,538	$62,958	$293.95
Montgomery County	$1,834	$67,884	$0	$49,158	$0	$44.58
Moore County	$1,884	$122,028	$0	$14,247	$0	$236.96
Morgan County	$812	$51,534	$0	$11,063	$0	$131.68

(Continued)

Tax Exportability*		County Median House-hold	System Child Poverty	Fiscal Capacity Per Pupil	Pupils (average daily member-	Total Fiscal Capacity	Percent of Total Fiscal Capacity	School Systems
Shared County	Unshared City/SSD							
38.95%	0.00%	$35,036	15.40%	$1,670	4,459	7,445,146	0.34%	Giles County
18.81%	0.00%	$28,698	20.97%	$757	3,299	2,498,993	0.11%	Grainger County
35.70%	0.00%	$30,673	15.83%	$1,738	6,922	12,032,746	0.54%	Greene County
35.70%	65.27%	$30,673	22.69%	$2,570	2,668	6,855,316	0.31%	Greeneville City
24.26%	0.00%	$24,246	28.58%	$708	2,266	1,604,262	0.07%	Grundy County
51.18%	0.00%	$32,933	17.01%	$2,373	9,024	21,416,457	0.96%	Hamblen County
49.96%	0.00%	$38,899	14.94%	$3,082	40,488	124,802,212	5.62%	Hamilton County
26.67%	0.00%	$20,124	32.83%	$516	1,067	550,609	0.02%	Hancock County
34.52%	0.00%	$28,375	20.38%	$1,091	4,501	4,909,765	0.22%	Hardeman County
34.86%	0.00%	$28,080	23.22%	$1,702	3,815	6,494,220	0.29%	Hardin County
38.43%	0.00%	$32,380	17.96%	$1,374	7,223	9,924,840	0.45%	Hawkins County
38.43%	64.41%	$32,380	18.78%	$2,244	640	1,437,177	0.06%	Rogersville City
39.90%	0.00%	$27,977	20.52%	$1,199	3,536	4,240,562	0.19%	Haywood County
37.99%	0.00%	$32,670	15.92%	$1,542	3,425	5,281,939	0.24%	Henderson County
37.99%	63.86%	$32,670	16.22%	$2,571	972	2,499,569	0.11%	Lexington City
35.25%	0.00%	$30,370	18.51%	$1,937	3,134	6,071,208	0.27%	Henry County
35.25%	54.94%	$30,370	21.79%	$2,389	1,462	3,492,250	0.16%	Paris SSD
23.62%	0.00%	$31,404	17.75%	$985	3,829	3,772,828	0.17%	Hickman County
26.44%	0.00%	$30,259	18.69%	$955	1,425	1,360,426	0.06%	Houston County
47.98%	0.00%	$35,384	15.63%	$1,727	2,998	5,179,125	0.23%	Humphreys County
27.02%	0.00%	$26,726	21.39%	$847	1,667	1,412,115	0.06%	Jackson County
29.93%	0.00%	$32,955	17.66%	$1,522	6,930	10,549,502	0.48%	Jefferson County
25.38%	0.00%	$23,582	24.05%	$1,063	2,282	2,425,987	0.11%	Johnson County
43.90%	0.00%	$39,167	13.11%	$3,338	52,038	173,693,506	7.82%	Knox County
31.67%	0.00%	$21,881	26.42%	$940	883	830,604	0.04%	Lake County
38.79%	0.00%	$28,838	20.08%	$1,086	4,555	4,945,626	0.22%	Lauderdale County
38.34%	0.00%	$30,779	17.31%	$1,484	6,719	9,970,932	0.45%	Lawrence County
29.91%	0.00%	$30,191	19.75%	$1,124	1,958	2,200,585	0.10%	Lewis County
28.63%	0.00%	$34,422	12.81%	$1,546	3,988	6,165,438	0.28%	Lincoln County
28.63%	65.56%	$34,422	28.77%	$2,195	1,019	2,236,603	0.10%	Fayetteville City
32.34%	0.00%	$40,885	11.98%	$2,007	4,896	9,826,984	0.44%	Loudon County
32.34%	63.91%	$40,885	20.92%	$2,359	2,032	4,793,553	0.22%	Lenoir City
53.09%	0.00%	$32,635	14.64%	$1,968	5,839	11,490,720	0.52%	McMinn County
53.09%	71.38%	$32,635	24.16%	$3,066	1,696	5,201,202	0.23%	Athens City
53.09%	53.33%	$32,635	25.96%	$2,616	380	994,202	0.04%	Etowah City
38.29%	0.00%	$30,345	19.91%	$1,239	4,133	5,120,985	0.23%	McNairy County
34.44%	0.00%	$30,586	19.63%	$1,234	3,564	4,398,920	0.20%	Macon County
50.74%	0.00%	$36,807	16.00%	$2,994	13,593	40,698,909	1.83%	Madison County
33.58%	0.00%	$32,145	17.44%	$1,717	4,118	7,070,323	0.32%	Marion County
33.58%	44.13%	$32,145	17.76%	$1,866	338	629,971	0.03%	Richard City SSD
45.75%	0.00%	$39,139	11.92%	$1,747	4,809	8,403,032	0.38%	Marshall County
36.74%	0.00%	$41,236	12.72%	$2,100	11,157	23,430,236	1.05%	Maury County
21.84%	0.00%	$29,708	22.28%	$935	1,842	1,722,245	0.08%	Meigs County
38.90%	0.00%	$30,737	18.87%	$1,613	5,106	8,236,741	0.37%	Monroe County
38.90%	58.04%	$30,737	32.43%	$1,874	1,440	2,698,954	0.12%	Sweetwater City
42.23%	0.00%	$39,586	13.39%	$1,874	24,625	46,148,843	2.08%	Montgomery County
42.33%	0.00%	$37,728	13.24%	$1,430	946	1,352,835	0.06%	Moore County
25.80%	0.00%	$28,674	19.73%	$712	3,241	2,308,511	0.10%	Morgan County

Prototype System-level Fiscal Capacity Model Variables and Results by School System (cont.)
Based on Three-year Averages for BEP Funding Year 2005-06

School Systems	System Revenue Per Pupil	Property per Pupil		Sales per Pupil		System State-shared Taxes
		Shared (County)	Unshared (City/SSD)	Shared (County)	Unshared (City)	
Obion County	$1,996	$78,603	$0	$48,575	$0	$131.49
Union City	$3,002	$78,603	$112,182	$48,575	$152,208	$645.16
Overton County	$1,004	$66,965	$0	$27,312	$0	$126.92
Perry County	$1,238	$93,584	$0	$23,364	$0	$410.54
Pickett County	$1,214	$94,215	$0	$30,680	$0	$219.76
Polk County	$1,270	$81,317	$0	$20,580	$0	$251.93
Putnam County	$2,038	$98,372	$0	$77,186	$0	$76.21
Rhea County	$1,306	$80,380	$0	$33,388	$0	$206.04
Dayton City	$1,531	$80,380	$148,739	$33,388	$141,632	$638.89
Roane County	$1,912	$98,381	$0	$48,866	$0	$152.04
Robertson County	$1,762	$86,962	$0	$36,949	$0	$62.73
Rutherford County	$2,350	$92,853	$0	$56,928	$0	$57.93
Murfreesboro City	$2,881	$92,853	$230,665	$56,928	$231,210	$977.95
Scott County	$1,131	$56,698	$0	$32,102	$0	$192.19
Oneida SSD	$1,403	$56,698	$38,856	$32,102	$0	$0.00
Sequatchie County	$1,740	$78,499	$0	$28,356	$0	$144.41
Sevier County	$3,228	$175,479	$0	$150,885	$0	$100.51
Shelby County	$2,806	$94,710	$0	$59,726	$0	$207.20
Memphis SSD City	$3,394	$94,710	$85,859	$59,726	$62,374	$509.81
Smith County	$1,093	$79,272	$0	$29,163	$0	$151.75
Stewart County	$1,287	$70,907	$0	$19,799	$0	$735.85
Sullivan County	$2,894	$112,294	$0	$67,508	$0	$133.87
Bristol City	$3,743	$112,294	$117,461	$67,508	$88,623	$594.23
Kingsport City	$4,692	$110,346	$176,090	$64,490	$161,054	$641.28
Sumner County	$1,873	$98,425	$0	$35,012	$0	$53.43
Tipton County	$921	$54,236	$0	$18,664	$0	$52.94
Trousdale County	$949	$64,633	$0	$20,065	$0	$291.69
Unicoi County	$1,262	$82,687	$0	$26,658	$0	$100.40
Union County	$845	$58,561	$0	$14,252	$0	$226.65
Van Buren County	$1,295	$85,180	$0	$17,808	$0	$277.46
Warren County	$1,809	$81,703	$0	$46,215	$0	$114.88
Washington County	$2,162	$113,096	$0	$83,081	$0	$117.31
Johnson City	$3,794	$113,096	$163,030	$83,081	$172,438	$700.70
Wayne County	$897	$59,208	$0	$20,296	$0	$226.46
Weakley County	$1,254	$76,586	$0	$34,786	$0	$118.96
White County	$1,052	$68,546	$0	$31,327	$0	$121.98
Williamson County	$3,373	$166,907	$0	$82,925	$0	$96.16
Franklin SSD	$5,642	$166,907	$280,371	$82,925	$0	$0.00
Wilson County	$1,923	$114,915	$0	$47,556	$0	$98.62
Lebanon SSD	$2,530	$114,915	$188,299	$47,556	$0	$0.00
Statewide	**$2,586**	**$105,363**	**$106,124**	**$62,703**	**$89,333**	**$245.39**

(Continued)

Tax Exportability*		County Median House-hold	System Child Poverty	Fiscal Capacity Per Pupil	Pupils (average daily member-	Total Fiscal Capacity	Percent of Total Fiscal Capacity	School Systems
Shared County	Unshared City/SSD							
40.01%	0.00%	$33,967	13.23%	$1,844	4,008	7,390,874	0.33%	Obion County
40.01%	57.02%	$33,967	22.63%	$2,580	1,390	3,584,906	0.16%	Union City
29.82%	0.00%	$27,783	20.88%	$1,110	3,230	3,585,456	0.16%	Overton County
35.23%	0.00%	$28,571	18.69%	$1,275	1,142	1,455,845	0.07%	Perry County
21.27%	0.00%	$24,819	23.42%	$1,200	704	845,148	0.04%	Pickett County
26.15%	0.00%	$30,268	19.09%	$1,098	2,469	2,711,926	0.12%	Polk County
43.51%	0.00%	$31,675	16.30%	$2,457	9,649	23,708,810	1.07%	Putnam County
35.53%	0.00%	$31,150	18.31%	$1,423	3,812	5,423,621	0.24%	Rhea County
35.53%	67.56%	$31,150	21.69%	$2,408	731	1,761,033	0.08%	Dayton City
28.74%	0.00%	$34,276	16.40%	$1,842	7,273	13,396,175	0.60%	Roane County
29.52%	0.00%	$43,713	10.92%	$1,734	9,670	16,768,786	0.76%	Robertson County
42.33%	0.00%	$47,423	7.69%	$2,334	28,086	65,561,013	2.95%	Rutherford County
42.33%	53.27%	$47,423	15.43%	$3,804	5,855	22,272,849	1.00%	Murfreesboro City
39.36%	0.00%	$24,558	25.26%	$1,122	2,602	2,918,472	0.13%	Scott County
39.36%	68.46%	$24,558	25.71%	$1,372	1,259	1,727,033	0.08%	Oneida SSD
26.70%	0.00%	$31,157	20.48%	$1,220	1,900	2,318,304	0.10%	Sequatchie County
44.00%	0.00%	$34,613	17.27%	$4,352	12,776	55,599,371	2.50%	Sevier County
48.65%	0.00%	$40,279	4.40%	$2,415	45,644	110,212,980	4.96%	Shelby County
48.65%	59.82%	$40,279	22.72%	$2,775	116,668	323,788,961	14.58%	Memphis SSD City
34.06%	0.00%	$36,191	14.22%	$1,437	3,138	4,507,834	0.20%	Smith County
21.81%	0.00%	$33,022	16.10%	$1,169	2,089	2,442,999	0.11%	Stewart County
48.01%	0.00%	$34,522	11.56%	$2,464	12,646	31,164,974	1.40%	Sullivan County
48.01%	56.17%	$34,522	15.99%	$3,219	3,607	11,609,042	0.52%	Bristol City
47.27%	65.35%	$34,357	22.16%	$3,432	6,388	21,926,247	0.99%	Kingsport City
31.37%	0.00%	$46,072	9.98%	$1,801	23,383	42,124,541	1.90%	Sumner County
26.89%	0.00%	$40,928	13.53%	$1,119	11,021	12,326,971	0.56%	Tipton County
30.99%	0.00%	$32,268	15.11%	$1,126	1,272	1,432,197	0.06%	Trousdale County
33.22%	0.00%	$30,682	16.28%	$1,288	2,506	3,226,928	0.15%	Unicoi County
20.31%	0.00%	$28,189	22.95%	$744	3,063	2,278,696	0.10%	Union County
12.13%	0.00%	$28,676	19.84%	$953	777	740,546	0.03%	Van Buren County
39.75%	0.00%	$31,295	19.36%	$1,686	6,102	10,285,986	0.46%	Warren County
40.75%	0.00%	$33,528	15.31%	$2,676	8,639	23,116,116	1.04%	Washington County
40.75%	54.47%	$33,528	15.17%	$3,816	6,819	26,024,699	1.17%	Johnson City
29.60%	0.00%	$26,306	20.80%	$928	2,610	2,423,561	0.11%	Wayne County
37.40%	0.00%	$30,711	16.31%	$1,451	4,858	7,049,886	0.32%	Weakley County
31.50%	0.00%	$29,271	18.15%	$1,265	3,870	4,897,567	0.22%	White County
35.75%	0.00%	$73,380	3.49%	$3,577	21,026	75,220,722	3.39%	Williamson County
35.75%	62.39%	$73,380	9.00%	$4,916	3,760	18,486,144	0.83%	Franklin SSD
32.73%	0.00%	$50,543	6.39%	$2,258	12,140	27,416,258	1.23%	Wilson County
32.73%	57.05%	$50,543	19.86%	$3,038	2,955	8,977,953	0.40%	Lebanon SSD
43.04%	**41.52%**	**$36,506**	**15.79%**	**$2,454**	**905,211**	**$ 2,221,013,014**	**100.00%**	
35.21%	**16.68%**	**$33,508**	**18.17%**	**$1,864**				

Appendix E-3

Comparison of State BEP Funding for Fiscal Year 2005-06 with County and System Models

Tennessee Basic Education Program
Comparison of State Funding with Alternative Fiscal Capacity Models
Actual County Model and Prototype System-level Model
2005-06 School Year

System Name	State Funding w/FY06 Capacity Models			Number of Students
	County Model	Prototype	Difference	
Anderson County	$23,307,000	$25,081,000	$1,774,000	6,811
Clinton City	3,151,000	2,371,000	(780,000)	902
Oak Ridge City	14,546,000	12,329,000	(2,217,000)	4,307
Bedford County	25,009,000	25,432,000	423,000	7,053
Benton County	9,464,000	9,559,000	95,000	2,462
Bledsoe County	8,826,000	8,731,000	(95,000)	1,859
Blount County	36,672,000	36,260,000	(412,000)	11,122
Alcoa City	4,324,000	2,449,000	(1,875,000)	1,386
Maryville City	14,523,000	11,254,000	(3,269,000)	4,604
Bradley County	28,490,000	29,469,000	979,000	9,349
Cleveland City	13,972,000	10,960,000	(3,012,000)	4,584
Campbell County	23,510,000	23,704,000	194,000	6,044
Cannon County	8,854,000	9,003,000	149,000	2,132
Carroll County	1,605,000	2,001,000	396,000	5
H Rock-Bruceton SSD	2,879,000	2,749,000	(130,000)	754
Huntingdon SSD	4,695,000	4,365,000	(330,000)	1,266
McKenzie SSD	4,952,000	4,664,000	(288,000)	1,332
South Carroll Co SSD	1,618,000	1,568,000	(50,000)	408
West Carroll Co SSD	4,059,000	3,918,000	(141,000)	1,064
Carter County	24,006,000	24,705,000	699,000	5,984
Elizabethton City	7,591,000	6,620,000	(971,000)	2,033
Cheatham County	25,929,000	25,507,000	(422,000)	6,952
Chester County	9,585,000	9,605,000	20,000	2,496
Claiborne County	19,467,000	20,221,000	754,000	4,725
Clay County	5,176,000	5,304,000	128,000	1,156
Cocke County	18,102,000	18,619,000	517,000	4,763
Newport City	2,512,000	1,863,000	(649,000)	694
Coffee County	13,640,000	13,879,000	239,000	4,270
Manchester City	4,139,000	3,543,000	(596,000)	1,266
Tullahoma City	11,080,000	9,646,000	(1,434,000)	3,651
Crockett County	7,021,000	7,305,000	284,000	1,733
Alamo City	2,036,000	1,936,000	(100,000)	494
Bells City	1,759,000	1,696,000	(63,000)	402
Cumberland County	23,682,000	22,370,000	(1,312,000)	6,980
Davidson County	144,703,000	155,200,000	10,497,000	70,189
Decatur County	6,016,000	6,081,000	65,000	1,539

Tennessee Basic Education Program (cont.)
Comparison of State Funding with Alternative Fiscal Capacity Models
Actual County Model and Prototype System-level Model
2005-06 School Year

System Name	State Funding w/FY06 Capacity Models			Number of Students
	County Model	Prototype	Difference	
DeKalb County	10,116,000	9,982,000	(134,000)	2,647
Dickson County	26,499,000	26,055,000	(444,000)	8,084
Dyer County	11,473,000	12,071,000	598,000	3,276
Dyersburg City	11,226,000	9,955,000	(1,271,000)	3,566
Fayette County	12,951,000	12,850,000	(101,000)	3,445
Fentress County	9,399,000	9,859,000	460,000	2,291
Franklin County	22,013,000	21,524,000	(489,000)	5,894
Humboldt City	5,497,000	5,102,000	(395,000)	1,494
Milan SSD	7,183,000	6,888,000	(295,000)	2,068
Trenton SSD	5,111,000	4,933,000	(178,000)	1,435
Bradford SSD	2,257,000	2,262,000	5,000	617
Gibson County SSD	9,531,000	9,245,000	(286,000)	2,690
Giles County	15,202,000	15,986,000	784,000	4,503
Grainger County	14,652,000	14,629,000	(23,000)	3,417
Greene County	24,445,000	25,377,000	932,000	7,039
Greeneville City	9,605,000	8,209,000	(1,396,000)	2,704
Grundy County	10,259,000	10,754,000	495,000	2,276
Hamblen County	26,980,000	28,197,000	1,217,000	9,401
Hamilton County	84,832,000	95,054,000	10,222,000	39,982
Hancock County	5,095,000	5,070,000	(25,000)	1,011
Hardeman County	18,755,000	18,506,000	(249,000)	4,384
Hardin County	13,110,000	13,258,000	148,000	3,761
Hawkins County	28,222,000	28,941,000	719,000	7,336
Rogersville City	2,226,000	1,749,000	(477,000)	626
Haywood County	13,878,000	14,014,000	136,000	3,492
Henderson County	12,744,000	12,954,000	210,000	3,487
Lexington City	3,692,000	2,935,000	(757,000)	1,007
Henry County	10,851,000	10,992,000	141,000	3,179
Paris SSD	5,131,000	4,644,000	(487,000)	1,527
Hickman County	16,802,000	16,285,000	(517,000)	3,831
Houston County	6,259,000	6,165,000	(94,000)	1,426
Humphreys County	11,053,000	10,934,000	(119,000)	3,018
Jackson County	6,944,000	7,219,000	275,000	1,610
Jefferson County	26,132,000	25,751,000	(381,000)	7,151
Johnson County	10,309,000	10,008,000	(301,000)	2,313
Knox County	114,086,000	117,559,000	3,473,000	53,182
Lake County	3,893,000	3,866,000	(27,000)	865
Lauderdale County	18,492,000	18,341,000	(151,000)	4,496
Lawrence County	24,262,000	24,729,000	467,000	6,724
Lewis County	7,762,000	7,531,000	(231,000)	1,893
Lincoln County	14,781,000	14,723,000	(58,000)	4,021
Fayetteville City	3,551,000	2,927,000	(624,000)	984

Tennessee Basic Education Program (cont.)
Comparison of State Funding with Alternative Fiscal Capacity Models
Actual County Model and Prototype System-level Model
2005-06 School Year

System Name	State Funding w/FY06 Capacity Models			Number of Students
	County Model	Prototype	Difference	
Loudon County	16,396,000	15,894,000	(502,000)	4,937
Lenoir City	6,989,000	6,306,000	(683,000)	2,161
McMinn County	18,796,000	18,600,000	(196,000)	5,772
Athens City	5,627,000	4,126,000	(1,501,000)	1,694
Etowah City	1,391,000	1,243,000	(148,000)	396
McNairy County	15,869,000	16,492,000	623,000	4,213
Macon County	14,476,000	14,484,000	8,000	3,662
Madison County	35,663,000	36,253,000	590,000	13,672
Marion County	14,752,000	14,669,000	(83,000)	4,081
Richard City SSD	1,197,000	1,141,000	(56,000)	334
Marshall County	15,899,000	16,515,000	616,000	4,892
Maury County	38,375,000	38,145,000	(230,000)	11,326
Meigs County	8,164,000	7,868,000	(296,000)	1,835
Monroe County	20,038,000	19,359,000	(679,000)	5,283
Sweetwater City	5,307,000	4,661,000	(646,000)	1,405
Montgomery County	83,562,000	86,640,000	3,078,000	25,867
Moore County	4,043,000	3,930,000	(113,000)	975
Morgan County	14,483,000	14,391,000	(92,000)	3,238
Obion County	13,191,000	13,782,000	591,000	4,053
Union City	4,523,000	3,870,000	(653,000)	1,369
Overton County	13,805,000	13,875,000	70,000	3,314
Perry County	4,745,000	4,847,000	102,000	1,118
Pickett County	3,101,000	3,014,000	(87,000)	690
Polk County	10,336,000	10,306,000	(30,000)	2,534
Putnam County	28,912,000	29,223,000	311,000	9,887
Rhea County	14,924,000	14,757,000	(167,000)	3,922
Dayton City	2,621,000	1,931,000	(690,000)	695
Roane County	26,326,000	26,080,000	(246,000)	7,369
Robertson County	35,535,000	34,953,000	(582,000)	10,017
Rutherford County	93,845,000	93,965,000	120,000	30,959
Murfreesboro City	18,878,000	11,347,000	(7,531,000)	6,018
Scott County	10,857,000	10,908,000	51,000	2,649
Oneida SSD	5,060,000	4,791,000	(269,000)	1,298
Sequatchie County	8,439,000	8,256,000	(183,000)	2,011
Sevier County	31,372,000	21,342,000	(10,030,000)	13,523
Shelby County	130,836,000	146,578,000	15,742,000	44,815
Memphis City SSD	348,391,000	359,621,000	11,230,000	118,265
Smith County	12,227,000	12,198,000	(29,000)	3,165
Stewart County	9,104,000	8,597,000	(507,000)	2,145
Sullivan County	34,507,000	36,035,000	1,528,000	12,417
Bristol City	10,055,000	8,384,000	(1,671,000)	3,733
Kingsport City	17,206,000	12,742,000	(4,464,000)	6,444
Sumner County	83,094,000	83,684,000	590,000	24,516

Tennessee Basic Education Program (cont.)
Comparison of State Funding with Alternative Fiscal Capacity Models
Actual County Model and Prototype System-level Model
2005-06 School Year

System Name	State Funding w/FY06 Capacity Models			Number of Students
	County Model	Prototype	Difference	
Tipton County	45,918,000	44,126,000	(1,792,000)	11,246
Trousdale County	6,039,000	5,907,000	(132,000)	1,273
Unicoi County	9,598,000	10,112,000	514,000	2,558
Union County	14,424,000	13,949,000	(475,000)	3,125
Van Buren County	3,875,000	3,738,000	(137,000)	765
Warren County	20,830,000	21,628,000	798,000	6,104
Washington County	24,473,000	24,521,000	48,000	8,873
Johnson City	18,635,000	11,801,000	(6,834,000)	6,832
Wayne County	11,070,000	10,848,000	(222,000)	2,527
Weakley County	17,253,000	17,879,000	626,000	4,792
White County	15,281,000	15,111,000	(170,000)	3,860
Williamson County	61,149,000	63,142,000	1,993,000	23,665
Franklin SSD	10,658,000	6,442,000	(4,216,000)	3,777
Wilson County	39,966,000	39,347,000	(619,000)	12,904
Lebanon SSD	9,718,000	7,618,000	(2,100,000)	3,049
Statewide	**$2,859,965,000**	**$2,859,972,000**	**$7,000**	**922,944**

Appendix E-4
Comparison of Alternative System Models, Past and Present

	1990 System Level Models			Models Evaluated for Task Force				
School System	Unique Property Base	Overlapping Property Base	02 Two Tier	04 Two-tier Regression/ Algebraic	04 Two-tier Regression/ Regression	04 One-tier Algebraic	04 One-tier Regression	05 Prototype
Anderson County	0.5267%	0.8665%	0.4630%	0.5617%	0.5730%	0.6352%	0.6268%	0.6254%
Clinton City	0.2053%	0.1263%	0.1929%	0.1374%	0.1245%	0.1525%	0.1355%	0.1401%
Oak Ridge City	0.6772%	0.4164%	0.7536%	0.5560%	0.5576%	0.6240%	0.5703%	0.5860%
Bedford County	0.5096%	0.5096%	0.4937%	0.5464%	0.5464%	0.4756%	0.4751%	0.4735%
Benton County	0.2024%	0.2024%	0.1919%	0.1414%	0.1414%	0.1826%	0.1522%	0.1562%
Bledsoe County	0.1017%	0.1017%	0.0828%	0.0900%	0.0900%	0.1153%	0.0823%	0.0816%
Blount County	0.9663%	1.2077%	0.7481%	0.9857%	1.0331%	1.1586%	1.1414%	1.1407%
Alcoa City	0.3779%	0.2612%	0.2986%	0.2584%	0.2127%	0.2852%	0.2481%	0.2435%
Maryville City	0.4035%	0.2789%	0.5637%	0.5749%	0.5732%	0.6568%	0.6008%	0.6214%
Bradley County	0.7721%	1.0227%	0.6230%	0.7553%	0.8049%	0.8340%	0.8685%	0.8601%
Cleveland City	0.7569%	0.5063%	0.7977%	0.6210%	0.5713%	0.6836%	0.6245%	0.6259%
Campbell County	0.5020%	0.5020%	0.3958%	0.3484%	0.3484%	0.4359%	0.3548%	0.3679%
Cannon County	0.1391%	0.1391%	0.0973%	0.0891%	0.0891%	0.1159%	0.1003%	0.0997%
Carroll County	0.0000%	0.2134%	0.0227%	0.0002%	0.0002%	0.0273%	0.0315%	0.0010%
Hollow Rock-Bruceton SSD	0.0607%	0.0303%	0.0460%	0.0381%	0.0409%	0.0497%	0.0532%	0.0524%
Huntingdon SSD	0.0937%	0.0468%	0.0888%	0.0672%	0.0652%	0.0922%	0.0874%	0.0888%
McKenzie SSD	0.0894%	0.0446%	0.0845%	0.0668%	0.0746%	0.0906%	0.0928%	0.0917%
South Carroll Co SSD	0.1519%	0.0758%	0.0249%	0.0201%	0.0190%	0.0271%	0.0260%	0.0264%
West Carroll Co SSD	0.0302%	0.0151%	0.0693%	0.0555%	0.0481%	0.0748%	0.0693%	0.0699%
Carter County	0.3187%	0.4529%	0.2794%	0.2776%	0.2479%	0.3478%	0.3275%	0.3290%
Elizabethton City	0.3809%	0.2466%	0.2212%	0.1339%	0.1636%	0.1966%	0.1808%	0.1801%
Cheatham County	0.3664%	0.3664%	0.3539%	0.4691%	0.4691%	0.3728%	0.4379%	0.4165%
Chester County	0.1625%	0.1625%	0.1320%	0.1339%	0.1339%	0.1349%	0.1363%	0.1372%
Claiborne County	0.2891%	0.2891%	0.2611%	0.2351%	0.2351%	0.2823%	0.2139%	0.2218%
Clay County	0.0807%	0.0807%	0.0681%	0.0460%	0.0460%	0.0703%	0.0520%	0.0536%
Cocke County	0.2789%	0.3099%	0.2423%	0.2512%	0.2381%	0.3095%	0.2722%	0.2777%
Newport City	0.1289%	0.0979%	0.1324%	0.0663%	0.0793%	0.0947%	0.0818%	0.0816%
Coffee County	0.2881%	0.5097%	0.2572%	0.3240%	0.3290%	0.3552%	0.3855%	0.3918%
Manchester City	0.1817%	0.1095%	0.1716%	0.1366%	0.1317%	0.1522%	0.1552%	0.1561%
Tullahoma City	0.3760%	0.2266%	0.4356%	0.3704%	0.3703%	0.4099%	0.4270%	0.4225%

Appendix E-4 (cont.)
Comparison of Alternative System Models, Past and Present

	1990 System Level Models			Models Evaluated for Task Force				
School System	Unique Property Base	Overlapping Property Base	02 Two Tier	04 Two-tier Regression/ Algebraic	04 Two-tier Regression/ Regression	04 One-tier Algebraic	04 One-tier Regression	05 Prototype
Crockett County	0.1419%	0.1506%	0.0803%	0.0843%	0.0801%	0.0946%	0.0773%	0.0773%
Alamo City	0.0222%	0.0179%	0.0395%	0.0320%	0.0292%	0.0355%	0.0339%	0.0329%
Bells City	0.0226%	0.0182%	0.0319%	0.0232%	0.0302%	0.0289%	0.0260%	0.0267%
Cumberland County	0.4710%	0.4710%	0.5742%	0.6097%	0.6097%	0.7680%	0.6707%	0.6707%
Davidson County	15.0778%	15.0778%	14.4789%	14.3233%	14.3233%	13.9624%	13.8659%	13.6587%
Decatur County	0.1332%	0.1332%	0.1329%	0.1072%	0.1072%	0.1299%	0.1168%	0.1170%
DeKalb County	0.2078%	0.2078%	0.1840%	0.2026%	0.2026%	0.2296%	0.1799%	0.1803%
Dickson County	0.6108%	0.6108%	0.7014%	0.7630%	0.7630%	0.6739%	0.7156%	0.7092%
Dyer County	0.1922%	0.3748%	0.2163%	0.2431%	0.2424%	0.2472%	0.2693%	0.2645%
Dyersburg City	0.4442%	0.2616%	0.4199%	0.3396%	0.3403%	0.3672%	0.3689%	0.3532%
Fayette County	0.2941%	0.2941%	0.2722%	0.3283%	0.3283%	0.3666%	0.2723%	0.2687%
Fentress County	0.1254%	0.1254%	0.1539%	0.1020%	0.1020%	0.1579%	0.1166%	0.1249%
Franklin County	0.4704%	0.4704%	0.4065%	0.4343%	0.4343%	0.4601%	0.4343%	0.4336%
Humboldt City	0.0525%	0.1453%	0.1579%	0.1232%	0.1128%	0.1485%	0.1528%	0.1426%
Milan SSD	0.2690%	0.1989%	0.1548%	0.1404%	0.1488%	0.1774%	0.1658%	0.1637%
Trenton SSD	0.1581%	0.1532%	0.1055%	0.0978%	0.0976%	0.1211%	0.1101%	0.1129%
Bradford SSD	0.1673%	0.1215%	0.0413%	0.0421%	0.0374%	0.0506%	0.0473%	0.0472%
Gibson County SSD	0.1486%	0.1766%	0.2070%	0.1769%	0.1839%	0.2230%	0.2017%	0.2096%
Giles County	0.4135%	0.4135%	0.4051%	0.4007%	0.4007%	0.3496%	0.3521%	0.3467%
Grainger County	0.1712%	0.1712%	0.1202%	0.1017%	0.1017%	0.1559%	0.1158%	0.1204%
Greene County	0.5448%	0.6494%	0.4092%	0.4810%	0.4579%	0.5779%	0.5338%	0.5461%
Greeneville City	0.3654%	0.2607%	0.3926%	0.2886%	0.3117%	0.3923%	0.3195%	0.3200%
Grundy County	0.1468%	0.1468%	0.1061%	0.0649%	0.0649%	0.1038%	0.0755%	0.0775%
Hamblen County	1.0681%	1.0681%	1.0450%	1.0782%	1.0782%	0.9686%	0.9694%	0.9590%
Hamilton County	6.9717%	6.9717%	6.4452%	5.9735%	5.9735%	5.5705%	5.7011%	5.6103%
Hancock County	0.0404%	0.0404%	0.0311%	0.0286%	0.0286%	0.0526%	0.0239%	0.0272%
Hardeman County	0.3052%	0.3052%	0.2285%	0.2259%	0.2259%	0.2459%	0.2178%	0.2228%
Hardin County	0.3742%	0.3742%	0.3230%	0.3163%	0.3163%	0.3657%	0.2932%	0.2956%
Hawkins County	0.7103%	0.7178%	0.3996%	0.5337%	0.5258%	0.4816%	0.4488%	0.4464%
Rogersville City	0.0809%	0.0734%	0.0931%	0.0729%	0.0809%	0.0737%	0.0661%	0.0663%

Appendix E-4 (cont.)
Comparison of Alternative System Models, Past and Present

	1990 System Level Models			Models Evaluated for Task Force				
School System	Unique Property Base	Overlapping Property Base	02 Two Tier	04 Two-tier Regression/ Algebraic	04 Two-tier Regression/ Regression	04 One-tier Algebraic	04 One-tier Regression	05 Prototype
Haywood County	0.3110%	0.3110%	0.2293%	0.2378%	0.2378%	0.2458%	0.1905%	0.1940%
Henderson County	0.1899%	0.2194%	0.1790%	0.2218%	0.2164%	0.2345%	0.2406%	0.2412%
Lexington City	0.1100%	0.0805%	0.1506%	0.0961%	0.1015%	0.1156%	0.1050%	0.1098%
Henry County	0.2894%	0.3480%	0.2559%	0.2378%	0.2432%	0.3158%	0.2713%	0.2774%
Paris SSD	0.2013%	0.1427%	0.1898%	0.1447%	0.1393%	0.1729%	0.1645%	0.1624%
Hickman County	0.2101%	0.2101%	0.1610%	0.1786%	0.1786%	0.2019%	0.1780%	0.1801%
Houston County	0.0837%	0.0837%	0.0579%	0.0585%	0.0585%	0.0694%	0.0594%	0.0617%
Humphreys County	0.3275%	0.3275%	0.2351%	0.2954%	0.2954%	0.2614%	0.2191%	0.2257%
Jackson County	0.1081%	0.1081%	0.0867%	0.0695%	0.0695%	0.0887%	0.0664%	0.0685%
Jefferson County	0.4543%	0.4543%	0.4433%	0.4954%	0.4954%	0.5487%	0.4844%	0.4833%
Johnson County	0.1639%	0.1639%	0.1115%	0.0964%	0.0964%	0.1521%	0.1047%	0.1112%
Knox County	7.6859%	7.6859%	7.8234%	7.3569%	7.3569%	7.2504%	7.8297%	7.7782%
Lake County	0.0816%	0.0816%	0.0453%	0.0400%	0.0400%	0.0541%	0.0374%	0.0384%
Lauderdale County	0.3263%	0.3263%	0.2822%	0.2599%	0.2599%	0.2361%	0.2268%	0.2310%
Lawrence County	0.5458%	0.5458%	0.5348%	0.4844%	0.4844%	0.4468%	0.4706%	0.4594%
Lewis County	0.1079%	0.1079%	0.1010%	0.0962%	0.0962%	0.1113%	0.1018%	0.1040%
Lincoln County	0.2579%	0.2903%	0.2111%	0.2342%	0.2404%	0.2809%	0.2787%	0.2825%
Fayetteville City	0.1295%	0.0971%	0.1471%	0.0931%	0.0869%	0.1196%	0.1132%	0.1085%
Loudon County	0.4612%	0.4758%	0.3353%	0.4589%	0.4469%	0.4807%	0.4212%	0.4268%
Lenoir City	0.0978%	0.0833%	0.2007%	0.2323%	0.2443%	0.2524%	0.2213%	0.2135%
McMinn County	0.4424%	0.5074%	0.3671%	0.5391%	0.5912%	0.5502%	0.5060%	0.5097%
Athens City	0.2104%	0.1549%	0.2897%	0.2886%	0.2437%	0.2805%	0.2433%	0.2422%
Etowah City	0.0362%	0.0266%	0.0478%	0.0506%	0.0433%	0.0484%	0.0428%	0.0432%
McNairy County	0.5138%	0.5138%	0.2702%	0.2659%	0.2659%	0.2473%	0.2265%	0.2318%
Macon County	0.2308%	0.2308%	0.1790%	0.1959%	0.1959%	0.1953%	0.1905%	0.1998%
Madison County	1.5649%	1.5649%	1.9553%	1.8382%	1.8382%	1.6906%	1.8452%	1.8146%
Marion County	0.5983%	0.5987%	0.3226%	0.3183%	0.3147%	0.3446%	0.3143%	0.3194%
Richard City SSD	0.0167%	0.0163%	0.0259%	0.0247%	0.0282%	0.0269%	0.0251%	0.0262%
Marshall County	0.4356%	0.4356%	0.4097%	0.4739%	0.4739%	0.3688%	0.3800%	0.3774%
Maury County	0.7107%	0.7107%	1.1308%	1.1503%	1.1503%	1.0031%	1.1064%	1.0695%

Appendix E-4 (cont.)
Comparison of Alternative System Models, Past and Present

	1990 System Level Models			Models Evaluated for Task Force				
School System	Unique Property Base	Overlapping Property Base	02 Two Tier	04 Two-tier Regression/ Algebraic	04 Two-tier Regression/ Regression	04 One-tier Algebraic	04 One-tier Regression	05 Prototype
Meigs County	0.1001%	0.1001%	0.0687%	0.0789%	0.0789%	0.1093%	0.0776%	0.0781%
Monroe County	0.4168%	0.4373%	0.2934%	0.3772%	0.3802%	0.4102%	0.3482%	0.3613%
Sweetwater City	0.1154%	0.0948%	0.1360%	0.1337%	0.1306%	0.1378%	0.1361%	0.1300%
Montgomery County	1.6631%	1.6631%	2.1714%	2.2142%	2.2142%	1.7115%	2.0587%	2.0450%
Moore County	0.0971%	0.0971%	0.0567%	0.0941%	0.0941%	0.0778%	0.0604%	0.0580%
Morgan County	0.2033%	0.2033%	0.1102%	0.1028%	0.1028%	0.1283%	0.1033%	0.1088%
Obion County	0.4236%	0.4709%	0.2820%	0.3077%	0.3080%	0.3181%	0.3368%	0.3329%
Union City	0.1966%	0.1493%	0.2411%	0.1615%	0.1612%	0.1782%	0.1707%	0.1669%
Overton County	0.1956%	0.1956%	0.1674%	0.1552%	0.1552%	0.1879%	0.1603%	0.1662%
Perry County	0.0766%	0.0766%	0.0792%	0.0827%	0.0827%	0.0880%	0.0613%	0.0641%
Pickett County	0.0422%	0.0422%	0.0401%	0.0324%	0.0324%	0.0545%	0.0375%	0.0386%
Polk County	0.2046%	0.2046%	0.1340%	0.1391%	0.1391%	0.1639%	0.1206%	0.1273%
Putnam County	0.9666%	0.9666%	1.0786%	1.0246%	1.0246%	1.0268%	1.0726%	1.0757%
Rhea County	0.2639%	0.2972%	0.1844%	0.2375%	0.2368%	0.2744%	0.2357%	0.2419%
Dayton City	0.1329%	0.0995%	0.0993%	0.0743%	0.0750%	0.0908%	0.0793%	0.0811%
Roane County	0.9495%	0.9495%	0.5604%	0.5934%	0.5934%	0.6125%	0.6177%	0.6040%
Robertson County	0.6340%	0.6340%	0.6928%	0.8263%	0.8263%	0.6904%	0.7547%	0.7340%
Rutherford County	1.3421%	1.7027%	1.8667%	2.7007%	2.9337%	2.4617%	2.8379%	2.8219%
Murfreesboro City	1.1442%	0.7836%	1.4395%	1.1993%	0.9663%	1.0647%	0.9759%	0.9969%
Scott County	0.2339%	0.2490%	0.1283%	0.1332%	0.1001%	0.1485%	0.1261%	0.1329%
Oneida SSD	0.0763%	0.0612%	0.0834%	0.0683%	0.1014%	0.0813%	0.0827%	0.0833%
Sequatchie County	0.1230%	0.1230%	0.1021%	0.1046%	0.1046%	0.1245%	0.1034%	0.1053%
Sevier County	1.0868%	1.0868%	1.7554%	2.1013%	2.1013%	2.4404%	2.3767%	2.4479%
Shelby County	6.1064%	11.5085%	4.1607%	4.2787%	4.9284%	4.5096%	4.8441%	4.9036%
Memphis City	13.2868%	7.8848%	16.8642%	14.5223%	13.8726%	14.4439%	14.5533%	14.8750%
Smith County	0.1997%	0.1997%	0.2087%	0.2375%	0.2375%	0.2116%	0.2044%	0.2030%
Stewart County	0.1041%	0.1041%	0.0825%	0.1091%	0.1091%	0.1525%	0.0973%	0.1095%
Sullivan County	1.4565%	2.2254%	1.0566%	1.2097%	1.3403%	1.4452%	1.4449%	1.4204%
Bristol City	0.5338%	0.3362%	0.5358%	0.4890%	0.4997%	0.5576%	0.5259%	0.5269%
Kingsport City	1.5432%	0.9719%	1.2611%	1.0256%	0.8843%	1.1277%	0.9913%	0.9962%

Appendix E-4 (cont.)
Comparison of Alternative System Models, Past and Present

	1990 System Level Models			Models Evaluated for Task Force				
School System	Unique Property Base	Overlapping Property Base	02 Two Tier	04 Two-tier Regression/ Algebraic	04 Two-tier Regression/ Regression	04 One-tier Algebraic	04 One-tier Regression	05 Prototype
Sumner County	1.9994%	1.9994%	1.7868%	2.2644%	2.2644%	1.8210%	1.9484%	1.8715%
Tipton County	0.4723%	0.4723%	0.4624%	0.5835%	0.5835%	0.4768%	0.5466%	0.5492%
Trousdale County	0.0979%	0.0979%	0.0600%	0.0665%	0.0665%	0.0685%	0.0601%	0.0644%
Unicoi County	0.2472%	0.2472%	0.1800%	0.1617%	0.1617%	0.1655%	0.1422%	0.1441%
Union County	0.1225%	0.1225%	0.0904%	0.0987%	0.0987%	0.1457%	0.1056%	0.1090%
Van Buren County	0.0427%	0.0427%	0.0251%	0.0298%	0.0298%	0.0508%	0.0342%	0.0354%
Warren County	0.5261%	0.5261%	0.5590%	0.5115%	0.5115%	0.4858%	0.4859%	0.4771%
Washington County	0.6822%	1.1879%	0.6320%	0.7598%	0.8406%	1.0260%	1.0405%	1.0422%
Johnson City	1.2809%	0.7751%	1.2189%	1.0254%	0.9446%	1.2713%	1.1544%	1.1821%
Wayne County	0.1654%	0.1654%	0.1111%	0.1081%	0.1081%	0.1372%	0.1066%	0.1122%
Weakley County	0.4812%	0.4812%	0.4130%	0.3671%	0.3671%	0.3414%	0.3397%	0.3328%
White County	0.3055%	0.3055%	0.2306%	0.2210%	0.2210%	0.2409%	0.2201%	0.2227%
Williamson County	1.4281%	1.5383%	2.3000%	3.6339%	3.8818%	3.0197%	3.2885%	3.1868%
Franklin SSD	0.5220%	0.4118%	0.9929%	1.0138%	0.7658%	0.6867%	0.7171%	0.8134%
Wilson County	0.8346%	0.9149%	0.8471%	1.1997%	1.2996%	1.1607%	1.2092%	1.1853%
Lebanon SSD	0.3513%	0.2710%	0.4212%	0.5107%	0.4108%	0.4552%	0.3881%	0.3921%
Statewide	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Note: Indices for LEAs included in the 1990 and 2002 studies that are no longer operational have been rolled into their respective county indices. Gibson County LEA indices for 1990 overlapping study adjusted to include WFTEADA weighted distribution of capacity of county area. The product of the two versions of the 1990 model was a total local share of BEP costs. These amounts are expressed as a ratio to the state total for comparability with the other models.

Appendix F - Comparing the Fiscal Structure of School Systems in Tennessee to Those in Other States

Most states provide some level of state aid to local governments to assist them in financing primary and secondary education. In many states, the financial assistance provided varies inversely with the fiscal capacity of each school district; districts that have relatively low fiscal capacity (generally calculated on a per student or per capita basis) receive relatively more financial assistance (per student) than those with relatively higher fiscal capacity. Some states provide no state aid to school districts whose fiscal capacity exceeds some predetermined level. In most states, measuring fiscal capacity is more straightforward and intuitive than in Tennessee.

The process is simpler in the majority of states for two reasons: (1) in a majority of states, all primary and secondary education is provided by independent school districts (not a mix of local fiscal entities, as in Tennessee), and (2) in these states independent school districts all have the same fiscal or taxing authority, primarily the power to levy property taxes. As a result, the amount of taxable property per student provides a simple and intuitively straightforward measure of each school system's fiscal capacity.

Measuring fiscal capacity is less straightforward when provided by fiscally different local jurisdictions. For Tennessee, it would be instructive to study and evaluate how other states with multiple types of fiscal jurisdictions providing public education measure fiscal capacity. A review of existing public school systems in the United States[25] provides a short list of states (thirteen) with a diverse set of fiscal jurisdictions responsible for public education.

Of the eight states that border Tennessee, only Alabama and Virginia exhibit some school-system-entity variation.[26] In all other bordering states, independent school districts (and in the case of North Carolina, county school systems only) provide all public education.[27] In Virginia, ninety-four school systems are run by counties, thirty-eight by municipalities, and one by an independent school district.[28] Only states with some

[25] U. S. Census. *2002 Census of Governments*, Volume I, Number 1, Government Organization, GC02 (1)-1, December 2002, Table 12.

[26] Federal data for Alabama shows K-12 education being provided by special school districts only. These districts, in fact, have no taxing authority. The actual fiscal capacity of these districts flows from the fiscal capacity of either the city or county government that created the special district. As a result, Alabama is included in the list of possible comparable states. Mississippi, although shown in the federal data as having both county and independent school systems, is excluded from the analysis since more detailed data showed that almost all K-12 education is provided by independent school systems with similar taxing authority.

[27] Arkansas, Georgia, and Kentucky.

[28] Virginia has the largest number of independent cities (thirty-nine) in the United States. Such cities do not belong to any county, and generally have the same taxing authority as counties.

substantive variety in the type of jurisdictions providing public education are included in Table 1.[29]

These thirteen states are analyzed to determine which, if any, have the potential to provide useful information and guidance for measuring fiscal capacity in Tennessee. Three preliminary characteristics of each state were first explored: (1) do the different school systems in each state (as initially identified in the U. S. Census data) actually provide K-12 education services, (2) do they have significantly different fiscal authority, and (3) does the state, in distributing state funds to local school systems, consider local fiscal capacity? Only states for which all three answers are in the affirmative would be helpful in providing guidance for measuring school system fiscal capacity in Tennessee.

The results of this preliminary investigation are shown in Table 1. The first column of information reflects the types of school systems identified in the *2002 Census of Government,* Table 12. Column 2 (Different Systems and Fiscal Authority) summarizes the results of two separate determinations, namely (1) is the Census description of multiple types of school systems correct and unambiguous, and (2) if so, do the school systems identified have different fiscal authority?

In some cases, it was determined from detailed data obtained from each state, that, in fact, public education was provided by only a single type of school system, and the Census data was misleading. This was true in several states where some independent school systems simply reflect a combination of several cities or towns that join together to provide education, and in others reflects legal entities that do not actually provide education, but merely pay tuition for students (generally in small towns or cities) to attend school systems operated in neighboring locations. The data in Column 2 (Different Systems and Fiscal Authority) show a clear absence of any states comparable to Tennessee.

Column 3 notes the presence or absence of some type of local capacity measure in a state's school-aid program. The data reflects that all but two states in the list use some measure of local fiscal capacity in establishing the distribution of state aid to local school systems.

Column 4 notes the type of taxes or revenues that are specifically considered in each state's calculation of school system fiscal capacity. In most states in which fiscal capacity plays a role in state aid calculations, only property wealth is considered.[30]

[29] Texas and Wisconsin are serviced predominantly by independent school districts with the exception of one system in Texas and two systems in Wisconsin. They are excluded from the list that follows. Data source: U. S. Census (2002), Table 12.

[30] This follows directly from the fact that in most cases, local school district taxing authority is limited to property taxes only.

Column 5 notes any other minor revenue sources that are available to school systems, even though not considered in a state's formal measure of fiscal capacity.

The result of the investigation of the school system structure of other states with multiple types of school systems is disappointing. No other state has the variety of school system types in combination with the complex fiscal powers and interrelationships among school system types that exists in Tennessee.

As a result, methods used in other states to measure the fiscal capacity of school districts are not applicable to the Tennessee situation. The uniqueness of our fiscal entity problem goes a long way toward explaining the frustration experienced by those who have worked on developing a rational methodology for broadening the existing 95 county fiscal capacity model to encompass all 136 school systems in the state.

Summary Data on Other States with Multiple Types of School Systems

State	Types of School Systems	Different Systems and Fiscal Authority	Capacity Measure Used	Major Own-Source Revenues Considered	Other Minor Revenue Available
Alabama	C,M	no	yes	P	S
Arizona	I,C	no	yes	P	none
California	I,C,M	no	no	na	na
Connecticut	I,M,T	no	yes	P	none
Maine	I,M,T	no	yes	P	V
Massachusetts	I,C,M,T	no	yes	P	V,H
Michigan	I,M,S	no	yes	P	none
New Hampshire	I,C,M	no	yes	P	none
New Jersey	I,C,M,T	no	yes	P	NT
New York	I,C,M	no	yes	P	S
Rhode Island	I,M,T	no	no	na	na
Tennessee	I,C,M	yes	yes	P,S	State-shared Taxes
Virginia	I,C,M	no	yes	P,S	Other*

Source: "2002 Census of Governments", and individual state data.

Notes: Types of School Systems: I= independent school district, C=county system, M=municipal system, T=town or township system, S=state school.
Major own-source revenues: P=property taxes, S= sales taxes, I=income tax, V=annual vehicle excise tax, H=hotel motel taxes, NT=non-tax revenue, Other*=state reimbursment payments for phased-out local vehicle property taxes.
na=not applicable because fiscal capacity not a consideration in distribution of funds.

Appendix G - Source of Data for Child Poverty Rates

School System Child Poverty Rates

The U.S. Census Bureau, with support from other Federal agencies, created the Small Area Income and Poverty Estimates (SAIPE) program to provide more current estimates of selected income and poverty statistics than the most recent decennial census. Estimates are created for states, counties, and school districts. The main objective of this program is to provide updated estimates of income and poverty statistics for the administration of federal programs and the allocation of federal funds to local jurisdictions.

Highlights—*School District estimates, income year 2002*

- Total population
- Children ages 5 - 17
- Related children ages 5 - 17 in families in poverty

The estimates are not direct counts from enumerations or administrative records, nor are they direct estimates from sample surveys. Data from those sources are not adequate to provide intercensal estimates for all counties. Instead, they model the relationship between income or poverty and tax and program data for the states and a subset of counties using estimates of income or poverty from the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC). They then use the modeled relationships to obtain estimates for all states and counties. For school districts, they use the model-based county estimates and the decennial census distribution of the population of poor of each county over its constituent school districts.

The school system estimates are derived from the Bureau's school district mapping project. This project's survey asks each state's department of education for a list of all school districts and their boundaries. The school district boundary survey is conducted biennially. The population and poverty estimates for each estimate-year are produced for all school districts identified in the most recent boundary update. The boundary year does not always match the year to which the estimates refer. For example, the 2000 poverty estimates were produced for school districts in existence for the 2001-2002 school year. The Bureau uses the most current list of school districts and associated geography because it allows for more efficient allocation of funds under the No Child Left Behind Act of 2001, for which the estimates are produced. The SAIPE estimates are the only system-level data available to measure the ability of residents to pay taxes.

School system information is available at http://www.census.gov/hhes/www/saipe/district.html

Appendix H - Using Multiple Regression Analysis (MRA)

Most complex decisions about quantifiable problems involve a relationship among many factors or variables. The greater the complexity, the greater the need for information from multiple sources. For example, climate analysis and prediction models may have thousands of different variables. In marketing, sales executive want and need to know the relationship between sales and the factors that cause sales to happen. Extending this example, the sales executive will recognize that sales will vary from month-to-month and year-to-year.

Using multiple regression analysis (MRA) to address the problem, sales would be the "dependent" variable; that is sales are dependent on a number of factors (i.e., the value for sales changes when the values for those factors change), or "independent" variables. These variables are called independent because their values do not change when the value of the variable being estimated or predicted is changed. Sales are influenced by

- price
- competition
- advertising
- location to markets
- disposable consumer income
- unemployment
- psychological factors
- influence on personal consumer behavior

Of course, no one can define completely the many influences on consumer spending, but what MRA can do is create a model to measure the influences of the most important variables depending, of course, on the availability of the necessary data or the ability and willingness to acquire it.

Definition

Multiple regression analysis is a method used to measure the simultaneous influence of any number of independent variables on a single dependent variable. The independent variables will describe some percentage of the variation in the dependent variable.

An Example

Extending these concepts to home sales prices, a number of variables would seem obvious. The dependent variable could be a random sample of home sales (or all available sales) during a specific period of time. A random sample could be drawn from an entire city (or county) or parts of the area. Data likely to be available on all houses are

y = sales price

x_1 = square feet

x_2 = number of bedrooms

x_3 = square feet in bedrooms

x_4 = number of bathrooms

x_5 = number of square feet in bathrooms

x_6 = number of fireplaces

x_7 = garage

x_8 = age of house

x_9 = location

x_{10} = central air conditioning

x_{11} = school availability

x_{12} = index of comparable sales

The form of the model becomes:

$$\hat{y} = a+b_1x_1+b_2x_2+b_3x_3+b_4x_4+b_5x_5+b_6x_6+b_7x_7+b_8x_8+b_9x_9+b_{10}x_{10}+b_{11}x_{11}+b_{12}x_{12}$$

$\hat{y}$ = estimated sales price

a = a constant value applicable to all sales

b_i = weights produced by the MRA that can be multiplied by the x-values for each house to calculate the estimated sales price

Note: Developing a good MRA model is more of an art than a science. The critical decisions involve the process of selecting the best (most appropriate) set of variables for the model.

Selecting Variables

The dependent variable is the starting point. The best model is the one with a set of independent variables that describe the greatest percentage of the total variation in the dependent variable.

The selection of the independent variables should result in a set that is highly correlated with the dependent variable and not significantly correlated with each other. Inevitably, this is difficult and frequently results in a situation called multicollinearity in which one or more independent variables are correlated with other independent variables. In such situations, collinear variables describe much of the same variation in the dependent variable, making it difficult to separate the effect of each variable on the dependent variable. This is particularly important when the purpose of the MRA is to determine these separate effects (i.e., whether each individual independent variable has a significant effect *given the effect of all other variables in the model*) rather than to produce the best fitting predicted values.

If the model otherwise makes sense, the best way to deal with it is to avoid any interpretation of the implications of any single dependent variable. Collinear variables could be discarded, but it may not make sense in the model used. For example, in measuring fiscal capacity, it makes sense for property value to be in the model even if it is highly correlated with taxable sales or income. Alternative, non-collinear variables should be considered, but may not be possible to find.

MRA and the System-level Prototype Model

The purpose of this model is to estimate or predict the amount of local revenue that could be raised with average rates and adjustments for the economic well-being of local taxpayers (ability to pay taxes). The goal is not to determine the individual effects of each independent variable relative to all others, but rather to develop a model that produces estimates that fit the actual values as closely as possible so that the differences between each predicted value and the actual value are as small as possible.

The starting point is actual local revenue for schools expressed as total local revenue per pupil. The challenge in developing this model is to select a set of variables that will explain or describe the variation in actual local revenue (the values of the dependent variable) with the greatest efficiency.

The independent variables are

- taxable property per pupil

  - countywide shared (among all systems within a county)
  - system unshared
- taxable sales per pupil
  - countywide shared (among all systems within a county)
  - system unshared
- the percentage of the property tax base that is business related (i.e., commercial, industrial, utility, including taxable personal property) serves as a proxy for the ability to export taxes
  - countywide shared (among all systems within a county)
  - system unshared
- median household income (MHI) to measure the economic well-being of the taxpayers in each county
- child poverty rates to measure the economic well-being of the taxpayers within the borders of each school system (serves as a proxy for MHI, which is not available for cities and special school districts)

Translating this information into a MRA format, we have the following equation:

y (revenue per pupil) = a (a "constant" or base amount included for all school systems)

+ b_1x_1 (shared property assessment per pupil)

+ b_2x_2 (unshared property assessment per pupil)

+ b_3x_3 (shared taxable sales per pupil)

+ b_4x_4 (unshared taxable sales per pupil)

+ b_5x_5 (state shared tax revenue per pupil)

+ b_6x_6 (shared exportability ratio)

+ b_7x_7 (unshared exportability ratio)

+ b_8x_8 (county area median household income)

+ b_9x_9 (school system child poverty rate)

+ e (the difference between actual revenue and the amount described by the independent variables)

[Output = Estimated fiscal capacity per pupil (by school system)]

Using the TACIR model with MRA produces the following results:

$$\hat{y} = -\$22 + .0047x_1 + .0048x_2 + .0204x_3 + .0010x_4 + .1714x_5 + \$570x_6 + \$152x_7 + .0130x_8 - \$1{,}399x_9$$

= estimated fiscal capacity for each system.

The figures in the equation are the actual values of the weighting factors (called "coefficients" in MRA and indicated by the lower case letter b). These weights are multiplied by the values of the x-factors for each school system to produce its estimated fiscal capacity. (See Appendix E-2.)

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Appendix I-1
Data Sources

Local Revenue

Tennessee Department of Education, Annual Financial Reports from public school systems, fiscal years 2000-01 through 2002-03. The most recent available data will be for the fiscal year immediately preceding the year during which the Department of Education establishes funding for schools. For example, the Department establishes funding for 2004-05 during 2003-04; therefore, the most current available data on local revenue for use in that process is for 2002-03.

Student Counts—Average Daily Membership

Tennessee Department of Education, Annual Statistical Reports for school years 2000-01 through 2002-03. http://www.state.tn.us/education/mreport.htm The most recent available data will be for the fiscal year immediately preceding the year during which the Department of Education establishes funding for schools. For example, the Department establishes funding for 2004-05 during 2003-04; therefore, the most current available student counts for use in that process are for 2002-03.

Sales Tax Base & State-shared Tax Revenues

Tennessee Department of Revenue, fiscal years 2000-01 through 2002-03. The most recent available data will be for the fiscal year immediately preceding the year during which the Department of Education establishes funding for schools. For example, the Department establishes funding for 2004-05 during 2003-04; therefore, the most current available data on the sales tax base and state-shared taxes for use in the funding process is for 2002-03.

Property Tax Base & Ratio of Business Assessment to Total Assessment

Tennessee Board of Equalization, Tax Aggregate Report of Tennessee, calendar years 2000 through 2002. http://www.comptroller.state.tn.us/pa/taxaggr.htm The most recent available data will be for the calendar year ended prior to the fiscal year during which the Department of Education establishes funding for schools. For example, the Department establishes funding for 2004-05 during 2003-04; therefore, the most current available data for use in that process is for 2002.

Median Household Income

U.S. Census Bureau, Housing and Household Economic Statistics Division, Small Area Estimates Branch, Small Area Income and Poverty Estimates—Tables for States and

Counties by Income Year and Statistic, 1998 through 2000. http://www.census.gov/hhes/www/saipe/stcty/estimate.html The most recent available data will be for the calendar year ended three years prior to the beginning of the fiscal year in which the Department of Education establishes funding for schools. For example, the Department establishes funding for 2004-05 during 2003-04; therefore, the most current available data for use in that process is for 2000, released October 2003.

Child Poverty Rates

U.S. Census Bureau, Housing and Household Economic Statistics Division, Small Area Estimates Branch, Small Area Income and Poverty Estimates—School District Estimates, 1997, 1999 and 2000. http://www.census.gov/hhes/www/saipe/schooltoc.html The most recent available data will be for the calendar year ended three years prior to the beginning of the fiscal year in which the Department of Education establishes funding for schools. For example, the Department establishes funding for 2004-05 during 2003-04; therefore, the most current available data for use in that process is for 2000, released November 2003.

Appendix I-2
Schedule of Data Availability

	2000	2001	2002	2003	2004	2005	2006
BEP Funding Year							X
Student Counts (ADM)			X	X	X		
Local Revenue			X	X	X		
Taxable Sales			X	X	X		
Taxable Property		X	X	X			
State-shared Tax Revenue			X	X	X		
Median Household Income	X	X	X				
Child Poverty Rates	X	X	X				

- **Calculations of funding through the Basic Education Program (BEP) formula are made during the fiscal year prior to the year in which funding is to be provided.** Because the calculations are made before the end of the prior fiscal year, no figures for the year during which those calculations are made are available for that purpose; therefore, the latest available data is always from two years prior to the year being funded. Moreover, data reported on a calendar year basis, which includes property, median household income and child poverty, will always be another six months behind. And figures from the federal government, which include median household income and child poverty, will lag further behind because they are based on a wide array of data and complex estimation processes.
- **Three-year averages are used for each factor by agreement with the BEP Review Committee appointed by the State Board of Education in order to mitigate any volatility that might be inherent in the data.** The most volatile data is typically the property tax base, in part, because of periodic and unpredictable challenges to the assessed valuations established by county appraisers.

Appendix J - Special Cases

Carroll County—When a School System Isn't a School System

The Carroll County school system is not a full-service school system. It is the only system in the state that does not provide regular educational services except to a tiny handful of students (less than a half dozen in the 2003 school year). It does, however, provide transportation services for the other five systems in the county and vocational classes for nearly one hundred students. Consequently, when its figures are computed for the prototype model by dividing its local revenue, its tax bases, and so on by its tiny handful of students, the results are so dissimilar to any other system that they do not function properly in the model. Resolving this problem in order to derive a reasonable estimate of fiscal capacity for this unique school system requires a simple modification: Rather than enter figures for the Carroll County school system into the model, figures are entered for the entire county area. That is the figures for all six systems in the county are combined so that their overall fiscal capacity can be estimated. At the same time, the five regular school systems in Carroll County are treated like any other school system so that individual estimates of fiscal capacity are produced for each of them. The estimates for those five are then summed and subtracted from the overall estimate, and the difference then becomes the estimated fiscal capacity for the Carroll County school system.

Calculation of the Carroll County School System's Fiscal Capacity

School System	Total Fiscal Capacity
All Systems in County	$ 7,036,655
Hollow Rock-Bruceton SSD	(1,074,007)
Huntingdon SSD	(1,902,566)
McKenzie SSD	(1,922,879)
South Carroll Co SSD	(572,622)
West Carroll Co SSD	(1,460,005)
Carroll County	$ 104,576

Memphis—When a Special School District is Really a City System

Memphis' school system, by charter, law and Attorney General's opinion, is a special school district. However, unlike any other special school district in Tennessee, it has no taxing authority. No special school district can tax sales, but all of them except Memphis can and do set their own property tax rates to supplement funding they receive from the county's tax structure. Because the Memphis Special School District has no independent taxing authority, the city of Memphis supplements the funding they receive from Shelby County's own education revenue. Memphis is unique in this regard. This creates a dilemma with respect to structuring the prototype model. Treating Memphis

like a special school district presumes that it has taxing access to the local property base, but cannot tap the sales tax base or rely on state-shared tax revenue flowing to the city. In this case, the model would include only the property tax base, and not the sales tax base or state-shared tax revenues received by Memphis. Treating Memphis like a city acknowledges its true fiscal nature—the city can tap all of those resources to fund the school system, regardless of which it chooses—and is consistent with actual practice for the past hundred plus years, but appears at least superficially to be inconsistent with the school system's actual legal status. This dilemma, because of the size of the system and the relatively large tax base of the city, affects more than just Memphis in the model. If Memphis is treated like a special school district in the model, the coefficient for state-shared tax revenue has the wrong sign. That is to say that it is negative, indicating that more revenue means less capacity, which is clearly not the case. In contrast, if Memphis is treated like a city in the model, consistent with its actual fiscal status, the coefficient for state-shared taxes has the correct sign. Therefore, in order to be consistent with the actual funding scheme in Memphis and to improve the prototype model in general, Memphis is treated as a city.

Appendix K - 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 sources of revenue.

2. **Why do we measure fiscal capacity?**

   Local governments cannot all raise the same revenue with the same tax rates; therefore, 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.

3. **What factors determine fiscal capacity?**

   Essentially, fiscal capacity is determined based on the following factors:

   - fiscal effort based on local revenue per student
   - tax revenue capacity based on
     - equalized assessed property values per student and
     - taxable sales per student
     - revenue available from state shared taxes to fund public schools
   - tax equity based on
     - the ability of individuals to pay taxes, including both

     — median household income and

     — child poverty rates
   - the ability of businesses to "export" taxes to non-residents measured by the ratio between business-related taxable property and all taxable property

4. **What is the difference between fiscal capacity and fiscal effort?**

   Fiscal effort is the actual amount of local revenue used to support public school expenditures in relation to the ability to raise revenue for education. It depends both on revenue bases and on tax rates. Fiscal capacity is the potential amount of local revenue a local government could raise for education if it made average effort adjusted for residents' ability to pay taxes and local businesses' ability to export taxes to non-residents.

5. How are taxes exported?

Taxes are said to be exported when they are paid in the taxing jurisdiction by someone who does not live in that jurisdiction or when they are paid by a business in the taxing jurisdiction, added to the business's products or services, which are then sold to customers or clients who do not live in that jurisdiction. Taxes that are exported are not a direct burden on resident taxpayers, those who live in the taxing jurisdiction. Examples of taxes often paid by non-residents include hotel and motel taxes paid by tourists; sales taxes on purchases at regional shopping areas; and property taxes paid by manufacturers.

6. What is the relationship between fiscal capacity and fiscal effort?

The fiscal effort made by all school systems is a factor in determining the fiscal capacity of each individual system. What they do as a group essentially sets the standard, which is why it is called a ***behavioral model***. Their **average** revenue-raising "behavior" (i.e., actual revenue per pupil) equals the average fiscal capacity per pupil produced by the model. The ability of each individual system to raise revenue for education (fiscal capacity) through tax rates that equalize the burden on resident taxpayers is estimated by measuring the relationship between actual local revenue (fiscal effort) and the various other factors affecting fiscal capacity for all systems.

Fiscal capacity is then used to equalize the local matching requirement imposed by the state's education funding scheme. If the local matching requirement exceeds actual local revenue, then actual revenue, which is the measure of fiscal effort used in the fiscal capacity formula, must increase. The effect on fiscal capacity of increases in fiscal effort by any one system is spread across all systems. No system's own effort affects its own fiscal capacity without also affecting all others.

7. Why has TACIR produced a system-level prototype fiscal capacity model?

TACIR staff produced the current prototype in response to a request from Governor Bredesen's Task Force on Teacher Pay and presented it again at the request of the Basic Education Program Review Committee (BEPRC) appointed by the State Board of Education. The BEPRC was asked by the General Assembly in 2004 to consider a system-level model. Interest in such a model has been expressed since the Basic Education Program (BEP) formula was first proposed by the State Board in the late 1980s. TACIR staff produced a succession of prototype models beginning then (first published in 1990), periodically refining the methodology throughout the 1990s. Staff continue to refine the model as more data becomes available and in consultation with outside experts.

8. **What is the actual output of TACIR's prototype fiscal capacity model?**

The TACIR model produces a dollar amount per pupil that the funding body for each system—based on the characteristics explained in Item 3 above—can afford to pay to fund its public schools.

9. What is the method for determining fiscal capacity?

Essentially, the fiscal capacity model is based on a set of averages computed from actual values for the factors listed in Item 3. The method used to compute the averages is called multiple regression analysis, which takes all of the factors (variables) and compares them simultaneously for all systems. From this process, an average weight (called a coefficient) is calculated for each factor. For the property and sales tax bases, this coefficient is conceptually similar to an average tax rate.

10. What is multiple regression analysis?

It is a very common and useful statistical method for addressing a wide range of issues. It is used to estimate or predict the effect of the values of a set of factors on the value of another factor that that set of factors is believed to influence. For example, multiple regression analysis is used to estimate the effect on housing prices of a combination of factors, including location, square footage, number of rooms and quality of materials. The result of this process can be used to predict the price of a house when the factors affecting price are known, but the price itself is not, for example, because it was last sold many years ago or because it is brand new and has never been sold. This same procedure is used to determine fiscal capacity by estimating the effect on actual local revenue of a combination of factors related to revenue. The result can be used to predict what the local revenue for ***each*** school system would be based on the effect of those factors for ***all*** systems.

11. Why are factors that are not statistically significant included in the model?

The model is based both on statistical theory and theories of fiscal capacity. The model includes all readily available factors that are believed to directly affect the ability of local governments to raise revenue for education. Statistical analyses other than multiple regression, such as correlation analysis, indicate that the factors in the model are related to local education revenue. The strength of these relationships is reflected in the coefficients, or weights, generated by the regression model.

Multiple regression analysis, while often taught as a method of determining the separate effects of various factors on the factor being estimated or predicted, is used here to produce estimates that correspond as closely as possible to the actual values of the factor being estimated. The difference between each actual value

(revenue per pupil) and its corresponding estimate (fiscal capacity) is called the residual value. The residual value may be viewed as the amount not accounted for by the set of factors included in the model. In some cases, this may be by design. For example, the TACIR fiscal capacity model intentionally excludes any direct measure of willingness to set unusually high or low tax rates because the purpose of the model is to estimate revenue at average rates adjusted only for taxpayer equity factors. The over-arching goal is to develop a model that includes a comprehensive set of factors related to the ***ability***, not the ***willingness***, to raise revenue locally for public schools so that the residuals are as small as possible.

12. Why does the prototype model include both median household income and child poverty?

Both factors are measures of the well-being of resident taxpayers. Median household income (MHI) is a countywide measure, and school-age child poverty is a school system measure. MHI is used to capture the ability of all county residents to pay countywide taxes. Child poverty is used to capture the ability of residents within the boundaries of each school system to pay taxes applied only within those boundaries. The tax bases for both areas—county wide and within system boundaries—are separate factors in the model; therefore, ability to pay taxes on those bases must be measured separately.

13. Why does the prototype model include two factors for the property tax base, the sales tax base and tax exportability?

Different local governments independently apply different tax rates to the tax bases for counties and the tax bases for city systems and special school districts. Therefore, it is necessary to include each tax base as a separate factor. Attempts to combine the factors produce less effective models, mainly because the methods used to develop the models cannot sort out the effects of the two-level tax structure (county wide plus system level) and the sharing requirement imposed on counties. County revenue for schools must be shared with any other systems within the same county based on each system's share of the total number of students (weighted full-time-equivalent average daily attendance) in the county.

14. Why do some school systems have zero values for some factors in the prototype system-level model?

The values in the model for each school system depend on whether the factor measured plays a role in that system's fiscal capacity. For example, special school districts have zeros for unshared taxable sales because they cannot tax sales.

Similarly, county school systems have zeros for unshared taxable property and sales because they cannot tax those revenue sources without sharing them with all other school systems within the county.

15. What is the effect of using tax exportability instead of tax burden in the model?

Tax exportability and tax burden are two forms of the same taxpayer equity factor. Taxes that are exported (i.e., paid by non-residents) are not part of residents' tax burden. When the percent of the property tax base that belongs to commercial and industrial enterprises or utilities (business-related property) and the percent that is a burden on residents (residential and farm property) are added together, they will always equal 100%. Either percentage will produce the same result in the model for county areas because no county area has a zero for that factor. However, because county systems have no unshared tax property tax bases, they have zeros for the property-based "unshared" taxpayer equity variable.

With tax burden ratios, low values mean high fiscal capacity so that a tax burden ratio of zero indicates the highest capacity of all. Using tax burden ratios for the system-level measure would cause a discrepancy for the county school systems because that is not what the zeros for county systems actually mean. With exportability ratios, low values mean low fiscal capacity so that an exportability ratio of zero indicates the lowest capacity of all. This is what the county systems' zeros really mean, and that is why this is the appropriate ratio for the system-level tax burden measure. If the tax burden form were used, the zeros for the county systems would be interpreted by the regression model as though they had greater ability to export taxes from the unshared base than the cities and special school districts. That is impossible with an unshared tax base of zero.

16. Why doesn't the prototype model include a service burden factor?

The current prototype system-level model was first developed at the request of Governor Bredesen's Task Force on Teacher Pay for inclusion with its recommendations. Those recommendations included enhancing the BEP to fund more adequately the service burden placed on local school systems. The service burden factor used in the county model is too broad a measure. It has been called "redundant" with respect to the current BEP formula without the recommended enhancements. It was omitted from the system-level model in order to eliminate the double counting that had been criticized by the state comptroller's office. The effect of double counting the service burden caused by retaining the factor used in the county model would be exacerbated if the Task Force's recommended enhancements were implemented. Nevertheless, some measure of service burden might be appropriate if it could be constructed so as not to be the same as that

included in the BEP formula itself. Ideally, the BEP formula would adequately measure the education service burden of each school systems so that is would not be necessary to do so in the fiscal capacity formula.

17. Why does the prototype model include revenue from state-shared taxes?

To the extent that cities use revenue from state-shared taxes in their general fund transfers for schools, the county model includes state-shared taxes. Including all state shared tax revenue used by all local governments to fund schools treats them more consistently. Total revenue from state-shared taxes available for schools is included as a factor in the prototype model for the same reason the sales and property tax bases are included as factors: all three are substantial sources of revenue that can be used at the discretion of local officials to fund their public schools. Considerable use of revenue from state-shared taxes by local school systems is evident from the financial reports they submit to the Department of Education. This confirms conclusions by TACIR staff from their work on state-shared taxes that local governments frequently use revenue from state-shared taxes to reduce reliance on local tax bases. In this sense, state-shared tax revenue stands in the place of revenue from those tax bases.

18. How is per pupil fiscal capacity actually calculated?

The statistical method produces an average weight (called a coefficient) for each of the factors in the model. These weights are multiplied by the value of each factor for each system and summed. This produces a per pupil fiscal capacity amount for each system. These per pupil amounts are different for each system because the values of the factors are different for each system.

19. What are the timing implications of fiscal capacity?

Because of a time lag in the collection and publication of official data, the most current data available is frequently eighteen to twenty-four months old. Moreover, the formula is based on a three-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 system will not be reflected in the most current fiscal capacity index.

20. Why does the fiscal capacity model use three-year averages?

Three-year averages are used to mitigate data errors and control volatility. The original county model was based on a single year of data, and it quickly became apparent that using a single year caused large changes in the fiscal capacity estimates from year to year. Using multiple years for each data element smoothes out the changes, whether they are caused by errors in the data reported or by real increases

or decreases in the values. Smoothing out increases in the data allows local governments to respond to any corresponding increases in fiscal capacity more thoughtfully over a longer period. On the other hand, smoothing out decreases that correspond to decreases in capacity delay the consequent increases in state funding. Multi-year averages were requested by the BEPRC early in the process of phasing in the BEP formula.

21. Will the fiscal capacity of each system change each year?

It is likely that there will be some change each year. However, experience with the county model shows that most changes will be insignificant. The influence of a change in the value of any one factor for any one school system may be offset or enhanced by changes in other factors and systems. A change in any single fiscal capacity factor will not necessarily mean a change in fiscal capacity based on all factors.

22. What is the fiscal capacity index (FCI)?

The State Board and the Department of Education use a percent of total measure of fiscal capacity rather than a per pupil measure. Once TACIR determines per pupil capacity for each system, this value is multiplied by average daily membership. This produces a system measure of total fiscal capacity. The values for the 136 systems are summed, and each system's value is expressed as a percentage of the total for all systems. The fiscal capacity index for each system is this percentage.

23. Can fiscal capacity per pupil change without affecting the index?

Yes. The capacity per pupil for any one school system can move up or down without necessarily causing a major change in its index. Whether the index changes depends on the changes that occur in all 136 systems because the index is a percentage that adds to 100% for all school systems.

24. Is the FCI the same thing as my local BEP match rate?

No. Your local match rate is the result of multiplying your fiscal capacity index by the total (statewide) local share of the Basic Education Program (a dollar amount) and then dividing the result (the amount of the BEP your system must fund) by the total dollar amount generated for your system by the BEP formula. The total (statewide) local share of the BEP is a dollar amount that results from multiplying the statutory match rate (e.g., 50% of the non-classroom components) by the total dollar amount generated for all school systems by the BEP formula.

25. How does the Fiscal Capacity Index influence the local share of funding for each system in the Basic Education Program?

The index is the portion of total fiscal capacity for which each system is responsible. If System A has an index of 1.45% in FY 2004, then System A is responsible for 1.45% of the total local share (in dollars) of the BEP. The total local share depends on the total cost of the BEP and the local match rate set in statute. If a system's index goes up or down, that system's share of responsibility for the match changes. Changes in the fiscal capacity index have much less effect on funding than do changes in the local match rate set in statute or changes in the total cost of the BEP.

26. Why do some counties with multiple school systems have greater fiscal capacity according to the prototype system model than with the county model?

First of all, this is not unique to multi-system counties. Many one-system counties also have higher fiscal capacity in the prototype system model than in the county model. **In fact, fully half of the one-system counties have higher capacity in the prototype model.** A review of the following table, which compares actual revenue per pupil to the fiscal capacity results from both models, indicates that the county model overestimates the revenue of one-system counties as a group and underestimates the revenue of the three-system counties. It estimates the two-system counties and the two with five and six systems fairly closely.

Comparison of County-area Shares of BEP Match to Actual Shares of Local Education Revenue

Current 95-County Model versus Revenue from Average Rates and Prototype 136-System Model *by Number of Systems in County*

			Share of Statewide BEP Local Match					
		Share of Actual Statewide Local Revenue	Current 95–County Model	Ratio of Match to Revenue	Revenue from Average Rates	Ratio of Match to Revenue	Prototype 136-System Model	Ratio of Match to Revenue
Counties with One School System	67	49.8%	52.3%	1.05	51.2%	1.03	51.3%	1.03
Counties with Two School Systems	20	40.5%	39.5%	0.97	39.2%	0.97	39.5%	0.98
Counties with Three School Systems	6	8.8%	7.3%	0.83	8.6%	0.98	8.2%	0.93
Counties with Five or Six School Systems	2	0.9%	0.9%	0.96	1.0%	1.11	1.0%	1.07
Total	95	100.0%	100.0%	1.00	100.0%	1.00	100.0%	1.00

What we refer to as fiscal capacity is actually a statistical estimate of revenue based on variables that are related to the ability to generate revenue. The county model underestimates the total revenue of the two-system counties by about 18% and overestimates that of the one-system counties by about 5%. The prototype estimates the total revenue of each of those groups more closely. The prototype estimates for the group with the two counties that have five and six systems each are 5% higher than actual revenue, but the percent of total (1.0%) is about the same.

The fact that some counties have higher capacities according to the prototype system model and some have higher capacities with the county model illustrates some basic differences between the two models. There are a number of reasons for the different results:

- First among them is the fact that the system model has a positive coefficient for property, which better reflects the direct relationship (as one goes up the other goes up) between the property tax base and the ability to generate education revenue than does the negative coefficient for property in the county model. The negative coefficient in the county model indicates that as property values increase, revenue or fiscal capacity decreases, which is counterintuitive and appears to result from interactions among the variables in the county model, particularly property and income. This difference between the two models affects all systems, not just those in multi-system counties. The effect is strongest for the counties with the very highest and the very lowest property values.

- Second, the system model places much greater emphasis on property and much less on income. When the coefficient for income in the county model is applied to the average (un-weighted) income for the counties, the result is greater than either the actual revenue or the fiscal capacity (revenue) estimated by the model. This appears to be an offset to the negative coefficient for property in the county model, but it is hard to explain how the effect of income alone can be greater than the estimated fiscal capacity based on all variables combined.

  The prototype sorts things out differently and produces coefficients (or weights) for property and income that appear more reasonable to the layperson. The result of the shift in emphasis in the system-level model away from income and toward property for systems in counties that rank high for property and lower for income is a relative increase in capacity; for systems that rank high for income and lower for property is a relative decrease in capacity. This is true regardless of the number of systems in the county and affects both one-system and multi-system counties.

- Third, the county model ignores the tax bases of cities and special school districts and is constructed as if there are only countywide tax rates in all counties. This is not the case for the approximately one third of counties that have city systems or special school districts. As a result, the statistical process that produces the county estimates must place all of the weight on the countywide variables included in the model. While the model is quite strong in relation to statistical models in general, it simply does not get at these sub-county systems' fiscal capacities. It is not designed to do so.

  When all systems are placed on equal footing, as they are in the prototype, the statistical process can "figure out" which ones have additional capacity because of their ability to apply supplementary tax rates, that is tax rates in addition to the countywide rates. This should be expected to increase the estimates for multi-system counties and decrease them for the one-system counties, which do not have these additional rates. In most cases, it does, but in one fourth of the multi-system counties, including one of the six three-system counties and six of the twenty two-system counties, it does not. Cocke, Crockett, Hawkins, Marion, Obion, Scott, and Shelby Counties have the same or lower fiscal capacity in the prototype compared with the county model, making it implausible to draw a general conclusion that multi-system counties fare worse in the prototype model. The effect of the prototype depends on the set of variables for each system in any particular county, and a pattern is not obvious.

Appendix L - 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 school system fiscal capacity model uses county median household income and school district poverty rates, which are based on income, to measure ability to pay.

Child Poverty Rate—the percentage of related children living in families below the federal poverty line—as used here, it refers to school-aged children, those between the ages of five and seventeen inclusive. This is strongly correlated with income.

Coefficient of Variation—a relative measure of variation expressed as a percentage, it describes the average difference between the observations (or points) in a dataset and the mean (arithmetic average) of those observations. Expressing this measure as a percent allows comparison of the variation in multiple datasets.

Correlation Coefficient [or coefficient of correlation]—a statistical measure used to describe the strength of a relationship or association between two variables in a sample. Its values range from -1 for a perfect negative correlation to +1 for a perfect positive correlation. Perfect means that if all the points were plotted in a scatter diagram, they could be connected with a perfectly straight line. Thus the coefficient of correlation measures the degree of linear association between two variables.

Fiscal Capacity—the potential ability of the school systems to raise revenues from their own sources to pay for public education.

Fiscal Effort—the degree to which a school system utilizes the revenue bases available to it, typically measured as the ratio between the actual amount of revenues collected or used for a particular purpose to a related measure of fiscal capacity.

Local Revenue—the amount of money provided at the discretion of local officials to support school systems, such as property taxes, and state-shared tax revenues that substitute for local revenue.

Median Household Income—the middle value among households (i.e., the value above and below which lie an equal number of households) for money income received in the previous calendar year by all household members 15 years old and over, including household members not related to the householder, people living alone, and others in non-family households.

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.

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

Service Burden—the cost of providing public education.

Shared Property—the equalized, assessed value of property subject to county education taxes, all of which must be shared among all school systems in the county based on the proportion of students in each system. ***Note:*** *all county education revenue must be shared with any and all other school systems in the county.*

Shared Taxable Sales— the value of sales subject to countywide taxes, all of which must be shared among all school systems in the county based on the proportion of students in each system. ***Note:*** *all county education revenue must be shared with any and all other school systems in the county.*

Shared Tax Exportability—the portion of county property tax payments for which owners of homes and farms are not responsible; the equalized assessed valuation of business-related property (commercial, industrial, utility and personal property) subject to county education taxes divided by the total taxable value of all property subject to county education taxes.

State-shared Tax Revenue per Pupil—funds provided by the State from state revenues to cities and counties to supplement funds from local sources used to provide city and

county services divided by the number of students in average daily membership. Revenue sources include state sales, excise, income, beer, mixed drink, and alcoholic beverage taxes, as well as TVA payments in lieu of taxes. Only revenue from income, beer and mixed drink taxes plus TVA payments in lieu of taxes are included in school systems' financial reports. However, other revenues may be reported as "other" and they may be used to support the general fund transfers widely used by cities to fund their school systems. Therefore, the tax base variable used in the fiscal capacity model is based on all sources available for use by local governments to fund schools. ***Note:*** *Special school districts are not eligible to receive this revenue directly, but may receive it from counties.*

Unshared Property—the equalized, assessed value of property subject to taxes that generate revenue that is not required to be shared with other school systems. ***Note:*** *County school systems' revenue from this source is restricted to retirement of rural education debt and support of pupil transportation under certain specific circumstances. Such revenue cannot be used for general support of the county school system; therefore, the value of unshared property for county school systems is zero.*

Unshared Taxable Sales—the value of sales subject to taxes that generate revenue that is not required to be shared with other school systems. ***Note:*** *County school systems' revenue from this source is restricted to retirement of rural education debt and support of pupil transportation under certain specific circumstances. Such revenue cannot be used for general support of the county school system; therefore, the value of unshared taxable sales for county school systems is zero. Special school districts do not have authority to tax sales; therefore, the value of unshared taxable sales for special school districts is zero.*

Unshared Tax Exportability—the portion of city and special school district property tax payments for which owners of homes and farms are not responsible; the equalized assessed valuation of business-related property (commercial, industrial, utility and personal property) divided by the total taxable value of all property.

Appendix M - References

Note: For additional references on multiple regression analysis, see Appendix H.

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