



Gains in Education Spending Equity Continue Four Years After Fully Funding the Basic Education Program

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OVERVIEW

The Basic Education Program funding formula was adopted by the Tennessee General Assembly as a key part of the Education Improvement Act of 1992. The primary purpose of the new funding formula, which began to be phased in during fiscal year 1993, was to improve equity in education spending. The Tennessee Advisory Commission on Intergovernmental Relations (TACIR) issued an interim report in 1996 on the gains in spending equity through fiscal year 1995, the mid-point of the six-year phase in of the formula, and then again in 2000 describing the effect of fully funding the formula in school year 1997-98.¹

This staff education brief updates the 2000 brief and examines the impact of the fully funded formula on equity in education spending through school year 2002-03.² Various statistics for measuring equity have been computed using Tennessee revenue and expenditure data over the implementation period of the Basic Education Program to demonstrate gains in equity. Six of seven equity measures demonstrate dramatic and continued gains in spending equity.

FINDINGS

In education finance, multiple measures of horizontal equity are used to ensure that statistical error does not cause misinterpretation of results. TACIR has used most of the standard measures as well as two of its own. The Green index ("how the other half lives") is a ratio of spending for the top fifty percent of students to spending for the bottom fifty percent. The TACIR index is a statistical estimate of the relationship between the TACIR index of fiscal capacity and the level of state spending for each county area.

The period measured was 1992 (the beginning of the Basic Education Program) through 2002. All of the equity measures show improvement during this ten-year period. Remarkably, six of the seven measures show continued improvement in spending equity for the four years beyond 1997 when Tennessee's current education formula was first fully funded. Key to this continued improvement is the structure of the formula with its built-in annual cost study and its comprehensive measure of education fiscal capacity. But perhaps the most important element of all has

been the demonstrated commitment of the state policy makers to keep the formula fully funded.

It should be noted that there are no absolute standards for horizontal equity and that no attempt has been made to measure vertical equity—the unequal treatment of unequals. This latter concern may become a new policy frontier in education finance.

INTRODUCTION

The Basic Education Program (BEP) formula became Tennessee's primary funding mechanism for education in fiscal year 1993. The Tennessee General Assembly adopted the new formula during the 1992 legislative session with the passage of the Education Improvement Act (EIA). More than ninety percent of all state funding for education now flows through this formula, and the state contribution to funding public schools has grown from 41% to 46% of the total, having peaked at just over 50% of the total in 1996-97 (including federal funds).

The General Assembly increased the state sales tax rate from 5.5% to 6.0% to ensure adequate revenues would be in place to phase in full funding of the BEP over a six-year period. The revenue generated by this increase only partially funded the increases required to phase the formula in. The phase in was also supported by growth in the existing tax base. Full funding was achieved in fiscal year 1998 with a cumulative total of \$682 million in new funds distributed through the BEP formula.

Legislative consideration of the BEP began in 1991 before the judicial decision in Tennessee Small School Systems v. McWherter (Small Systems I)³, but after the initial lawsuit challenging the way the state funded education was filed. A consortium of small, rural school systems filed suit in July 1988 asking the court to declare the old funding formula in violation



of both the education and the equal protection clauses of the Tennessee Constitution and require the State to establish a new funding system that meets constitutional standards. In March 1993—during the first year of the six-year phase-in period for the new formula—the Supreme Court of Tennessee ruled in favor of the plaintiffs on the equal protection clause, affirmed the trial court's holding allowing the General Assembly to devise a remedy and remanded the case to the trial court for further proceedings.

The case returned to the Supreme Court in a second appeal after the trial court denied the plaintiffs' demand for immediate full funding of the formula, priority for capital improvements and equity in teachers' salaries. The Supreme Court issued its second opinion in February 1995 (Small Systems II)⁴ ruling against the plaintiffs on all issues except equalization of teachers' salaries. That issue was addressed by the General Assembly in 1995 with additional state funds external to the BEP. That funding scheme was challenged by the plaintiffs in 1988 and rejected by the Supreme Court in a decision issued October 8, 2002 (Small Systems III).⁵ A timeline for the small systems lawsuit is presented on page 10.

IMPROVING EQUITY AS SET FORTH IN THE EIA AND BY THE COURT

Pursuant to T.C.A. § 49-3-356, no local education agency (LEA) may receive state BEP funding until the local legislative body has appropriated the required local share. The local share for each LEA is determined by its county area fiscal capacity in accordance with the statute:

. . . It is the intent of the general assembly to provide funding on a fair and equitable basis by recognizing the differences in the ability of local jurisdictions to raise local revenues.

The General Assembly heard extensive testimony regarding the adoption of a methodology that would meet its intent to provide funding on a fair and equitable basis. TACIR's study of education fiscal capacity produced the methodology adopted to satisfy this requirement.



In *Small Systems II*, the Court acknowledged the TACIR methodology and further stated that

[i]t appears that the BEP addresses both constitutional mandates imposed upon the State—the obligation to maintain and support a system of free public schools and the obligation that that system afford substantially equal educational opportunities.⁶

Fiscal capacity was not an issue in the Court's *Small Systems III* decision.

TACIR FISCAL CAPACITY AND EQUITY

The TACIR determines the education fiscal capacity of each county area annually by analyzing tax base, ability to pay, and tax and education service burden variables. The result of the analysis is a dollar figure per pupil representing the fiscal capacity of each county area. That figure is multiplied by the average daily student membership (ADM) of the public schools in each county area to produce a figure for the county area's total fiscal capacity, and a percentage of the statewide total is computed for each county area from those dollar figures.

In order to implement the equity provision adopted by the legislature, the Tennessee Department of Education applies TACIR's percentages to the aggregate local share of the BEP to determine each county area's required

local match. For multi-school-system counties, the Department computes an overall state and local percentage for each county area and applies those ratios to determine the local match for each system within those counties.

CONSIDERATIONS FOR MEASURING EQUITY

Now that the BEP formula has fully phased in and in place for an additional four years, an evaluation of its lasting effect on fiscal equity is warranted. As noted in the 1996 and 2000 TACIR briefs, a set of questions that together comprise a framework for analyzing equity in school finance have crystallized in the education finance literature over the last two decades. These questions and the analysis that follows are based on that literature.⁷

The questions are

1. for whom should school finance systems be equitable?
2. what resources or services should be distributed equitably .
3. how should equity be defined?
4. how should equity be measured?



The fourth question is generally a two-part question, embodying both the measures and the results. It has been rephrased here, and the question of results is presented separately:

5. how equitable is the system?

Questions one through four describe the framework for analyzing equity; question five involves the application of that framework to suggest conclusions.

First, how do questions one through four apply in Tennessee?

Who: Equity Groups

The two groups in which education equity researchers are generally interested are students and taxpayers. The concern for students was explicitly stated by the Tennessee Supreme Court in its unanimous opinion in *Small Systems I*:

. . . the disparities in educational opportunities available to public school students throughout the state . . . have been caused principally by the statutory funding scheme, which, therefore, violates the constitutional guarantee of equal protection.⁸

This brief presents seven measures of equity among students and one measure designed to evaluate both student and taxpayer equity.

What: Equity Objects

The education finance literature supports analyzing three general categories of things (or objects of interest) to be distributed equitably: inputs, outputs and outcomes. In order to evaluate the extent to which the legislative intent of the BEP formula has been met, this brief is focused on financial inputs. The traditional objects of interest in analyses of financial inputs are operating expenditures and various compositions of revenues. These data are easily obtainable and are collected uniformly across the United States, including Tennessee. In addition, this type of analysis is generally accepted by the courts.

The literature also describes several levels at which these objects may be measured: the individual student, the school, the educational program within the school, and the school district as a whole. While the ideal level may be the individual student, such detailed data is rare. The most common level of analysis is the district. In Tennessee, the district, or system, is the only level at which financial data is available. It is also the level at which the BEP formula is calculated.

Why: Defining Equity

In order to decide how to measure equity, one must first decide how to define it. Education equity is generally described as having three dimensions:

1. Equal treatment of equals—horizontal equity: students who are alike should receive equal shares. This principle requires equal expenditures or revenue per student.
2. Unequal treatment of unequals—vertical equity: in some circumstances and for some reasons it is not only acceptable but also necessary to treat students differently. Examples include students with learning disabilities and students whose primary language is not English.
3. Equal opportunity: the amount of educational resources and services provided to students should not vary based on illegitimate characteristics such as race, gender, national origin, property wealth, or household income. In some cases, equal opportunity is treated as a condition of horizontal equity.



Vertical equity was not at issue in the lawsuit brought by the small systems in Tennessee. Both the funding formula replaced by the BEP and the BEP itself address issues of vertical equity by including adjustments for differing student needs based on grade level and program, including academic, vocational and special education.⁹

In *Small Systems I*, the Court noted that neither equal funding nor sameness was the issue, but rather equal opportunity. However, the justices centered their rationale for finding Tennessee's education funding scheme unconstitutional on the relationship between dollars spent by a school system and the quality of education its students receive and the fact that the state's

funding scheme produced great disparity in the revenues available to the school districts. Therefore, the focus of this brief is on measurements of horizontal equity.

How: Measuring Horizontal Equity

The education finance literature describes at least a dozen measures of horizontal equity. This brief provides an update of the eight measures presented in the 2000 brief and extends the analysis to look specifically at the change in the distribution of state revenue as a result of the BEP to analyze the impact of the new formula on spending equity.

The following is a general discussion of the statistics applied to analyze Tennessee data. If all systems spent exactly the same amount per student, the four ratios presented and the coefficient of variation would equal zero; the McLoone and Green indices would equal one. The TACIR index is applied only to state revenue. If state revenue completely eliminated the disparity in local fiscal capacity, then the TACIR index would equal negative one.

Range Ratio. The range ratio is a traditional measure that compares the most extreme differences within a data set. Here it is calculated by dividing the highest value for expenditures per pupil by the lowest value. This is probably the weakest statistic of all those considered here because it includes only two school systems and gives no indication of equity among the school systems in between.

Federal Range Ratio. The federal range ratio is frequently used in school finance litigation arguments and in the distribution of some federal education funds. It avoids the extremes, but like the range ratio, includes only two school systems and gives no indication of equity among the others. Here it is calculated by dividing the value of the observation at 5th percentile divided by the value at the 95th percentile with the values arranged in descending order.

Kingsport/Hancock County Ratio. This indicator is unique to Tennessee. It is used here as in the past to illustrate the impact of the BEP on two systems made nationally famous by CNN. The CNN segment has been shown at education conferences to illustrate a stark difference in equity. This index is computed by dividing Kingsport's expenditures per pupil by Hancock County's. It shares the same major weakness as the range ratios.

Top 10/Bottom 10 Ratio. This measure has been used by the Small Systems plaintiffs to support their arguments that the previous funding formula and the current salary provisions violate the Tennessee Constitution. Because this measure includes more systems—and therefore more students—it is arguably more representative than the first three measures described. However, it still suffers from a focus on the extreme values and offers no indication of equity among the majority of school systems.

Coefficient of Variation. The coefficient of variation is a statistic that includes all values in a set of data. A standard parametric statistic, it is based on the differences between each value in the data set and the mean or arithmetic average of all values. It is computed by dividing the standard deviation of the data set by its mean. One weakness of the coefficient of variation is that, because of its dependence on the mean, it is affected by extreme values.

McLoone Index. The McLoone index uses the median rather than the mean in order to lessen the impact of extreme values. The median is the mid-point value that divides a set of data into two equal parts. The McLoone index is the ratio of the total of the actual expenditures of all districts at or below the median expenditure per student to what their expenditures would be if all such districts spent at the median level.¹⁰

Green Index. This statistic is unique to TACIR. Developed by and named for the Executive Director, it measures the relationship between

the top half and the bottom half of a set of data. The theory of this statistic is that expenditures per pupil for the top half of students should not greatly exceed the expenditures for the bottom half.

TACIR Equity Index. This statistic differs from the others in that it measures equity among the counties both in funding for students and in taxpayer burden by comparing state funding to local fiscal capacity. It is designed to measure both the extent to which the education of the students in each county in Tennessee is equitably funded and the extent to which comparable effort by taxpayers produces reasonably equal funding for education in each county.

Similar or equal taxpayer effort will produce greatly unequal amounts of local revenue from county to county because of variations in the size of local tax bases. Therefore, state funds should be distributed in inverse proportion disproportionately in order to ensure reasonably equal funding overall.

This measure involves correlation analysis, which produces values between +1 and -1. However in this case, as noted earlier, if the distribution of state revenue compensated perfectly for differences in local fiscal capacity, then the TACIR index would equal negative one.

EDUCATION EQUITY IN TENNESSEE: What has the BEP Achieved?

The application of these eight measures to the first year of full BEP funding indicates education finance equity improved substantially as the formula was phased in and thereafter. No definitive standard that would indicate a minimum acceptable degree of equity has been set for any of the measures described. Given that not all systems have exactly the same complement of students in terms of their needs, it is inappropriate to expect that any of them would equal exactly zero or one. Nevertheless, the measures are valuable as trend indicators.

Exhibit A Public Education Spending Equity Measurements for Tennessee

	Base Year 1991-92	Full Funding 1997-98	Change Since 1991-92		Fiscal Year 2001-02	Change Since 1991-92	
Range Ratio	2.23	2.12	-0.11	-4.8%	1.84	-0.39	-17.3%
Federal Range Ratio	1.60	1.53	-0.07	-4.4%	1.43	-0.17	-10.4%
Kingsport / Hancock Ratio	1.54	1.30	-0.25	-15.9%	1.15	-0.40	-25.7%
Top 10 / Bottom 10 Systems	1.65	1.68	0.03	1.7%	1.48	-0.17	-10.3%
Coefficient of Variation	0.16	0.14	-0.02	-11.4%	0.12	-0.04	-26.7%
McLoone Index	1.10	1.07	-0.03	-2.5%	1.08	-0.02	-1.5%
Green Index	1.31	1.26	-0.04	-3.4%	1.23	-0.08	-5.9%

All statistics are based on expenditures and average daily membership (ADM) published in the Tennessee Department of Education's Annual Statistical Report.

The years chosen for the analyses represent the last year of the previous funding formula, the Tennessee Foundation Program (TFP) as a base year (fiscal year 1992), the first year of full funding (fiscal year 1998) and the most recent year for which data is available (fiscal year 2002). All trends presented are based on comparisons to fiscal year 1992.

All seven of the equity indicators presented in Exhibit A improved between the base year and 2002, and all seven improved between full funding and 2002. The five indicators most influenced by extreme values (the first five in Exhibit A) show the most improvement.

The extent to which the improvement in spending equity resulted from changes in the distribution of state revenue may be judged in part by applying the same equity measures to revenues. Exhibit B shows the results of applying the seven indicators used to measure spending equity plus the TACIR index to state revenue. In this case the farther the four ratios

and the coefficient of variation are from zero and the farther the McLoone and Green indices are from one, the greater the differentiation among school systems in the distribution of state revenue. The closer the TACIR index is to negative one, the more effective the state formula is in compensating for differences in local fiscal capacity.

As Exhibit B illustrates, the degree of differentiation among school systems in the distribution of state funds increased substantially through full funding in percentage terms by most measures, but stabilized at that point through fiscal year 2002. The coefficient of variation and the McLoone and Green indices show most clearly how little differentiation existed before implementation of the BEP formula. The TACIR index, which is the one measure that directly incorporates local fiscal capacity, illustrates most clearly the improvement in the degree to which the new formula compensates for local variations.

Exhibit B Equity Measurements Applied to State Education Revenue in Tennessee

	Base Year 1991-92	Full Funding 1997-98	Change Since 1991-92		Fiscal Year 2001-02	Change Since 1991-92	
Range Ratio	1.58	2.12	0.53	33.7%	2.15	0.56	35.5%
Federal Range Ratio	1.17	1.69	0.53	45.0%	1.70	0.53	45.3%
Kingsport / Hancock Ratio	1.14	1.82	0.68	59.3%	1.77	0.63	54.8%
Top 10 / Bottom 10 Systems	1.32	1.73	0.41	30.8%	1.73	0.41	30.9%
Coefficient of Variation	0.07	0.14	0.06	83.0%	0.14	0.07	90.0%
McLoone Index	1.03	1.12	0.09	9.2%	1.12	0.09	8.5%
Green Index	1.08	1.29	0.21	19.8%	1.31	0.23	21.2%
TACIR Index	-0.32	-0.87	-0.55	173.0%	-0.87	-0.55	170.8%

All statistics are based on revenue and average daily membership (ADM) published in the Tennessee Department of Education's *Annual Statistical Report*.

CONCLUSION

The intent of the General Assembly to provide fair and equitable funding by implementing a formula that compensates for differences in local fiscal capacity was largely met by the BEP. Horizontal spending equity improved as the new formula was phased in and continued to improve thereafter, and a comparison of state funding to the TACIR method of determining fiscal capacity indicates that fully funding the BEP played a strong role in the improvement.

Considering that Tennessee chose not to cap local support of public education, the progress through full funding of the formula is significant, but the substantial improvement in spending equity beyond that point belies the belief held by many that caps on local support are necessary to sustain spending equity. Three characteristics of the BEP formula likely account for the amount of progress made in the absence of a cap:

- (1) More than ninety percent of all state funds—including benefits for teachers and more than a dozen formerly categorical funding programs—are now equalized through the formula.
- (2) The local share required is large—25% of the BEP classroom components and 50% of the non-classroom components.
- (3) The measure of local fiscal capacity applied to allocate the local share is comprehensive, covering the two largest local tax bases (property and sales) with adjustments for taxpayer equity (income), tax exportability and education service burden.

Given the differences in the needs of individual students—and the fact that they vary from system to system—measures of horizontal equity should not be expected to reach statistical perfection. Indeed, as the Supreme Court indicated in *Small Systems I*, the issue is neither perfect equality in funding nor sameness. The pursuit of equity in spending will always be an important issue in education finance. Statistical measures, including the ones discussed in this brief, will allow researchers to recognize and follow emerging education finance trends in Tennessee.

NOTES

¹Harry A. Green and Lynne Holliday, *Much Ado About Something: Gains in Education Spending Equity*, TACIR Research Brief No. 5 (July 1996) and Lynnisse Roehrich-Patrick and Harry A. Green, *Gains in Education Finance Equity: How Has the BEP Changed Things?* TACIR Staff Education Brief No. 4 (October 2000).

²The Education Improvement Act imposed a statutory deadline on the phase in of the Basic Education Program funding formula of July 1, 1997. Tennessee Code Annotated, § 49-3-354(h). That deadline was met.

³851 S.W.2d 139 (Tenn. 1993).

⁴*Tennessee Small School Systems v. McWherter*, 894 S.W.2d 734 (Tenn. 1995).

⁵*Tennessee Small School Systems v. McWherter*, 91 S.W.3d 232 (Tenn. 2002).

⁶894 S.W.2d 738 (Tenn. 1995).

⁷Berne, R. and Stiefel, L., The Measurement of Equity in School Finance, Baltimore, MD: Johns Hopkins University Press, 1984; Odden, A., and Picus, L.O. School Finance: A Policy Perspective, New York: McGraw-Hill, 1992; Swanson, A. and King, R. School Finance: Its Economics and Politics, New York: Longman, 1997.

⁸851 S.W.2d 156 (Tenn. 1993).

⁹Tennessee Code Annotated, §§ 49-3-306 and 49-3-354.

¹⁰The ratio is inverted as presented here to make it easier to compare to the other measures. Computed in the usual manner, the ratio will be less than one and the higher the ratio, the greater the equity. When inverted, the ratio will be less than one and the lower the ratio, the greater the equity, which is how the other measures presented are interpreted.

Small Systems Lawsuit Time Line

Small Schools I

1988

Lawsuit Filed

Coalition of 66 rural school systems sues the state

Plaintiffs claim education funding system

- creates unconstitutional disparities
- relies too heavily on local government funding
- education funding capacity varies greatly

1992

Legislative Response

- General Assembly adopts plan presented by Governor McWherter as part of the Education Improvement Act
- Basic Education Program (BEP) replaces Tennessee Foundation Program (TFP)
- \$600 million program to be phased in over six years—*no change in teachers' salaries*

1993

Supreme Court Decision

- The State's school funding scheme (the TFP and associated programs) is unconstitutional
- Pre-BEP funding scheme fails to maintain and support a system that affords substantially equal educational opportunities to all students
- No specific remedy ordered

Small Schools II

1993

Plaintiffs Challenge BEP

- Coalition of rural schools challenge new funding formula
- Costs of increasing or equalizing teachers' salaries *are not a component*
- New formula should be funded immediately
- Poor systems should be given additional funds to improve school buildings

1995

Supreme Court Decision

Court conditionally upholds new funding plan known as the BEP, including proposed phase in, noting that the omission of a requirement for equalizing teachers' salaries is a significant defect in the BEP that puts the entire plan at risk both functionally and legally

"The plan must include equalization of teachers' salaries according to the BEP formula."

1995

Legislative Response

- Tennessee General Assembly adopts plan developed by Governor Sundquist, Comptroller, House and Senate Education Committees, and Plaintiffs
- Provides flat amount salary adjustment for teachers in 50 systems with average salaries below state average, excluding extreme highs and lows
- State and locals pay same percent as in classroom BEP components

Small Systems Lawsuit Time Line (continued)

Small Schools III

1998

Plaintiffs Challenge Salary Equity Plan

Coalition of rural school systems claim that the state has not complied with the Supreme Court's directive in Small Schools II

- Legislative plan creates artificial floor unrelated to the BEP
- Teachers' salaries are not reviewed annually as are other BEP components
- Teachers' salaries are not subject to annual cost determination as are other BEP components

2000

Supreme Court Decision

"the salary equity plan [adopted by the legislature] fails to comport with the State's obligation to formulate and maintain a system of public education that affords substantially equal educational opportunity to all students."

Key Points

The current salary equity plan does not equalize teachers' salaries according to the BEP formula because

- It contains no mechanism for cost determination or annual review—unlike the BEP approved in Small Systems II.
- Wide disparities continue—extreme difference in 1999 of \$14,500 only \$2,200 less than extreme difference in 1995 of \$16,700.

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