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## Educational Considerations, vol. 21 (2) Full Issue

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Guest Editor: R. Craig Wood  
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### PUBLICATION INFORMATION

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# Guest Commentator Foreword

The authors of the eight essays in the issue of *Educational Considerations* focus on some of the cutting edge problems in education finance. The problems they discuss, their methods of analysis, and the technical terms they use differ markedly from the standard school finance textbooks of an earlier period. This volume is a contemporary treatment of a topic that has been with us since the earliest schools were established.

Despite the broad range of problems represented by the essay titles in this volume, a few themes are repeated in most of them. First, there is the argument that greater equity in school funding is needed. Although this is not a "cutting edge" problem, some of the authors have advanced new arguments for school finance equity, and their language has become more strident. For instance, Mueller believes that "children are the 'walking wounded' of the school finance equity wars." Further, he speculates that children could "become casualties of the choice movement." McLoone examines this issue from the perspective of an economist. He writes, "Schools are responsible for some of the growing inequality in the income distributions. . . . If schools are failing, they are doing so for persons at the lower end of the ability scale or the income scale. Schools do not seem to fail the talented."

Wood and Thompson explore the notion that schools are "consumers" of goods and services in their essay, *Funding Public Education Based on the Concept of Cost of Living*. Their identification of education cost factors that are somewhat independent of cost of living variables adds a refinement that is certain to attract the attention of education finance scholars. Moreover, their discussion of cost of living/education provisions in school finance formulae in Florida and Texas demonstrates that the idea of a cost of education index has reached some level of diffusion in public policy.

At the core of all these pronouncements about the need for greater equity in education is an implied definition of equity. McLoone equates equity to "equal results," while others speak of equity as equal access to schools of comparable quality. Wood and Thompson imply that the search for equity in school spending, which is presumably related to school quality, would be enhanced if researchers could develop a satisfactory cost of education index. Mueller, quoting favorably from Jonathan Kozol's *Savage Inequalities*, implies in his message that equality of education cannot be realized as long as persons of greater means or with a different set of priorities are allowed to purchase a private school education for their children. How Mueller and Kozol would achieve their goal of equality in education without either a reversal of the United States Supreme Court's 1925 ruling in *Pierce v. Society of Sisters*, or the enactment of a constitutional amendment, is not explained. With this plethora of definitions, the reader of this volume is treated to a host of suggestions about what ought to be done to solve the problems that the authors identify.

A second major issue that is discussed in these essays is the flip side of the education equality issue. Is there fairness in the tax structure that supports education? Brent and Monk say that the tax structure should have "horizontal and vertical equity." They explain "Horizontal equity requires that equals be treated as equals. Conversely, vertical equity requires that unequals be treated unequally." Kearney describes how the

Michigan Legislature discarded school property taxes entirely in 1993 because, after years of endless tinkering with property taxes, the inequities in tax rates continued to grow. Thus Michigan became the first state to implement tax expert E.R.A. Seligman's proposal to discard property taxes when he wrote seventy years ago, "The property tax's retention can be explained only through ignorance or inertia."

Nevertheless, many of the authors of this issue of *Educational Considerations* explain refinements in property tax systems. They write about "circuit breakers" and "homestead credits" which provide targeted tax relief for property owners who do not have sufficient liquid resources to satisfy their property tax liabilities. One proposed solution to the dilemma of the "property-rich/cash-poor" elderly is the Reverse Equity Mortgage (REM). Through implementation of REMs, lending institutions allow elderly homeowners to systematically "convert" the equity in their homes to liquid resources to pay their bills, including property taxes for schools. Understandably, elderly homeowners have shown little enthusiasm for this scheme that has the potential to evict them from their homes if their needs for cash are great and they live longer than expected. Ironically, Brent and Monk discuss the REM at some length and then report research showing that most low income elderly are not "property-rich and cash-poor." The authors cite U.S. Bureau of Census data showing that housing wealth and income are directly related. The median housing wealth of households within the 65–70 age range is but \$38,000. Thus the authors conclude that the monthly advances of money through REM distribution are unlikely to significantly improve the ability of the low income, low housing equity elderly to pay taxes on their homes.

The authors of *Resource Accessibility, Wealth Neutrality, and Tax Yield in Montana* take research and model building one step beyond the theoretical level. Thompson, Wood, Honeyman, and Miller develop a conceptual framework for evaluating a state fiscal support system for education and put their model to test in Montana in the context of a legal challenge to the state's school finance system. The authors begin with a statement of three generally accepted principles of equity in the research literature of education finance—resource accessibility, wealth neutrality, and equal tax yield. The authors use correlational analysis and regression, the McLoone Index, and the Gini coefficient to seek answers to critical questions about disengaging wealth from educational opportunity in Montana. Their work provides a model for monitoring school finance systems by state departments of education and a framework for a defense if the system is challenged in court.

The essays discussed to this point focus on how dollars are distributed to school districts, with little attention to how to put dollars to productive use in districts, schools, and classrooms. The essay by Picus, *Estimating Determinants of Pupil/Teacher Ratios*. . . , addresses this issue and provides an important balance to this publication. Picus reports the current state of knowledge regarding resource allocation patterns in schools; describes the research methodology he used in a national investigation of the topic; and reports his findings and conclusions. His conclusion on the relationship between pupil/teacher ratios, district and student characteristics, and community types will provoke great interest in school finance circles.

*Financing Public Education in the American Heartland* by Ward stands alone in this collection of essays in that it focuses on the willingness and ability of a group of states to support education. All of the other essays include elements of theory contributions, model building, or statistical analysis. Ward simply looks at the efforts that taxpayers are making and the school revenue generated in the American Heartland to support the education in grades K–12 and in postsecondary education. He uses two important indicators of the willingness of a populace to support public services. One is the overall level of state and

local government revenue from "own sources" per capita, which provides a measure of overall fiscal support. The second indicator is revenues from "own sources as a percent of personal income." Ward reports some interesting discrepancies between the effort and ability of a state to support public services and how resources are allocated to K-12 school systems, postsecondary institutions, and other public sector spending.

In sum, education finance issues are enmeshed in a complex web of values, priorities, public policies, and educational theories. There are no simple solutions. The authors of these essays have raised issues and discussed possible solutions.

They have applied contemporary research methods and economic theories to construct and test school finance models that may be used as guides to future policy developments in school finance.

**Professor Clifford P. Hooker**

University of Minnesota

and

Chairman, Editorial Advisory Committee

West's *Education Law Reporter*

# Guest Editor Foreword

It is with great pleasure that this issue of *Educational Considerations* is presented. This issue encompasses some of the finest minds of financing public education in America today. These scholars represent diverse opinions and views. Notwithstanding these philosophical and methodological differences in this important area, all the researchers agree that a vitally funded public education system is necessary for the future of our society.

The policy issues surrounding the financing of public education in America represent the cutting edge of the most significant and vitally important public policy debate concerning edu-

cation. No other area of public education combines the vitality, the intensity, and the scholarly research that is necessary for public policy makers and the courts to determine the future of public education. No other discipline has so dominated the overall discussion concerning the future of public education. Given the issues and their impact, the current debate concerning the concept of financing public education will continue for the future. It is the intention that by this presentation of *Educational Considerations* greater understanding of the technical as well as policy issues will be disseminated to an even larger audience.

**Professor R. Craig Wood**

University of Florida and Codirector  
UCEA Center for Education Finance  
and  
Member Editorial Advisory Board  
of *Educational Considerations*

Until litigation reaches the point where both sides are willing to listen to data, so much so that states actively monitor themselves and that plaintiffs concede when sophisticated data deny genuine differences, plaintiffs and states and children will suffer equally in lengthy and expensive litigation.

## Resource Accessibility, Wealth Neutrality, and Tax Yield in Montana\*

by David C. Thompson, R. Craig Wood, David S. Honeyman and M. David Miller

\*This article was prepared from an earlier document entitled *The Study of Resource Accessibility, Wealth Neutrality, and Tax Yield in Montana Rural Education Association v State*<sup>1</sup> prepared on behalf of the Attorney General's Office, State of Montana. The earlier report was prepared under contract between the State of Montana and Wood, Thompson & Associates. These data were argued in the trial court and subsequently admitted into evidence.

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### Introduction

In recent years, school finance litigation has dominated thought among theorists and researchers interested in the public policy dimensions of fiscal support for education. Nearly every state has experienced litigation, and in many instances repeated attacks on state funding methods for public elementary and secondary education have occurred. In some instances, litigation has represented emergence of more sophisticated thought about equal educational opportunity, while in other instances controversy has returned again and again as compliance litigation has sought to enforce earlier court rulings. Thoroughly illustrated in the literature, these complaints have followed a distinct pattern of argument as plaintiffs have alleged that states have not met their constitutional obligation to provide high quality educational opportunity to all children without regard to local wealth and school district boundaries.<sup>2</sup>

Although plaintiffs have argued with varying degrees of success in the many state courts, they repeatedly seek to test judicial sympathy in new settings and at new times in history. Although settings and conditions constantly change, the arguments are often the same, creating an unceasing challenge for defendants who must balance the delicate mix between the grim realities of limited state budgets and plaintiffs' successes in some states that have generally aided a climate of fiscal reform momentum. Such was recently the case in *Montana Rural Education Association v State*<sup>3</sup> where plaintiffs contended that the fiscal amounts allocated to the plaintiff school districts "... denies certain student equality of educational opportunity, ... and equal protection of the laws."<sup>4</sup> Specifically, the plaintiffs contended that:

- (a) The classifications and funding levels provided in the foundation program schedules are arbitrary, with no rational and educationally-related basis. Additionally, the amounts allocated through the foundation program have been, and continue to be, less than needed to fund public elementary and secondary education at the levels required by the State of Montana sufficient to provide equal educational opportunities;
- (b) Because they are arbitrary and not based on educationally-related determinations of need, the foundation program schedules fail to reflect the costs of providing educational opportunities to students in rural elementary and secondary school districts in Montana;
- (c) The eligibility formula for GTB aid is biased against smaller, rural school districts, and in favor of larger, non-rural districts. As a result, rural school districts are significantly less likely to qualify for Guaranteed Tax Base aid than are non-rural school districts;
- (d) Additionally, the distribution formula for determining the amount of GTB aid for qualifying districts is biased against smaller rural districts, and favors larger, non-rural districts. As a result, even though a rural district may qualify for GTB aid, the amount it receives is disproportionately small compared to the amount that is distributed to a qualifying non-rural district;
- (e) As a result of the funding inequities described, students in rural school districts are not afforded equal educational opportunities; and
- (f) Montana's school finance system in general, and the foundation program classifications and funding inequities, in particular, adversely affect the quality of education afforded to students in the plaintiff school districts.<sup>5</sup>

These plaintiff claims are representative of and consistent with the broad context of school finance equity litigation that has characterized the last three decades in the fiscal policy arena. Although the facts were specific to one state, the broader questions of constitutional equity and sound finance theory were

again raised because the state of Montana was being challenged to show that its statutory scheme for financing public education did not violate equal opportunity as defined in constitutional and fiscal theory. As in every other state where challenges have arisen, the question for the court rested in whether the principle of equalized educational opportunity is uniformly operational, and whether equalization can be served when differential costs of educational delivery are only those related to enrollment and size of the district, rather than extended to include plaintiffs' claim of other attributable costs relating to economic and geographic factors affecting the actual price of education.<sup>8</sup> As such, the issue at bar became whether the Montana finance formula had achieved full equity, satisfactorily addressing the intent of equalization and equitable financing in the modern context of equal opportunity.

Often ignored in the modern frenzy of reform litigation, however, is the question of whether states are assumed guilty of inequitable treatment of children. The literature often trumpets the reform agenda as if such conclusion were naturally true, with little opportunity for defendants to offer their views in a reflective discourse. Since the root of controversy rests in disagreement about whether real harm has occurred or whether mere political theory is offended,<sup>7</sup> it becomes important to recognize that each side in a legal dispute views its claims as correct and justified. It is equally often unnoticed that plaintiffs and defendants effectively ask the same questions when they develop their arguments. Hence the literature generally attributes considerable detailing to plaintiff claims. Yet defendant claims deserve consideration in a democracy, particularly given that each party approaches the same legal and methodological questions.

Both plaintiffs and defendants in Montana addressed the same questions, but from radically different perspectives. In traditional form plaintiffs concluded that where disparity on fiscal variables could be found, such disparity was unacceptable on its face. Defendants likewise looked for disparity; however, the approach was quite different by extending the question beyond observation of phenomenon and linking these questions to legal theory of burden upon the state to redress both the *fact* and *root* of disparity. For defendants, the questions focused on the state-created aid formula on two dimensions:

First, has the *formula* created wealth-related educational opportunity? If it has not, then legislative intent in enacting an equalization formula is by default met.

Second, are there *formula*-based inequities which differentiate plaintiffs from nonplaintiffs? While absolute perfection may not be possible, any inequities should be rationally related to the aims of equalization. The question becomes: Are plaintiff districts differentially harmed by the formula? If not, then equity is by default met.<sup>5</sup>

Under these conditions, this analysis offers a significant contribution to the search for equal educational opportunity by tracing an actual data analysis for defendants in Montana and by offering the literature an analysis of the other side of a legal controversy.

### The Challenged Statutory Scheme<sup>9</sup>

The state share of funding for public elementary and secondary schools in Montana is derived from a formula which includes both a foundation and guaranteed tax base component. The purpose of the formula, which took effect in the 1990–91 academic year in response to the declaration of the unconstitutionality of the former system of school finance in *Helena Elementary School District No. 1 v Montana Education Association*,<sup>10</sup> was to equalize per pupil educational expenditures among the 538 school districts across the state in order that each child may be provided a sufficient program of instruction regardless of

the relative property wealth of the child's community. The rationale behind the foundation portion of the Montana public school funding formula is provided by statute:

A uniform system of free public schools sufficient for the education of and open to all school age children of the state must be established and maintained throughout the state of Montana. The state shall aid in the support of its school districts on the basis of their financial need as measured by the foundation program and in the manner established in this title.<sup>11</sup>

The foundation program attempts to accomplish this goal through establishment of a dollar amount of the general fund of each district which is necessary to support a sufficient educational opportunity for each school child in the state.

The Montana formula is enrollment driven, with state funding based on pupil units expressed as *average number belonging* (ANB). The ANB, a modified form of average daily attendance, includes attendance for 180 instructional days per year plus up to seven instruction-related days. Elementary and high school districts are divided into fifteen funding categories based on ANB. The districts in each category are provided a certain general fund budget dollar amount through the foundation formula, with the per-pupil rate declining for each category as ANB increases. Each county government acts as fiscal agent for the school districts located within the county's borders. The Board of County Commissioners in each county is required by statute to fix and levy taxes necessary to finance the final budget of each school district. This includes levying taxes in support of the foundation program, as well as any permissive levies authorized by those districts that choose discretionary taxation for additional school spending.

The Montana foundation program includes statewide aid, as well as county equalization aid, to individual school districts. The state requires a 95 mill property tax rate to be levied by each county. The revenue resulting from the levy of the first 40 mills is deposited to the state special revenue account to be used as statewide equalization aid through the foundation program. The revenue derived from the remaining 55 mills is retained in each county, and is distributed as equalization aid among the districts in the county. The aggregate foundation program aid, including both state and county equalization funds, was \$341 million for the 1990–91 school year.

County equalization aid money is distributed to the districts within each county's borders in an attempt to fund the general budget in accordance to the state schedule which bases general fund parameters on district ANB category. If the county is unable to fund districts at 100 percent of the foundation program general fund level, then districts in the county are eligible for state equalization aid. Funds from the state special revenue fund are used to provide foundation equalization aid to districts in counties unable to finance their general funds at 100 percent of the scheduled amount, as well as guaranteed tax base aid to qualified districts. If the special revenue fund is not sufficient to finance districts according to law, then the state commissioner of public education is authorized to request a special appropriation by the legislature to bring funding up to the total foundation program level.

The guaranteed tax base (GTB) component of the Montana public school funding formula is used to supplement statutory permissive levies of individual districts, as well as the levies passed by counties for teacher retirement funds. The purpose of the GTB is to assure that the levy resulting from a mill rate (either the permissive levy or the county retirement levy) is equivalent to the statewide average levy resulting from that same tax rate.

Permissive levies are statutorily available wherein individual school districts are authorized to pass mill rates above those prescribed in the foundation program. Such mill rate must be



passed by the district board of trustees and approved by district voters in a general election. The permissive levy which results from this mill rate by law may not exceed 35 percent of the foundation program levy of that district. In addition, no district may have an overall levy greater than 104 percent of the previous school year.

Calculation of the GTB for any given district is as follows: the mill value per ANB of the district is subtracted from the statewide mill value per ANB. This difference multiplied by the mill value passed by district voters in support of the general fund yields the amount of the guaranteed tax base. The GTB for a county in support of its teacher retirement fund for the districts within its borders is similarly calculated, i.e., the countywide mill value per ANB is subtracted from the statewide mill value per ANB. This difference is multiplied by the mills levied by the county to support the county teacher retirement fund. Although the formula is considerably more complex in its operation, the description here is sufficient to understand the fundamental aspects of the formula that were challenged by plaintiffs.

### Framework for Evaluating the Montana Formula<sup>12</sup>

Evaluation of fiscal equity in a state funding scheme for public education always requires measurement. Plaintiffs offer "proofs" of their complaints, and defendants are obliged to consider whether those proofs are accurate. As a general rule, measurement of selected aspects of the state aid formula and its impact on plaintiffs and nonplaintiffs follows wherein each side develops its own assessment of the formula for presentation to the court. While plaintiffs and nonplaintiffs have many strategic options, some framework to develop convincing data is always employed. Regardless of the level of analytical sophistication, measurement is implicit. Of critical importance is the selection of objects to be evaluated and the choice of methodologies by which measurement will occur. Generally plaintiffs and defendants will agree that the modern context of equity is to eliminate disparities over time and to disengage wealth from opportunity. Although there is general agreement to this end, there is less sophistication in the analyses that actually follow.

Despite absence of a single approach to measuring equity, three generally accepted principles of equity common across the research literature in education finance are *resource accessibility*, *wealth neutrality*, and *equal tax yield*. These broad standards seek answers to critical questions about equity that interest both plaintiffs and defendants. The resource accessibility standard asks whether students have access to resources to appropriately meet their educational needs. The wealth neutrality standard then asks whether those resources are unacceptably related to local wealth and residence. The tax yield standard finally seeks equity for taxpayers and asks whether equal tax effort results in equal yield. Although subject to varying degrees of emphasis in different analyses, these standards usually drive litigation data analysis. In the present instance, they again provide a useful framework to assess performance of the Montana statutory scheme for funding public education, both at the state level and within unique formula aspects relating to enrollment categories (ANB).

These equity standards must be further defined in order to be measurable, wherein a legislature's intent by enacting an aid formula must be considered. If the formula implies a heavy state responsibility for the education system, equity under the resource accessibility standard may be evaluated by looking critically at the degree of dispersion of wealth and expenditures per pupil. Measures that capture dispersion about some variable central to the formula are most useful in showing whether variance is too great at either end of the distribution. Generally analyses examine the relationship of school districts to variables such as median or mean budget or expenditure, wherein the critical question must finally be directed to whether their position is

linked to local wealth, is related to choice, or is a function of some other political reality. If it can be determined that illegitimate relationships exist, then equity is seriously questioned. Less apparent, however, is that variability not explained by wrongful formula design should not be presumed the result of neglect. As a result, resource accessibility is the first key aspect of this evaluation of Montana's aid plan.

Whenever variability in resources is found, the question of formula flaw must be examined by measurement of the link between local wealth and resources. This second element of equity defines the wealth neutrality standard. If, in examining the dispersion of resources it were found that wealth and expenditures per pupil are positively correlated so that an increase or decrease in local wealth results in an increase or decrease in the budget per pupil, and if these differences were greater for a select group of school districts, then the wealth neutrality standard would be violated because opportunity becomes a function of local wealth. If, on the other hand, it were argued that variations are related to a legitimate educational purpose such as compensating for differences in certain costs, i.e., sparsity or density or special educational needs, then tests for significant cost differentials between affected groups should reflect the concept that rational differences in fact exist. The test is more accurately between similarly situated groups: if differences are observed, then equity questions may be confirmed. However, if the formula creates differences based on justifiable differences in populations, then equity may in fact be served by variability.

If differences are significant and are unrelated to relevant attributable costs, both the resource accessibility and wealth neutrality standards must be measured. Such measures need to assess relationships between wealth and expenditure and should assess differences between affected groups (e.g., plaintiffs, nonplaintiffs, and matched sets of nonplaintiff districts) to provide an effective means of evaluating wealth neutrality in a finance formula. When inequality as defined by differences in correlations between wealth and expenditure is present, or when there are demonstrable and significant differences between these groups unrelated to legitimate purposes, the formula may become suspect. Measuring wealth neutrality thus forms a central feature of this examination of Montana's school finance plan.

The final standard of taxpayer equity concludes the equity argument and seeks equal treatment by questioning the relationship between tax yield and equal tax effort. If one school district can produce higher tax yield with less tax effort than another school district which cannot reach that level without higher tax rates and therefore an unequal tax burden, the taxpayer equity standard is violated and access to educational opportunity is barrier-laden unless the state aid formula actively intervenes to nullify inequality. Consequently, observations regarding tax yield and tax effort are also instructive about resource accessibility and wealth neutrality. While many complex issues cloud the taxpayer equity standard and make it largely unmeasurable with the present level of sophistication in research, for rough consideration statistical assessment is still necessary. Because taxpayer equity can be considered as a *de facto* byproduct of the wealth neutrality standard, taxpayer equity is separately evaluated in this analysis of Montana's aid scheme only insofar as it enlightens discussion on resource accessibility and wealth neutrality.

Statistical measurement is therefore a necessary condition to determining equity in school finance litigation. By observing variations in the values of selected school finance measures, judgments can be made about formula effects on generally accepted equity standards for the affected groups. Although each side always believes its proofs to be accurate, measurement must show meaningful disparity if plaintiffs' contentions are to be valid, i.e., there must be a substantively negative effect on

educational opportunity caused by statutory provisions. This analysis therefore uses measurement to examine performance of the Montana school aid formula generally, within, and between groups on the common standards of resource accessibility, wealth neutrality and taxpayer equity.

### Measuring Resource Accessibility, Wealth Neutrality and Tax Yield

The standard measures of equity<sup>19</sup> used in this study to evaluate resource accessibility were the *mean*, *range*, *restricted range*, *variance*, *standard deviation*, *coefficient of variation*, and *analysis of variance*. These tests were applied, by group, to a number of variables which measured budget, expenditure, wealth (the dollar value generated by one mill), budget surplus, and tax millage for each district. The groups used in this analysis included: all districts, plaintiff districts, nonplaintiff districts, and a randomly selected group of nonplaintiff districts matched by enrollment (ANB). Likewise, the statistical measures used to determine wealth neutrality and equivalency of tax yield were *correlational analysis and regression*, the *McLoone Index*, and *Gini coefficient*. All data were for the 1991–1992 school year, except the percentage of budget surplus which was projected for the 1992–1993 school year, and were provided by the Montana Office of Public Instruction.

#### Mean

The mean is a measure of the central tendency of the distribution of observations. It represents the average value in a distribution of a variable. The mean takes into account all observations in the distribution. The mean of each variable examined was calculated with the following formula:

$$\sum X_i / N$$

where  $\sum$  is the sum of all districts,  $X_i$  is the value of a given variable in district  $i$ , and  $N$  is the number of districts.

#### Range

The range is the difference between the highest and lowest observations in a distribution. The smaller the value of the range, the smaller the variation in the distribution of a given variable. The smaller the variation, the better the assumed equity of a distribution. As a measure of equity, the usefulness of the range is limited. It is based on only two values, does not indicate the pattern of variation, nor is it sensitive to changes within the distribution. Nonetheless, the range is highly useful in assessing disparity. The range of selected variables in Montana was calculated with the following formula:

$$\text{Highest } X_i - \text{Lowest } X_i$$

where  $X_i$  is the variable considered in district  $i$ .

#### Restricted Range

The restricted range is the difference between the observation at the 95th percentile of the distribution and the 5th percentile. Due to the sensitivity of the range to extreme values, the restricted range eliminates values below the 5th percentile and above the 95th percentile. The smaller the value of the restricted range, the smaller the variation in the distribution of a given variable per district. The smaller the variation, the better the equity of the distribution. However, like the range, the restricted range is subject to the same limitations as a measure of equity. The restricted range was used in examining Montana's fiscal profile and was calculated with the following formula:

$$X_i \text{ at 95th percentile} - X_i \text{ at 5th percentile}$$

where  $X_i$  was the variable considered in district  $i$ .

#### Variance

The variance is the average of the squared deviations from the mean. The smaller the value of the variance, the smaller the

variation in the distribution of a given variable. The smaller the variation, the better the equity of a distribution. The advantage of the variance over the measures previously discussed is that the variance takes into account all observations. However, the variance is not expressed in original units and is sensitive to outliers, i.e., extreme values at either end of a distribution. The variance was a fundamental tool in examining expenditures per pupil in Montana and was calculated with the following formula:

$$\sum P_i (X_p - X_i)^2 / \sum P_i$$

where  $\sum$  is the sum of pupils in all districts,  $P_i$  is number of students in district  $i$ ,  $X_p$  is the mean expenditure per pupil for all pupils, and  $X_i$  is the expenditure per pupil in district  $i$ .

#### Standard Deviation

The standard deviation is the square root of the variance. The smaller the value of the standard deviation, the smaller the variation in the distribution per pupil per district. The smaller the variation, the better the equity of a distribution. The advantage of the standard deviation is that all observations are included in the calculation and the units of measurement are in the original scale. However, it is sensitive to outliers. The standard deviation formed a central aspect of evaluating Montana's equity performance and was calculated as the square root of the variance as previously discussed using the following formula:

$$\sqrt{\sum P_i (X_p - X_i)^2 / \sum P_i}$$

#### Coefficient of Variation

The coefficient of variation is the standard deviation divided by the mean, or the square root of the variance divided by the mean. It is expressed as the ratio of the standard deviation of the distribution to the mean of the distribution. The smaller the value of the coefficient of variation, the smaller the variation in the distribution of some variable per pupil per district. The smaller the variation, the better the equity of the distribution. It is sensitive to outliers but not to changes in scale. The coefficient of variation was utilized in examining Montana's equity profile and was calculated with the following formula:

$$\sqrt{\sum P_i (X_p - X_i)^2 / \sum P_i} / X_p$$

where  $X_p$  is the mean expenditure per pupil for all districts.

#### McLoone Index

The McLoone Index is the ratio of the sum of expenditures per district for all districts below the median to the sum of expenditures that would be required if all districts below the median were brought up to the median level of expenditure. The larger the value of the McLoone Index, the closer the lower half of the distribution is to the median of the distribution. Usually this index has a value between 0 and 1; however, if the group of districts (e.g., a selected subgroup as opposed to the entire distribution) being compared were to have a mean value close to the median, this value can be greater than 1. The McLoone Index formed a central aspect of evaluating the wealth neutrality standard and was calculated with the following formula:

$$\sum (1 \dots j) P_i X_i / M_p \sum (1 \dots j) P_i$$

where districts 1 through  $j$  are below the median,  $\sum$  is the sum of pupils in all districts 1 through  $j$ ,  $P_i$  is the number pupils in district  $i$ ,  $X_i$  is the expenditure per pupil in district  $i$ , and  $M_p$  is the median expenditure per pupil for all districts.

#### Gini Coefficient

The Gini coefficient indicates how far the distribution of expenditures is from providing each percentage of students with the same percentage of expenditures. The smaller the value of the Gini coefficient, the more equitable the distribution of expenditures in providing a specified percentage of students with the same percentage of expenditures. Values range from

Table 1. Descriptive Statistics for the Entire State

Category	N	ANB MEAN	ANB ST. DEV.	BUDGET MEAN	BUDGET ST. DEV.	EXPEND MEAN	EXPEND ST. DEV.	PPEXP MEAN	PPEXP ST. DEV.	PPMILVAL MEAN	PPMILVAL ST. DEV.
1	45	6.58	1.88	\$32,644.91	\$8,040.86	\$28,523.44	\$7,481.19	\$4,620.44	\$1,478.81	\$101.41	\$103.76
2	30	11.27	1.01	\$43,142.63	\$18,876.74	\$37,657.65	\$14,627.38	\$3,315.38	\$1,090.59	\$94.94	\$161.32
3	10	17.00	15.50	\$61,196.00	\$17,563.22	\$51,000.66	\$13,817.72	\$3,284.92	\$813.02	\$42.40	\$33.49
4	1	20.00	—	\$51,014.00	—	\$44,619.05	—	\$2,230.95	—	\$10.50	—
5	49	24.90	5.69	\$86,161.47	\$44,062.38	\$72,028.38	\$24,999.55	\$2,912.32	\$657.78	\$36.43	\$28.47
6	72	69.46	17.37	\$326,197.68	\$132,629.90	\$294,559.93	\$126,018.70	\$4,211.38	\$1,366.82	\$39.05	\$70.87
7	87	179.08	53.34	\$657,639.17	\$235,121.51	\$625,167.78	\$23,078.13	\$3,535.52	\$931.61	\$19.30	\$31.16
8	70	1185.47	1696.32	\$3,887,630.87	\$5,380,191.83	\$3,831,718.84	\$5,362,217.30	\$3,275.07	\$603.66	\$15.85	\$27.84
9	6	20.50	3.51	\$367,440.50	\$70,518.03	\$208,012.60	\$37,195.77	\$10,273.73	\$1,670.92	\$77.58	\$29.75
10	24	34.38	4.24	\$361,328.67	\$85,947.51	\$326,084.99	\$94,959.40	\$9,495.23	\$2,467.89	\$78.94	\$46.20
11	53	65.21	19.60	\$487,246.83	\$119,344.06	\$452,750.31	\$103,153.56	\$7,315.30	\$2,074.85	\$49.81	\$31.08
12	36	149.83	28.75	\$827,608.17	\$259,746.64	\$788,615.62	\$226,866.47	\$5,294.33	\$1,261.13	\$46.65	\$36.69
13	15	237.47	30.87	\$1,163,770.60	\$363,776.86	\$1,095,864.07	\$236,882.66	\$4,665.93	\$1,143.99	\$39.74	\$14.88
14	18	433.28	76.28	\$2,129,535.17	\$853,555.89	\$1,981,557.42	\$552,246.45	\$4,643.00	\$1,359.37	\$45.40	\$80.33
15	11	1931.64	1345.77	\$7,888,533.55	\$5,437,399.65	\$784,935.57	\$5,456,326.61	\$4,048.49	\$311.42	\$27.86	\$4.45
Overall	527	280.83	784.12	\$1,079,468.23	\$26,282,710.31	\$1,044,072.98	\$2,613,356.00	\$4,537.31	\$2,178.45	\$44.84	\$67.78

zero to 1. The coefficient compares expenditures at each level with expenditures at every other level and is sensitive to changes throughout the distribution, though not to extreme outliers. The Gini coefficient formed a central aspect of evaluating the wealth neutrality standard and was calculated with the following formula:

$$\frac{\sum_i \sum_j P_i P_j (X_i - X_j) / 2 (\sum_i P_i)^2 X_i}{\sum_i P_i X_i}$$

where  $\sum$  is the sum for all pupils in districts  $i$  and district  $j$ ,  $P_i$  is the number of pupils in district  $i$ ,  $P_j$  is the number of pupils in district  $j$ ,  $X_i$  is the expenditure per pupil in district  $i$ ,  $X_j$  is the expenditure per pupil in district  $j$ , and  $X_p$  is the mean expenditure per pupil for all districts.

The foregoing measures were useful in assessing both the resource accessibility and wealth neutrality standards by dealing with the dispersion or variation of single variables. Other measures were also used, however, to describe relationships between two variables and were regression-based measures. Correlations and slopes were two such regression-based measures used to examine Montana's aid formula.

#### Simple Correlation

Simple correlation describes the degree to which two variables are associated. In the present study the two main variables were wealth (mill value) in each school district and the corresponding expenditure per pupil. In the study of school finance, these two variables are often used to describe the fiscal neutrality of a state school finance system. A system that is fiscally neutral is generally able to show very low relationship between wealth and pupil revenue/expenditure.

The correlation coefficient has values that range from -1.0 to +1.0. When two variables are positively associated, larger values of one tend to be accompanied by larger values of the other. Conversely, when two variables are negatively related, larger values in one tend to be accompanied by smaller values of the other. A value of +1.0 indicates a perfect positive linear relationship and a value of -1.0 a perfect negative linear relationship. A value of 0 indicates no linear relationship between the two variables. As a measure of fiscal neutrality, a correlation coefficient of 0 would indicate no linear relationship between the two variables. In assessing Montana's aid scheme, the simple correlation was found by the Pearson correlation coefficient and was calculated using the following formula:

$$\frac{\sum P_i (X_i - X)(W_i - W) / (\sum P_i (X_i - X)^2)^{1/2} (\sum P_i (W_i - W)^2)^{1/2}}$$

where  $\sum$  is the sum of pupils in all districts,  $P_i$  is the number of pupils in district  $i$ ,  $X_i$  is the expenditures per pupil in district  $i$ ,  $X$  is the mean expenditures per pupil for all districts,  $W_i$  is the

wealth per pupil in district  $i$ , and  $W$  is the mean wealth per pupil for all districts.

These fundamental tools formed the basis for assessing resource accessibility, wealth neutrality, and by inference tax yield in Montana. The results of the analysis were reviewed by the court in the record wherein defendants were able to respond to plaintiffs' claims of formula-based inequity.

#### Results of the Analysis<sup>14</sup>

##### Resource Accessibility

Table 1 shows the derived values for school district budgets, expenditures, and mill rates for the 527 school districts in Montana. The funding categories included eight (1–8) elementary school district categories and seven (9–15) secondary school district categories. The primary method of defining funding category at both the elementary and secondary levels was the ANB. Thus, many of the discrepancies in operating schools for fewer students can be seen simply by examining the funding categories with their differences in ANB. As the funding categories increased in ANB, there was a concomitant increase in district budgets and expenditures for both elementary and secondary categories. However, expenditures per pupil, as well as mill values per pupil, did not follow the same trend. At the secondary level, per pupil expenditures decreased with increases in ANB, while the pattern was less clear at the elementary level. While there were exceptions, per pupil mill values were higher given fewer students.

Plaintiffs in this cause were 146 school districts comprising some of the smaller and more rural districts in Montana. Because the state of Montana has greater diversity in district sizes (*i.e.*, ANBs) than was represented by plaintiff school districts bringing this action, comparisons between plaintiffs and the rest of the state in funding and expenditures should be interpreted with caution. Nevertheless, Tables 2 and 3 show descriptively the budgets and expenditures of all plaintiffs and all nonplaintiffs in the state respectively, thereby giving some preliminary indication of the relative position of plaintiffs to the remainder of the state's districts.

As expected, total budgets and expenditures of nonplaintiff school districts were much higher (means) and more variable (higher standard deviations) when considered on a statewide basis. This finding was expected on the basis of observed differences in ANBs for plaintiffs and nonplaintiffs where the average ANB for nonplaintiffs was almost three times the average ANB for plaintiffs. In addition, the plaintiffs did not represent any districts in the two largest secondary funding categories (14 and 15), and represented only smaller districts in the largest ele-

**Table 2. Descriptive Statistics for Plaintiff Districts**

Category	N	ANB MEAN	ANB ST. DEV.	BUDGET MEAN	BUDGET ST. DEV.	EXPEND MEAN	EXPEND ST. DEV.	PPEXP MEAN	PPEXP ST. DEV.	PPMILVAL MEAN	PPMILVAL ST. DEV.
1	8	6.50	2.39	\$36,495.75	\$10,480.17	\$30,780.90	\$9,776.66	\$5,172.30	\$1,918.56	\$150.46	\$92.80
2	4	11.75	0.96	\$46,991.25	\$13,209.20	\$39,761.81	\$9,331.20	\$3,368.64	\$664.23	\$77.00	\$48.77
3	2	15.00	1.41	\$75,925.00	\$23,753.13	\$56,619.34	\$3,217.28	\$3,718.32	\$142.02	\$46.58	\$37.86
4	1	20.00		\$51,014.00		\$44,619.05		\$2,230.95		\$10.50	
5	13	25.31	5.06	\$85,080.46	\$24,730.58	\$70,396.23	\$12,082.12	\$2,857.79	\$644.49	\$53.66	\$45.22
6	26	67.35	19.26	\$356,890.50	\$120,577.15	\$313,541.12	\$121,298.41	\$4,617.28	\$1,141.55	\$60.84	\$111.73
7	27	181.15	52.00	\$701,778.33	\$200,491.20	\$637,949.22	\$179,075.19	\$3,610.79	\$897.83	\$29.61	\$53.09
8	9	482.78	122.45	\$1,631,249.22	\$474,924.84	\$1,579,681.58	\$438,716.19	\$3,267.41	\$310.01	\$33.25	\$52.86
9	3	22.33	2.08	\$270,147.67	\$66,015.16	\$224,343.41	\$51,524.87	\$9,975.42	\$1,497.90	\$85.46	\$44.55
10	16	34.63	4.40	\$387,900.56	\$90,581.12	\$347,895.55	\$109,538.75	\$10,030.57	\$2,810.05	\$88.80	\$51.72
11	20	67.75	20.52	\$521,854.60	\$122,583.05	\$472,625.25	\$97,126.35	\$7,258.59	\$1,278.81	\$57.66	\$25.76
12	12	152.08	31.50	\$897,837.92	\$269,446.99	\$824,135.07	\$253,938.85	\$5,387.25	\$992.29	\$62.08	\$55.20
13	5	226.40	26.42	\$1,221,979.60	\$359,809.77	\$1,155,752.73	\$255,154.58	\$5,067.35	\$639.16	\$45.46	\$17.00
14	0										
15	0										
Overall	146	112.32	121.43	\$541,334.86	\$439,981.26	\$496,112.22	\$420,325.52	\$5,303.53	\$2,608.40	\$60.25	\$69.99

**Table 3. Descriptive Statistics for Non-Plaintiff Districts**

Category	N	ANB MEAN	ANB ST. DEV.	BUDGET MEAN	BUDGET ST. DEV.	EXPEND MEAN	EXPEND ST. DEV.	PPEXP MEAN	PPEXP ST. DEV.	PPMILVAL MEAN	PPMILVAL ST. DEV.
1	37	6.59	1.79	\$31,812.30	\$7,325.22	\$28,035.34	\$6,960.08	\$4,501.12	\$1,369.24	\$90.81	\$104.08
2	26	11.19	1.02	\$42,550.54	\$19,740.10	\$37,333.93	\$15,392.46	\$3,307.18	\$1,151.62	\$97.70	\$172.75
3	8	15.63	0.92	\$57,513.75	\$15,444.05	\$49,595.99	\$15,255.40	\$3,160.82	\$871.19	\$41.36	\$35.09
4											
5	36	24.75	5.97	\$86,559.06	\$49,520.86	\$72,617.77	\$28,385.13	\$2,932.01	\$670.42	\$30.21	\$16.15
6	46	70.65	16.31	\$308,849.57	\$137,204.67	\$283,831.43	\$128,671.50	\$3,981.96	\$1,440.36	\$26.73	\$23.67
7	60	178.15	54.33	\$637,776.55	\$248,141.20	\$619,416.12	\$251,709.02	\$3,501.66	\$951.88	\$14.66	\$10.14
8	61	1289.15	1795.03	\$4,220,539.64	\$5,690,518.60	\$4,163,986.63	\$5,671,659.80	\$3,276.20	\$637.37	\$13.29	\$21.61
9	3	18.67	4.04	\$244,733.33	\$87,118.11	\$191,681.80	\$1,978.85	\$10,572.02	\$2,114.07	\$69.69	\$6.45
10	8	33.88	4.16	\$308,184.88	\$42,986.98	\$282,463.87	\$25,587.12	\$8,424.54	\$1,060.94	\$59.23	\$24.78
11	33	63.67	19.17	\$466,272.42	\$114,107.84	\$440,704.90	\$106,270.41	\$7,349.67	\$2,453.85	\$45.05	\$33.37
12	24	148.71	27.92	\$792,493.29	\$253,153.39	\$770,855.90	\$215,623.48	\$5,247.86	\$1,393.76	\$38.93	\$20.11
13	10	243.00	32.72	\$1,134,666.10	\$381,430.93	\$1,065,919.75	\$234,981.37	\$4,465.22	\$1,311.46	\$36.88	\$13.74
14	18	433.28	76.28	\$2,129,535.17	\$853,555.89	\$1,981,557.42	\$552,246.45	\$4,643.00	\$1,359.37	\$45.40	\$80.33
15	11	1931.64	1345.77	\$7,888,533.55	\$5,437,399.65	\$7,849,535.57	\$5,456,326.61	\$4,048.49	\$311.42	\$27.86	\$4.45
Overall	381	345.41	911.24	\$1,285,682.07	\$3,055,174.32	\$1,254,052.69	\$3,037,541.66	\$4,243.69	\$1,913.32	\$38.94	\$66.06

mentary category (8). Thus, larger budgets and expenditures for nonplaintiffs were expected from their larger ANBs. Also, the larger ANBs for nonplaintiffs led to lower average per pupil expenditures. These findings were consistent with the pattern expected on the basis of relationships of these variables to ANB in the overall state summary as seen previously in Table 1. Deeper examination, however, revealed that differences between plaintiffs and nonplaintiffs were not necessarily predictable by normal expectations of equity critics in school finance litigation. Differences between plaintiffs and nonplaintiffs were in fact negligible, even when cursorily taking into account the funding category, or ANB. When comparing plaintiffs and nonplaintiffs within the categories of ANB comparability in Tables 2 and 3 (Categories 1, 2, 3, 5, 6, 7, 9, 10, 11, 12 and 13), it could readily be seen that budgets and expenditures were higher for plaintiff school districts with only one exception (category 5) and that per pupil plaintiff expenditures were higher in 11 of the 13 categories (not 9 or 11). In addition to plaintiffs having higher per pupil expenditures, wealth as shown by per pupil mill values was higher for plaintiffs. Thus, plaintiffs were wealthier districts with higher per pupil expenditures.

Although rough statewide comparison showed absence of gross disparity after recognizing the impact of district size, these data on budget, expenditure, and per pupil expenditure were still nonetheless comparing two groups (plaintiffs versus nonplaintiffs) that were not perfectly comparable. This lack of com-

parability can be seen in ANBs. To more fairly examine such phenomena, actual plaintiffs needed to be compared with comparable nonplaintiff districts. For purposes of this study, comparability was defined as matching the two groups in terms of their individual funding categories and their individual ANBs. To accomplish this, a matched nonplaintiff counterpart was selected for each plaintiff school district. The matched district was derived from the same funding category and with the same (or as nearly possible) ANB. Whenever multiple districts qualified on the criteria, the matched district was randomly selected by appropriate statistical procedure. Table 4 shows descriptively these data for the matched school districts. Note first that the number of districts in each funding category was the same for plaintiff and the nonplaintiff matched pair.<sup>15</sup> In addition, the means and standard deviations for ANBs were approximately the same for the two groups within each funding category as well. Thus, comparisons between Table 2 (all plaintiffs) and Table 4 (matched nonplaintiffs) provided a better basis for examining whether plaintiffs materially differed from other districts in the state.

When comparing plaintiffs with comparable nonplaintiffs, differences in budgets, expenditures and mill value still existed, generally for the same reasons observed earlier. Because budgets and expenditures overall were still higher for plaintiffs, higher overall budgets and expenditures seen in Table 3 were simply a result of including larger noncomparable school dis-

**Table 4. Descriptive Statistics for Comparison Non-Plaintiff Districts**

Category	N	ANB		BUDGET		EXPEND		PREXP		PPMILVAL	
		MEAN	ST. DEV.	MEAN	ST. DEV.	MEAN	ST. DEV.	MEAN	ST. DEV.	MEAN	ST. DEV.
1	37	6.59	1.79	\$31,812.30	\$7,325.22	\$28,036.34	\$6,960.08	\$4,501.12	\$1,369.24	\$90.81	\$104.08
2	26	11.19	1.02	\$42,550.54	\$19,740.10	\$37,333.93	\$15,392.46	\$3,307.18	\$1,151.62	\$97.70	\$172.75
3	8	15.63	0.92	\$57,513.75	\$15,444.05	\$49,595.99	\$15,255.40	\$3,160.82	\$871.19	\$41.36	\$35.09
4	5	24.75	5.97	\$86,559.06	\$49,520.86	\$72,617.77	\$29,386.13	\$2,992.01	\$670.42	\$30.21	\$16.15
5	46	70.65	16.31	\$308,849.57	\$137,204.67	\$283,831.43	\$128,671.50	\$3,981.96	\$1,440.36	\$26.73	\$23.67
6	60	178.15	54.33	\$637,776.55	\$248,141.20	\$619,416.12	\$251,709.02	\$3,501.66	\$951.86	\$14.66	\$10.13
7	32	475.53	124.94	\$1,616,274.75	\$587,125.40	\$1,581,576.97	\$529,106.35	\$3,323.52	\$688.58	\$11.07	\$4.51
8	3	18.67	4.04	\$244,733.33	\$97,119.11	\$191,681.80	\$1,978.85	\$10,572.02	\$2,114.07	\$69.69	\$6.45
9	3	33.88	4.16	\$308,184.88	\$42,986.98	\$282,483.87	\$25,587.12	\$8,424.54	\$1,060.94	\$59.23	\$24.78
10	33	63.67	19.17	\$466,272.42	\$114,107.84	\$440,704.90	\$106,270.41	\$7,349.67	\$2,453.85	\$45.05	\$33.37
11	24	148.71	27.92	\$792,493.29	\$253,153.39	\$770,855.90	\$215,623.48	\$5,247.86	\$1,383.76	\$38.93	\$20.11
12	10	243.00	32.72	\$1,134,666.10	\$381,430.93	\$1,065,919.75	\$234,981.37	\$4,485.22	\$1,311.46	\$36.88	\$13.74
13											
14											
15											
Overall	323	121.16	143.53	\$492,282.47	\$525,876.91	\$471,790.81	\$507,895.52	\$4,319.63	\$2,020.00	\$41.04	\$68.30

**Table 5. Descriptive Measures Including Range Calculations for Expenditures Per Pupil and Millvalue Per Pupil By Group**

Group	Mean	St. Dev.	Minimum	Maximum	Range	Res. Range**
All Districts	4537.31	2178.50	1832.78	16570.70	14737.00	6570.50
	44.84	67.80	0.26	911.45	911.20	129.50
Plaintiffs	5303.54	2608.40	1922.58	16570.69	14648.17	7148.83
	60.25	69.99	5.45	599.43	593.99	162.85
Non-Plaintiffs	4243.69	1913.32	1832.78	14344.35	12511.57	5463.38
	38.94	66.05	0.264	911.45	911.20	88.09
Comparison Non-Plaintiffs	4319.64	2020.00	1832.78	14344.35	12511.57	6071.48
	41.04	68.29	0.26	911.45	911.20	95.79

\* All data are reported in Dollars  
 \*\* The Restricted Range

tricts. Even after removing those districts (see Table 4), plaintiffs still budgeted more money for schools and plaintiffs still spent more per pupil. In addition to overall differences in budgets and expenditures, per pupil expenditure remained about \$1,000 higher in plaintiff districts. Significantly, higher expenditures of plaintiff districts were accompanied by higher wealth, as can be seen in the per pupil mill values. Finally, variability for comparison sets and plaintiffs also showed some other differences. Standard deviations of budgets and expenditures were higher for the nonplaintiff comparison group, while standard deviations for per pupil expenditures were higher for plaintiffs, showing less homogeneity within groups. Finally, per pupil mill values were about equally variable in the plaintiff group and the nonplaintiff comparison group.

For the remaining analyses examining resource accessibility, districts were analyzed across funding categories. Except as a basic description of the populations, the number of districts within any single funding category was too small to confidently draw conclusions. Consequently, analyses were run for each of the groups as a whole (*i.e.*, the state as a whole, plaintiffs, nonplaintiffs, and matched nonplaintiffs). The results are reported in Tables 5-7.

Results of range measures examining wealth (mill value per pupil) and expenditures per pupil are reported in Table 5. As analysis by these data showed, unrestricted ranges of these variables were noteworthy. Plaintiff districts had greater average wealth per pupil (\$60.25) than was true for either the state (\$44.84), non-plaintiffs (\$38.94), or for the comparison nonplaintiff group (\$41.04). The range of wealth expressed as mill value per pupil was in fact dramatic, as wealth varied by \$911.20 per mill per pupil between the highest (\$911.45) and lowest (\$0.26) wealth districts in the state. This relationship was also true for the nonplaintiff group and for the comparison group as well. For plaintiffs, however, the range was considerably narrower at \$593.99 (from \$5.45 to \$599.43).

The restricted range measure was also applied to the mill value per pupil, offering both a more conservative view of wealth disparity and an estimate of where wealth inequality was concentrated. By ignoring those districts at the extreme top 5 percent and bottom 5 percent of the scale of mill value per pupil, the restricted range at the state level revealed that mill value range dropped from \$911.20 to \$129.50 for the state (-14.2%). The decrease in restricted range was more variable for the other two groups, as the nonplaintiff group dropped from \$911.20 to \$88.90 (-9.7%), and the comparison group dropped from \$911.20 to \$95.79 (-10.5%). Further, the increase in restricted range was less dramatic for plaintiffs, ranging from \$593.99 to \$162.85, showing a 27.4% difference between the unrestricted and restricted ranges. These data indicated that disparity in mill values per pupil at the 5th-95th percentile was greatly reduced. Such a result was meaningful, indicating that there were several districts in the state that counted for the apparent wide variations in wealth. At the same time, plaintiff districts appeared to be more homogeneous in the distribution of wealth as evidenced by a larger restricted range percentage. Such a result was significant because, though the state's unrestricted range in wealth per pupil appeared low compared to plaintiffs, this variation was reas-

**Table 6. Analysis of Variance for Millvalue Comparing Plaintiffs with Non-Plaintiffs**

ANOVA Table of MILVALUE/ANB					
	DF	Sum of Squares	Mean Square	F-Value	P-Value
P-NP	1	47942.704	47942.704	10.628	.0012
Residual	525	2368224.122	4510.903		

Model II estimate of between component variance: 205.736.

**Means Table for MILVALUE/ANB  
Effect: P-NP**

	Count	Mean	Std. Dev.	Std. Err.
1	146	60.248	69.987	5.792
2	381	38.936	66.054	3.384

**Scheffe for MILVALUE/ANB  
Effect: P-NP  
Significance Level: 5%**

	Mean D...	Crit. Diff.	P-Value	S
1, 2	21.312	12.842	.0012	

ably explained by a few extremely wealthy and extremely poor districts. Likewise, the greater restricted range of plaintiffs indicated that they were generally wealthier than the state as a whole. Thus, nonplaintiff and comparison groups did not differ dramatically from the restricted range calculations and percentage changes calculated for the entire state.

That plaintiffs were wealthier per pupil than either nonplaintiffs or the state as a whole was especially apparent when looking at comparison groups by category. Both the expenditure per pupil and mill value per pupil differentials were found to be located in only a few districts holding extremely high or low wealth. As seen in Table 6, these differences were statistically significant. The *p* value of 0.0012 indicated that there was a statistically significant difference of \$21.31 in the mill value per pupil between plaintiff and nonplaintiff districts. In other words, the bulk of districts came closer together in wealth as indicated by the reduction in the restricted range, while the plaintiff districts were significantly higher in wealth per pupil as measured by dollars generated by each mill levied. While these observations were insufficient to conclude that wealth inequality was not an identifiable issue with impact on educational opportunity in Montana, they did indicate that the issue of wealth disparity between the plaintiff districts, their matched counterparts, and the state as a whole was not totally accurate because, as a group, plaintiff districts were wealthier than other districts in the state.

Wealth measures are important, however, only insofar as they relate to expenditures per pupil by either facilitating or hindering the ability of districts to fund expenditures and by indicating the relative position of districts to one another on the resource accessibility standard. Because it is difficult to interpret wealth measures alone, it was necessary to compare the range of wealth per pupil to equivalent measures of expenditure per pupil in order to make informed and valid assessment of the resource accessibility standard.

As may be seen from the analysis in Table 7, plaintiff districts also had greater mean expenditures per pupil (\$5,303.54) than was true for any other group. As seen earlier in discussion of ranges of wealth, plaintiffs had a slightly lower range of expenditures per pupil than the state as a whole (\$14,648.17 to \$14,737.00). However, plaintiffs had a greater restricted range for all groups (\$7,148.83) when compared to the state (\$6,570.50), to nonplaintiffs (\$5,463.38), and to the matched

**Table 7. Analysis of Variance for Expenditures per Pupil Comparing Plaintiffs with Non-Plaintiffs**

ANOVA Table for EXP/P					
	DF	Sum of Squares	Mean Square	F-Value	P-Value
P-NP	1	118564207.732	118564207.732	26.180	<.0001
Residual	525	2377651181.924	4528859.394		

Model II estimate of between component variance: 540184.703

**Means Table for EXP/P  
Effect: P-NP**

	Count	Mean	Std. Dev.	Std. Err.
1	146	5303.535	2608.404	218.873
2	381	4243.688	1913.322	98.022

**Scheffe for EXP/P  
Effect: P-NP  
Significance Level: 5%**

	Mean Diff.	Crit. Diff.	P-Value	S
1, 2	1059.847	406.922	<.0001	

group (\$6,071.48). These data indicated that plaintiffs spent more per pupil than any other group—a difference in mean expenditure per pupil that was statistically significant when plaintiffs were compared to nonplaintiffs. As seen in Table 7, the *p* level of significance at 0.0001 yielded a difference in means of plaintiffs compared to the means of nonplaintiff groups of \$1,059.85. Investigation showed that it was thus possible to assert that higher wealth per pupil did not necessarily drive higher expenditures per pupil since several plaintiff districts had lower wealth and higher expenditures, and vice versa, than was true for several of their counterparts. Although plaintiff districts and the categories represented thereby appeared to have higher expenditure levels and higher wealth, it was thus observable that this was not the result of membership in an ANB category. The relationship between wealth and expenditures per pupil across the state ameliorated equity concerns related to any district's position in the distribution because it was not provable that higher wealth districts had increased per pupil expenditures faster than low wealth districts as there was no statistical evidence to suggest such a situation that could be causally related to the state funding mechanism.

Examination of resource accessibility in the framework of this analysis therefore yielded the overall conclusion that range and restricted range measures of mill value and expenditures per pupil, measures comparing the performance of variables within and across ANB categories and groups, and tests for significant differences had not supported plaintiffs' claims of inequitable performance on the resource accessibility standard in Montana.

### Wealth Neutrality

As stated earlier, three conditions of equity had to be met in this analysis if the state aid formula were to be judged equitable. The formula passed the first standard of resource accessibility in that expenditures were based on a scheme of enrollment categories that did not result in an unacceptable variation of funds. The second standard of wealth neutrality followed closely, requiring that the relationship between wealth and expenditure be at least a neutral, if not inverse, covariant. As a somewhat natural byproduct of wealth neutrality, taxpayer equity can also be determined. While it should be clearly stated that the successful achievement of any one standard is often

sufficient to cast shadows on plaintiff arguments concerning the operation of a formula and its credibility, it was nonetheless desirable to continue in this analysis by assessing wealth neutrality in order to more fully judge the relationship between wealth (mill value) and expenditures available to each student, i.e., a measure of educational opportunity.

It was observable on its face that expenditures per pupil in Montana were positively related to local wealth such that poorer districts sometimes had lower expenditure levels. In fact, as seen in Figure 1 the correlation between expenditure per pupil and mill value per pupil was 0.25 statewide, 0.289 for plaintiff districts, 0.194 for nonplaintiff districts, and 0.178 for the matched comparison group. While it was correct to observe that these relationships were positive in direction and implied that greater wealth per pupil correlates unfavorably with greater expenditures per pupil, these relationships were very

**Figure 1. Correlation between Wealth per Pupil and Mill Value per Pupil for all Districts in the State, Plaintiff Districts, and Non-Plaintiff Districts**

All Districts in the State

**Regression Summary**  
EXP/P vs. MILVALUE/ANB

Count	527
Num. Missing	0
R	.250
R Squared	.062
Adjusted R Squared	.060
RMS Residual	2111.561

Non-Plaintiff Districts

**Regression Summary**  
EXP/P vs. MILVALUE/ANB

Count	381
Num. Missing	0
R	.194
R Squared	.038
Adjusted R Squared	.035
RMS Residual	1879.261

Comparison Districts

**Regression Summary**  
EXP/P vs. MILVALUE/ANB

Count	323
Num. Missing	0
R	.178
R Squared	.032
Adjusted R Squared	.029
RMS Residual	1990.975

Plaintiff Districts

**Regression Summary**  
EXP/P vs. MILVALUE/ANB

Count	146
Num. Missing	0
R	.289
R Squared	.084
Adjusted R Squared	.077
RMS Residual	2505.677

small, particularly given the unevenness of such phenomena as judged under the resource accessibility standard. As seen in Figure 1, the R squared value indicated the amount of variability of expenditure per pupil statistically explainable by the wealth of a district. For example, despite a positive correlation between wealth and expenditure for the state as a whole, only 6.2% ( $R^2 = 0.062$ ) of variation in expenditure per pupil could be explained by wealth in any given district. It then followed that 94% of this difference was explained by other factors. Even the slightly higher level of explained variance for plaintiffs (8.4%) was very low. Importantly, for nonplaintiff districts (3.5%) and matched groups (2.9%) the effect of wealth on the level of per pupil expenditure was almost negligible. As a classic measure of wealth neutrality, these correlations and variance in expenditure explained by wealth (as mill value per pupil) indicated a relatively wealth-neutral situation.

However, tests for wealth neutrality should also be interested not only in access to wealth by district based on the number of students, but also based on the amount of revenue a local district could generate in support for its educational program. In order to address this issue, it was necessary to consider the strength of linkages between wealth and expenditures per pupil in the state as a whole and within each of the individual groups to more fully judge the level of wealth neutrality. If

**Table 8. Correlation and Regression Analysis for the State**

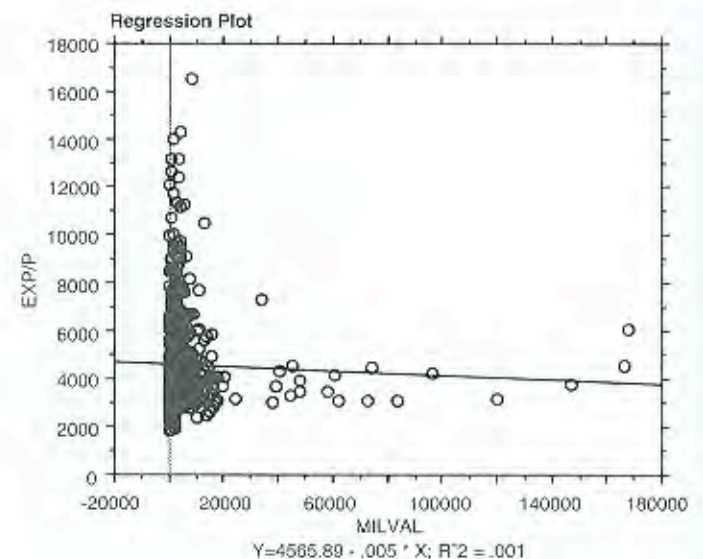
**Regression Summary**  
EXP/P vs. MILVAL

Count	527
Num. Missing	0
R	.034
R Squared	.001
Adjusted R Squared	.
RMS Residual	2179.263

**Regression Coefficients**  
EXP/P vs. MILVAL

	Coefficient	Std. Error	Std. Coeff.	t-Value	P-Value
Intercept	4565.890	101.753	4565.890	44.872	<.001
MILVAL	-.005	.006	-.034	-.780	.4356



**Table 9. Correlation and Regression Analysis for the Plaintiff Districts**

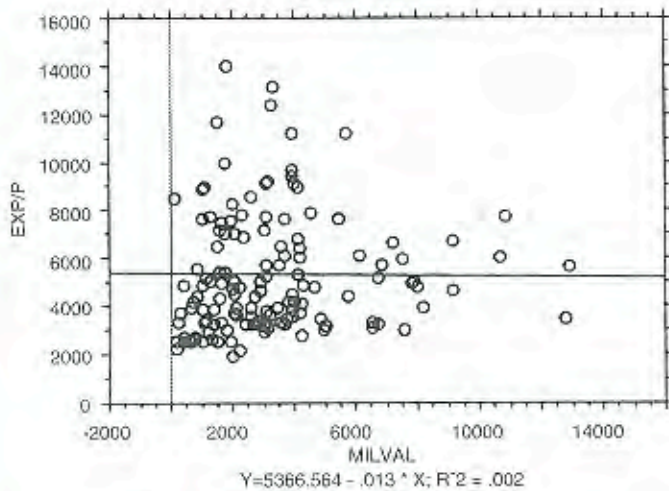
**Regression Summary  
EXP/P vs. MILVAL**

Count	146
Num. Missing	0
R	.046
R Squared	.002
Adjusted R Squared	•
RMS Residual	2614.691

**Regression Coefficients  
EXP/P vs. MILVAL**

	Coefficient	Std. Error	Std. Coeff.	t-Value	P-Value
Intercept	5366.564	244.773	5366.564	21.925	<.0001
MILVAL	-.013	.023	-.046	-.551	.5825

Regression Plot



**Table 10. Correlation and Regression Analysis for the Comparison Districts**

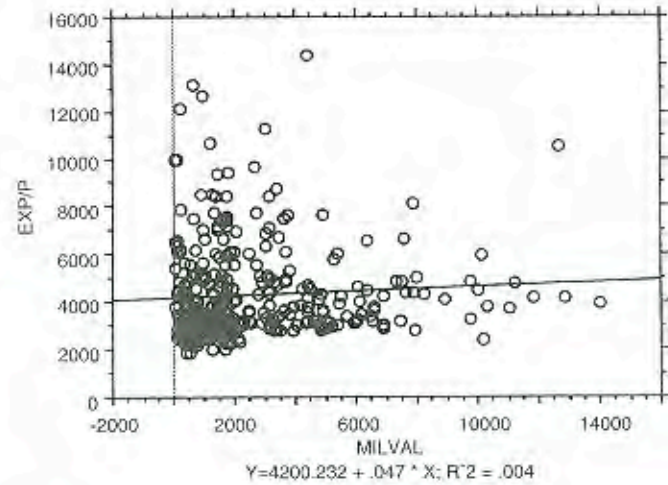
**Regression Summary  
EXP/P vs. MILVAL**

Count	323
Num. Missing	0
R	.061
R Squared	.004
Adjusted R Squared	.001
RMS Residual	2019.317

**Regression Coefficients  
EXP/P vs. MILVAL**

	Coefficient	Std. Error	Std. Coeff.	t-Value	P-Value
Intercept	4200.232	155.978	4200.232	26.928	<.0001
MILVAL	.047	.043	.061	1.104	.2706

Regression Plot



the formula had successfully eliminated residence-related educational opportunity, the link between expenditures and local wealth (mill value for the district) should be noticeably absent throughout the distribution. If the formula had failed to break the link, the presence of statistically significant relationships between expenditures and wealth at any level would indicate that the wealth neutrality standard (and consequently the taxpayer equity standard) was violated. As such, this portion of the analysis was designed to further test and confirm the initial findings that wealth neutrality was adequately operative within the state.

For purposes of this study, two procedures were utilized to assess wealth neutrality in the state and in each enrollment category on the variables of expenditure per pupil and mill value of property reported for every district in the state. The first tests for wealth neutrality were run to develop correlation coefficients and regression equations to assess the relationship between variables and to predict the contribution of each variable to observed variance. All measures cited were correlated and also included in the regression equations. The results are shown in the tables and graphs which follow.

Data reported in Table 8 show correlations and variability for relationships between expenditures and wealth for all districts in the state. It is important to note that the relationship between expenditure per pupil and wealth per mill was very small ( $r=0.034$ )

and was negatively directed. Such a relationship indicated that the link between expenditure per pupil and wealth was weak and inversely directed. Wealthier school districts did not exhibit higher expenditure levels. This is shown graphically as a slightly downward slope to the regression line. This pattern of association generally held true within and across all groups and enrollment categories with the exception of the matched group. Table 9 contains the regression analysis for plaintiff districts, and Table 10 contains similar information for the matched set of districts.

As expected, regression analysis for plaintiff districts in Table 9 indicated a strong similarity in lack of strength and negative direction of the correlation between expenditure per pupil and wealth. The R value of 0.046 and an  $R^2$  of 0.002 indicated that the relationship was weak at best and negatively directed. The shape of the graph showed this relationship visually. As seen in Table 9, for plaintiff districts there was virtually no relationship between expenditure and wealth. The regression equation developed to help explain the relationship between wealth and expenditures for the districts selected as matches for plaintiff districts, however, showed a slightly different relationship as seen in Table 10. The correlation coefficient was stronger and positively directed, which would indicate that there was a positive relationship between the two variables such that, as wealth increased, so did expenditures per pupil in these districts.



However, it was noted that the relationship was still minimal as reported by an  $R^2$  of .004, less than 0.4% of the differences in expenditures per pupil explained by the wealth of the district (see Table 10). Despite its greater strength, these observations indicated the presence of strong and widespread wealth neutrality across the state. With the slight exception noted for the comparison group, this observation found wealth neutrality across all enrollment categories.

Nonetheless, two additional tests for wealth neutrality were conducted to further explore relationships between wealth and expenditures due to some evidence of positive association. These tests were the McLoone Index and the Gini coefficient. As noted earlier, the McLoone Index is the ratio of the sum of expenditures per district for all districts below the median to the sum of expenditures that would be required if all districts below the median were brought up to the median level of expenditure. The larger the value of the McLoone Index, the closer the lower half of the distribution is to the median of the distribution and the greater the equity of the distribution. Usually this index has a value between 0 and 1. However, if the group of districts being compared were in fact a selected subgroup of a mean value close to the median, the McLoone value could be greater than 1. The second measure, the Gini coefficient, indicates how far the distribution of expenditures is from providing each percentage of students with the same percentage of expenditures. The smaller the value of the Gini coefficient, the more equitable the distribution of expenditures in providing a specified percentage of students with the same percentage of expenditures. Values range from zero to 1. Results of the calculations for the McLoone Index and the Gini coefficients for each of the groups is reported in Table 11.

**Table 11. McLoone's Index and the Gini Coefficients for All Groups**

Group	McLoone Index	Gini Coefficient
All Districts	0.6598	0.034
Plaintiffs	1.004	0.019
Non-Plaintiffs	0.5484	0.024
Comparison Non-Plaintiffs	0.5513	0.018

As expected from the earlier tests showing strong wealth neutrality, the values for the McLoone and Gini were similar for all groups. The larger values for the McLoone Index reported for plaintiffs was explained by their relatively higher expenditures per pupil. As explained previously, if the group of districts being compared were to have a mean value close to the median, this value can be greater than one. Likewise, the favorable value and consistency across groups of the Gini coefficient was indicative of a situation where wealth neutrality did not vary much according to membership in any of the groups being tested. The conclusion held that for the state as a whole and for both the plaintiff and matched groups and the enrollment categories, measures of resource accessibility and wealth neutrality were similar and consistent and continued to favor the defendant state.

**Tax Yield**

The final area of examination sought answers to questions raised earlier regarding tax yield equity. The analysis of tax yield for districts in Montana was driven by two basic questions:

- Are taxpayers living in a given school district or group of school districts paying higher tax rates than others for support of public schools; and

- If in fact taxpayers do pay at some differential rate, does the revenue generated help or harm these districts under expectations of the resource accessibility and wealth neutrality standards?

In order to address the first issue of taxpayer effort it was necessary to investigate the relative tax loads imposed on taxpayers. The second issue was in fact a marketplace evaluation which would consider the relative efficiency of school districts and consider the budget surplus carried by each district or group of districts. The assumption was that surplus, or cash carryover, is sensitive to revenue excess or shortfall during any given financial period. If one group were to suffer from lack of adequate revenue or experienced consistent economic hardship, such adversity should be reflected in reduced surplus. These factors could then be used to compare surplus levels with tax effort to determine if the yield of a local tax had a relationship to the amount of surplus. For example, if a district was conserving or increasing its surplus at a higher rate than its neighbors, and if tax effort was significantly lower than in neighboring wealthy districts, then the argument of potential inequity would be strengthened. If on the other hand all districts, even though there were extreme differences in wealth, exerted consistent and equivalent tax rates while maintaining similar and consistent surpluses, the challenge to the equity of the state funding system would be suspect—i.e., no district or its taxpayers would be differentially harmed by the formula.

The first analysis investigated relative local tax rates, with selected local millages analyzed and reported in Table 12. As expected, all groups reported consistent and equivalent county tax millages. These millages ranged from 59.36 for all districts to a high 60.353 for plaintiff districts, or an approximate 2% difference. Likewise total local millages were close, with plaintiffs having the lowest rates at 30.961 while the matched counterparts had a rate of 34.772 mills. The interesting difference was the local voted millages. Here plaintiff districts had approximately twice the millage rate (11.793), compared to other categories (state= 6.975). Even the matched group had a lower local rate at

**Table 12. Local Millages for Districts**

	All Districts			
	Mean	Std. Dev.	Std. Error	Count
	Plaintiff Districts			
Total County	60.353	12.940	1.071	146
Local Perm.	8.979	13.192	1.092	146
Local Voted	11.793	15.395	1.274	146
Total Local	30.961	21.001	1.738	146
	Non-Plaintiff Districts			
Total County	58.980	9.992	.512	381
Local Perm.	16.430	16.278	.834	381
Local Voted	5.129	12.278	.629	381
Total Local	36.192	29.122	1.492	381
	Comparison Non-Plaintiffs			
Total County	59.525	10.010	.557	323
Local Perm.	15.832	16.892	.940	323
Local Voted	4.558	12.074	.672	323
Total Local	34.772	30.234	1.682	323

**Table 13. Comparison Between Plaintiff and Non-Plaintiff Districts on the Variable Total Tax Rate**

	DF	Sum of Squares	Mean Square	F-Value	P-Value
P-NP	1	1571.364	1571.364	1.701	.1927
Residual	525	485030.239	923.867		

Model II estimate of between component variance: 3.067.

**Means Table for TOTAL MILLAGE  
Effect: P-NP**

	Count	Mean	Std. Dev.	Std. Err.
1	146	91.314	24.110	1.995
2	381	95.173	32.474	1.664

**Scheffe for TOTAL MILLAGE  
Effect: P-NP  
Significance Level: 5%**

	Mean Diff.	Crit. Diff.	P-Value
1, 2	-3.858	5.812	.1927

4.558 mills. However, the reverse was true for local permanent millage rates. Plaintiffs had a rate approximately one-half of the rate for the remaining groups (8.976) compared to nonplaintiffs (16.43). At first analysis it appeared that taxpayers in plaintiff districts in fact did exert greater effort at the local voted level than did other districts in the state. This result would be expected in districts with significantly higher expenditures and significantly lower wealth. However, this was not the case in Montana since there was no statistically significant difference between total millage paid by taxpayers in plaintiff districts compared to nonplaintiff districts. As seen in Table 13, the *p* value was 0.1927 and even though plaintiffs had an average 3.858 greater mill levy than nonplaintiffs, this level was small and was not statistically significant. As a result, it could be confidently said that taxpayers in all districts paid similar taxes for the support of schools.

Although the second issue of differential tax rates was meaningfully addressed while answering the first question, additional analysis was conducted as seen in Tables 14 and 15. From these data, several observations were made. Most importantly, within the general fund the total tax efforts (voted and permissive) of the various groups could be seen to be quite similar. As shown in Table 14, the difference between plaintiff districts (20.722 mills) and the state (21.341 mills) was only 0.619 mills, with plaintiffs exerting the lower general fund tax effort. Similarly, the difference between plaintiffs (20.772 mills) and nonplaintiffs (21.559 mills) was only 0.787 mills. In fact, the greatest difference in total general fund tax effort (1.169 mills) was found between nonplaintiff districts (21.559 mills) and the matched comparison group of districts (20.39 mills). As a result, both plaintiffs and the matched comparison group had a lower effort for general fund millage than either the state as a whole or the group of

**Table 14. The Total Local Millage less the Required Local Millage**

District	Total Local Millage	Local Permanent Millage	Net Local Effort
State	34.743	14.366	20.377
Plaintiff	30.988	8.959	21.98
Non-Plaintiff	36.142	16.380	19.762
Comparison Group	34.726	15.778	18.940

**Table 15. Comparison Between Plaintiff and Non-Plaintiff Districts on the Variable Net Local Tax Rate**

	DF	Sum of Squares	Mean Square	F-Value	P-Value
P-NP	1	520.257	520.257	1.163	.2813
Residual	525	234831.259	447.298		

Model II estimate of between component variance: .346.

**Means Table for Net Local Millage  
Effect: P-NP**

	Count	Mean	Std. Dev.	Std. Err.
1	146	21.982	18.170	1.504
2	381	19.762	22.181	1.136

**Scheffe for TOTAL MILLAGE  
Effect: P-NP  
Significance Level: 5%**

	Mean Diff.	Crit. Diff.	P-Value
1, 2	2.220	4.044	.2813

nonplaintiff districts. Equally important was the observation in Table 15 where it can be seen that any difference in tax effort for general fund between plaintiffs and nonplaintiffs was not statistically significant, with a *p* value of 0.2813.

Notwithstanding tests showing uniformity of revenue or expenditure and notwithstanding policy questions impacting on equity such as locally voted millages, a persistent equity question has always troubled scholars about whether fiscal differences may be assumed to create differential effects. Although the question is vastly complex and has never been successfully disentangled, it was necessary and possible in this instance to determine whether the small differences did have a negative effect on expenditure levels of plaintiff districts which subsequently could influence the effectiveness of their operation. One analysis which can be used to determine whether these differences had a substantial effect on expenditure patterns for local school districts is to investigate respective levels of budget surplus for plaintiff and nonplaintiff groups. For purposes of satisfying this nagging question in Montana, the 1992 budget surplus was calculated as a percentage of total budget for each district and reported as a percentage of total general fund budget. The results of the comparison are reported in Tables 16 and 17.

As seen in Table 16, the statewide average for budget surplus was 20.7% (0.207) and the surplus calculation for plaintiff districts was 23.3%. The surpluses reported for comparison districts and nonplaintiff districts were approximately 19% each. Again, it would appear that plaintiff districts were not sufficiently harmed so as to affect their budget surplus which, as a group, was the highest in the state. As seen in Table 17, the average difference between plaintiff and nonplaintiff surpluses was in fact statistically significant. Statistical significance, however, augured against plaintiffs since that group carried higher mean budget surpluses. Consequently while differences in wealth, expenditure, tax effort and budget surplus did in fact exist, it was apparent that no identifiable harm fell to members of the plaintiff group. In a situation where plaintiffs had higher wealth, higher expenditures per pupil, and similar tax effort while maintaining larger budget surpluses, it was entirely reasonable to conclude that the Montana school finance formula had protected local taxpayers from the need for excessive tax rates to support quality educational programs and services.

**Table 16. Budget Surplus Calculations**

All Districts				
	Mean	Std. Dev.	Std. Error	Count
% Surplus 92	.207	.164	.007	525
Plaintiff Districts				
	Mean	Std. Dev.	Std. Error	Count
% Surplus 92	.233	.203	.017	146
Non-Plaintiff Districts				
	Mean	Std. Dev.	Std. Error	Count
% Surplus 92	.196	.145	.007	379
Comparison Group				
	Mean	Std. Dev.	Std. Error	Count
% Surplus 92	.196	.146	.008	321

**Summary and Conclusions**

This analysis performed on behalf of the defendant state of Montana led to final summary of observations and impressions about fiscal equity generally and about the context of modern school finance litigation. One such observation is that data arguments are often lengthy and complex. Another such observation is that each side will present data arguments that contest the validity of any contrary opinion. From the data presented in this paper, an apparent further observation is that proving the plaintiffs' cause can be difficult because these data show with considerable elaboration that plaintiffs were not differentially harmed by the Montana aid formula. The analysis detailed here showed that it is difficult to substantiate that the formula failed to provide a mechanism for equitable distribution of funds to schools. Increasingly, plaintiffs may expect to encounter such analyses because states are increasingly seeking data-driven arguments.<sup>16</sup>

A critically important observation also rests in recognition that recent school finance litigation has generally taken a tack arguing no need for specificity of harm to plaintiffs. Instead plaintiffs have argued that raw horizontal disparity in numbers, uncluttered by the complex adjustments of vertical equity, is sufficient to cast a pall over the manner in which states fund education. While there can be no doubt that many states have been reluctant and even unwilling to appropriately fund education, it is equally without doubt that this strategy may have limited utility in the future because states are now beginning to understand that the historic presumption that states are derelict in their constitutional obligation is refutable only when convincing data are available to show that plaintiffs' claims of illegitimate variability may not be well grounded. Until recently, only plaintiffs have understood the important role of data in litigation. Until litigation reaches the point where both sides are willing to listen to data, so much so that states actively monitor themselves and that plaintiffs concede when sophisticated data deny genuine differences, plaintiffs and states and children will suffer equally in lengthy and expensive litigation. It should be recognized by both sides that in some instances the culprit is not the formula or the ability of local districts to pay which must be questioned. Rather it is sometimes the willingness of taxpayers in local districts to assume responsibility for funding, rather than furthering a victim psychology. Such seems the case in Montana where the statistical analysis led to a collective view concluding that the plaintiff school districts exhibited high expenditures (expenditure per pupil) and low wealth (mill value) while claiming that the statutory scheme for funding public schools is unfair when there was evidence to support the view that they also maintained consistent budget surpluses and expe-

**Table 17. Comparison of Budget Surplus for Plaintiff and Non-Plaintiff groups**

ANOVA Table for % Surplus 92					
	DF	Sum of Squares	Mean Square	F-Value	P-Value
P-NP	1	.143	.143	5.384	.0207
Residual	523	13.904	.027		

**Means Table for % Surplus 92  
Effect: P-NP**

	Count	Mean	Std. Dev.	Std. Err.
1	146	.233	.203	.017
2	379	.196	.145	.007

**Scheffe for % Surplus 92  
Effect: P-NP  
Significance Level: 5%**

	Mean Diff.	Crit. Diff.	P-Value	
1, 2	.037	.031	.0207	S

rienced consistent and moderate tax rates. In states where such data exist, plaintiffs may not depend on a climate of reform to adequately secure their claims.

**Footnotes**

1. The original document citation was David Honeyman, M. David Miller, R. Craig Wood, and David C. Thompson, *The Study of Resource Accessibility, Wealth Neutrality, and Tax Yield in Montana Rural Education Association v State* (Gainesville: Wood, Thompson & Associates, 1992). Attribution is as follows: conceptualization by Wood, data design and analysis by Miller and Honeyman, further analysis and rewrite for publication by Thompson.
2. For a thorough discussion of these concepts and historical developments, see Chapter 5 in David C. Thompson, R. Craig Wood, and David Honeyman, *Fiscal Leadership for Schools: Concepts and Practices*. New York: Longman (1994); see also R. Craig Wood and David C. Thompson, *Educational Finance Law: Constitutional Challenges to State Aid Plans—An Analysis of Strategies*. Topeka: NOLPE (1993); see also David C. Thompson, Julie K. Underwood, William E. Camp, *Equal Protection Under Law: Reanalysis and New Directions in School Finance Litigation*. In *Spheres of Justice in American Education. 1990 American Education Finance Association Yearbook*. New York: Harper (1990); see also David C. Thompson, *School Finance and the Courts: A Reanalysis of Progress*. *West's Education Law Reporter*, v59 n4 (1990); see also R. Craig Wood, "Adequacy in Education Finance Litigation," Washington, DC: Office of Educational Research and Improvement, Center for Education Statistics (in press); see also numerous expert studies on behalf of plaintiffs or defendants by Thompson and Wood that have been developed for court testimony.
3. *Montana Rural Education Association v State* No. BDV-91-2065.
4. *Id* at 2.
5. *Id* at 5-8.
6. Price differential effects are developed elsewhere in detail in this issue of *Educational Considerations*; see later R. Craig Wood and David C. Thompson, *Funding Public Education in Montana Based on the Concept of*

- Cost of Living Indices in Montana Rural Education Association v State*. The general concepts of uniform operation and limited cost inclusion were first raised in David C. Thompson, R. Craig Wood, and M. David Miller, *Findings of Fact and Opinion on the Equity and Fiscal Neutrality of Kansas' New State Aid Formula to Public Schools: Expert Analysis on Behalf of Plaintiffs in Newton USD 373 et al v State of Kansas et al* (1993).
7. For a full development and discussion of harm versus offense to political reform theories, see Chapter 3, Thompson et. al., *FISCAL LEADERSHIP FOR SCHOOLS* (New York: Longman, 1994), pp208–264.
  8. These two concepts, developed repeatedly by Thompson and Wood in expert studies in various states for both plaintiffs and defendants, represent significant forward movement in litigation data strategy. Studies have historically ignored whether the formula itself caused the problem or whether problems were phenomena rooted in some peripheral area: e.g., an aid formula may appear inequitable because property assessments are wrong—an issue that should not indict the school aid formula. Likewise, the concept of direct comparison of interested parties is often conveniently ignored—yet if plaintiffs can demonstrate no actual harm, there is serious *prima facie* doubt about their claims if they must rely on noncaptioned parties to prove their claims.
  9. Subsequent to this litigation, the Montana Legislature changed the distribution formula, rendering moot plaintiff claims. The trial court maintained jurisdiction regarding selected aspects of the new formula. The scheme as described here is the challenged statutory scheme grieved by plaintiffs and examined by this analysis for its equity performance.
  10. 769 P.2d 684.
  11. *Montana Code*, § 20-9-301.
  12. The framework used here has been employed repeatedly by Thompson and Wood in expert studies. See, for example, Chapter 3, Thompson et. al., *FISCAL LEADERSHIP FOR SCHOOLS* (Longman, 1994), pp. 208–264 and more than a dozen state studies. This section has been adapted from standard language incorporated in those studies.
  13. Various excellent sources for deeper discussion of equity measures are available. See Thompson et. al., *FISCAL LEADERSHIP FOR SCHOOLS* (New York: Longman, 1994); see various expert reports by Thompson and Wood for plaintiffs and defendants on state-specific application of measurement; for extended theoretical discussion, see Robert Berne and Leanna Stiefel, *The Measurement of Equity in School Finance* (Baltimore: Johns Hopkins, 1984). This discussion here is nearly verbatim of sections from Thompson et. al. (1994).
  14. The general methodology was developed elsewhere in Thompson, et al, *FISCAL LEADERSHIP FOR SCHOOLS* (New York: Longman, 1994) based on earlier studies by Wood and Thompson and completed for plaintiffs or defendants in other states. Specific research design and analysis in Montana were conducted by Miller and Honeyman. Original text in this portion of the analysis was prepared by Wood and developed further by Thompson for publication.
  15. Comparison districts were selected by eliminating the large ANB school districts from the nonplaintiffs. For secondary school districts, this was accomplished by dropping school districts in categories 14 and 15. For elementary schools, all districts with ANB greater than 750 were eliminated.
  16. Similarly complex arguments have been offered or are now being developed by Wood, Thompson & Associates in more than a dozen states.

In determining support for public education in states, politics seems to be a stronger determining factor than economics, at least in the Heartland of America.

# Financing Public Education in the American Heartland: A Profile and Analysis

by James G. Ward

The states of the American Midwest (Great Lakes and Plains U. S. Census regions) are sometimes known as the American Heartland. This region comprises states that border on America's fourth coast, the Great Lakes, as well as those deep in the interior plains. Residents of the region often feel that they are part of a "Lost America" in a bicoastal mindset, thought of only as one flies over the region on the way from Seattle to Washington or New York to Los Angeles. The Heartland contains states that are prime producers of corn, soybeans, cheese, and hogs, but also has a significant portion of what has been termed the "Rust Belt." It is a diverse region, but one with a common identity.

This study examines the financing of public education, both elementary and secondary and higher education, in the twelve states of the Heartland. Five of these states are in the Great Lakes region (Ohio, Indiana, Illinois, Michigan, and Wisconsin) and seven are in the Plains region (Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas). The purpose of this study is to better understand factors affecting financing public education in the Heartland by examining trends over a five year period (1986-91) and placing them in the context of economic changes in the region over the same period.

## The States of the American Heartland: The Population and Economic Base

Selected data on the twelve states of the American Heartland are shown in Table 1. They range in population from somewhat sparsely populated, rural states like North Dakota (0.6 million people), South Dakota (0.7 million), Nebraska (1.6 million), Kansas (2.5 million), and Iowa (2.8 million) to heavily metropolitan and highly populous states like Illinois (11.6 million), Ohio (11.0 million), and Michigan (9.4 million).

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Four states fall in a mid-population range: Indiana (5.7 million), Missouri (5.2 million), Wisconsin (5.0 million), and Minnesota (4.5 million).

These states also vary greatly in terms of wealth, as measured by the 1991 state per capita income. The wealthiest states are Illinois (\$20,737), Minnesota (\$19,130), Michigan (\$18,642), and Kansas (\$18,306), while the poorest are North Dakota (\$15,646), South Dakota (\$16,095), Indiana (\$17,193), and Iowa (\$17,251). A different pattern emerges when one examines the change in per capita personal income from 1986 to 1991. The greatest per capita income growth occurred in South Dakota (36.7 percent), Illinois (33.4 percent), Nebraska (31.7 percent), and Indiana (30.7 percent). Slow income growth states over the period were Michigan (25.3 percent), Kansas (26.4 percent), and North Dakota (26.6 percent).

An economic typology of the Heartland states was developed on the basis of proportions of personal income derived from particular industry types in order to attempt to discern economic factors which may help explain education funding. This economic typology is shown in Table 2. Three distinctly different economic base patterns were found.

The three states of Illinois, Minnesota, and Missouri are characterized as "trade and financial services states," with a higher proportion of personal income derived from the industry categories of wholesale trade and finance, insurance, and real estate. These states contain major metropolitan centers (Chicago, Minneapolis-St. Paul, St. Louis, and Kansas City) which are regional centers for commerce and banking and financial services. While each of these states are industrial, they have a lower percentage of personal income coming from manufacturing than do the states categorized as "industrial states." Only one of these states (Minnesota at 2.9 percent) derived more than 2 percent of its personal income from agriculture. The trade and financial services states tend to be wealthier than the rest of the states in the Heartland. These states account for 37.4 percent of the personal income of the region, but only 35.1 percent of the population.

Four states, Ohio, Indiana, Michigan, and Wisconsin, are classified as "industrial states." Each derived 28 percent or more of their state personal income from manufacturing and no other state in the Heartland exceeded 23 percent. These four states had proportions of personal income coming from wholesale trade and finance, insurance, and real estate below average for the region. Only South Dakota was lower in this category than the four industrial states. Only Wisconsin (2.2 percent) derived more than 2 percent of its personal income from agriculture. These states are dominated economically by manufacturing and contain some of the cities well known for their heavy industrial bases, such as Detroit, Cleveland, Toledo, Gary, and Milwaukee. The industrial states have 49.7 percent of the region's personal income and 51.3 percent of its population.

Finally, the five states of Iowa, North Dakota, South Dakota, Nebraska, and Kansas are classified as "agricultural states," with relatively high proportions of personal income derived from agriculture. Only Iowa (20.9 percent) and Kansas (18.2) seem to have significant concentrations of manufacturing. Each of these states have significant income from trade and financial services, but these seem to be secondary trade and financial services centers which feed into the large centers in the trade and financial services states. The agricultural states provide 12.9 percent of the region's personal income and have 13.5 percent of the Heartland population.

## Government Finance in the Heartland

There are two important indicators of the willingness of a populace to support public services. One is the overall level of state and local government revenue from own sources per capita, which provides a measure of overall fiscal support. The

second is revenues from own sources as a percent of personal income, which standardizes for ability to pay. Both indicators are shown in Table 3.

In own source state and local revenues per capita, only three Heartland states exceed the U.S. average. These are Minnesota (119 percent of the U. S. average), Wisconsin (103 percent), and Michigan (101 percent). Two states, Missouri (75 percent) and South Dakota (77 percent) raise revenues for own sources per capita at more than twenty percent below the national average. Within five percentage points of the national average are North Dakota (98 percent), Iowa (97 percent), Nebraska (97 percent), and Illinois (95 percent).

Since own source state and local revenue as a percent of state personal income bases revenue production on the basis of ability to pay, it may be a more useful indicator. Exactly one half of the Heartland states exceed the U. S. average on this measure. States that show strong support for state and local government programs are North Dakota (119 percent), Minnesota (118 percent), Wisconsin (110 percent), Iowa (106 percent), Nebraska (104 percent), and Michigan (103 percent). It may be no accident that North Dakota, Minnesota, and Wisconsin have strong progressive traditions and a history of activist governments.

States with low support for public services are Missouri (80 percent), Illinois (87 percent), South Dakota (92 percent), Ohio (93 percent), Indiana (96 percent), and Kansas (98 percent). All of these states, but most notably Missouri and Illinois, have been characterized by conservative governments over the past few decades and a more probusiness, anti-government climate than many of their neighbors. If the economic typology presented above has any meaning here, it is that a higher level of public services is most prevalent in the agricultural states and least prevalent in the trade and financial services states. The industrial states are in the middle.

### Enrollment in Public Education

Enrollments in public elementary and secondary schools and in public higher education in the Heartland states are shown in Table 4, along with enrollment trends from fall 1985 to fall 1990. Overall, between 1985 and 1990, public elementary and secondary school enrollment in the Heartland increased by 76,000 students, or 0.8 percent, while public higher education enrollment over the same period rose by 279,000 students, or 11.2 percent. The latter may reflect a natural increase in college enrollments that occur during recessionary economic times. These aggregate figures mask large state variations.

The trade and financial service states gained 1.9 percent in public elementary and secondary enrollment over the five year period, with Illinois losing 0.3 percent, but Minnesota gaining 7.2 percent and Missouri gaining 2.1 percent. The manufacturing states lost 0.5 percent of its elementary and secondary school enrollment, with only Wisconsin (3.8 percent) gaining students. Losses were recorded in Indiana (-1.1 percent), Ohio (-1.2 percent), and Michigan (-1.3 percent). The agricultural states gained 2.7 percent in enrollments, with two states losing students: Iowa (-0.2 percent) and North Dakota (-0.8 percent). States with enrollment gains were Nebraska (3.0 percent), South Dakota (4.0 percent), and Kansas (6.6 percent).

Gains were made in all the Heartland states in public higher education enrollments from 1985 to 1990, with the exception of North Dakota (-0.3 percent). Five year gains were fairly consistent across all three classifications: trade and financial services states (10.1 percent), manufacturing states (11.6 percent), and agricultural states (12.8 percent). The only states with gains of less than 10 percent were Illinois (6.0 percent), Wisconsin (6.2 percent), and Iowa (7.4 percent). Largest percentage increases in public higher education enrollments from 1985 to 1990 were registered in Missouri (20.2 percent), Kansas (17.2 percent), and Nebraska (16.5 percent).

### Financing Public Elementary and Secondary Education

In FY 1986, the per capita expenditure on public elementary and secondary education in the Heartland ranged from a low of \$506 in Missouri to a high of \$707 in Michigan. By FY 1991, the range had increased from a low of \$760 in Illinois to a high of \$964 in Minnesota. Per capita expenditures and regional ranks for FY 1986 and FY 1991 are shown in Table 5.

One way of analyzing these data is to look at both the regional ranks and the change in regional ranks from 1986 to 1991. Three states have demonstrated strong support for public elementary and secondary schools by reason of being in the top half of the regional ranking in FY 1986 and improving that ranking from 1986 to 1991. These states are Minnesota (rank 2 to 1), Wisconsin (rank 3 to 2), and Nebraska (rank 6 to 4). Remaining in the top half of the rankings, but dropping in rank was Michigan, moving from 1 to 3. Dropping out of the top half were Kansas, moving from 4 to 8, and North Dakota, moving from 5 to 10. Two states in the bottom half of the rankings in FY 1986, but moving into the top half in FY 1991 were Iowa (8 to 5) and Indiana (11 to 6). Missouri improved its rank in the five year period under analysis, but only moved from 12 to 11. Ohio (7) and South Dakota (9) did not change their respective rankings. Illinois showed the most dismal record by starting in the bottom half of the rankings and dropping in rank from 10 to 12.

Another measure of support for public education is to take account of ability to pay by examining state and local expenditures for public education as a percent of state personal income. This measure compensates for differing abilities to support public services. In theory, states making equal efforts will have identical percentages of state personal income spent on a particular public service. State and local expenditures for public elementary and secondary education as a percent of personal income for the Heartland states are shown in Table 6.

In FY 1986, the percentage of state personal income going to public elementary and secondary schools ranged from 3.7 percent in Illinois to 5.2 percent in Michigan. Other high ranking states were North Dakota (5.1 percent), South Dakota (5.1 percent), Minnesota (5.0 percent), Wisconsin (4.9 percent), and Ohio (4.6 percent). In FY 1991, the range extended from 3.8 percent in Illinois to 5.5 percent in Wisconsin. Other high ranking states in FY 1991 were Michigan (5.2 percent), Nebraska (5.2 percent), Minnesota (5.2 percent), South Dakota (5.1 percent), and North Dakota (5.1 percent).

Again, these data will be examined looking at relative rankings and changes in ranks from FY 1986 to FY 1991. By this measure, the most exemplary performance was shown by Wisconsin, which improved its rank from 5 in FY 1986 to 1 in FY 1991. Another high ranking state, Minnesota, maintained its rank at 4. Other high ranking states fell in rank, but maintained their position in the top half: Michigan (1 to 2), North Dakota (2 to 6), and South Dakota (3 to 5). Ohio fell out of the top half by dropping from 6 to 9.

Nebraska moved into the top half of rankings by improving its rank from 7 to 3, representing an actual increase in percentage of personal income going to public schools from 4.6 percent to 5.2 percent. Two states improved their ranks, but remained in the bottom half: Iowa (9 to 8) and Indiana (10 to 7). Kansas dropped in rank from 8 to 10. Missouri (11) and Illinois (12) did not change ranks.

Combining these two measures produces results that indicate that the best record of providing financial support for public elementary and secondary schools in the Heartland belongs to Minnesota, Wisconsin, and Michigan. These three states all rank in the top half of the region in personal income per capita in 1991, with Minnesota ranking 2, Wisconsin ranking 6, and Michigan ranking 3. However, the states with the worst record in supporting, Illinois and Missouri, ranked 1 and 5 respectively in personal income per capita in 1991. The state ranking 4th, Kansas, did have not have a very strong record in supporting

public education. The three states with the best records on education funding are two industrial states (Wisconsin and Michigan) and one trade and financial services state (Minnesota). However, the two states with the worst records, Illinois and Missouri, are both trade and financial services states. Illinois and Missouri are both states with large intrastate inequities in levels of educational funding with some very lavishly funded suburban school districts in major metropolitan areas and larger city districts with very poor levels of funding in relation to need, such as Chicago, St. Louis, Kansas City, East St. Louis, and Rockford. The agricultural states seem to maintain a moderate level of financial support for public schools, generally not falling at either extreme.

### Financing Public Higher Education

The per capita state and local government expenditure for public higher education in FY 1986 in the Heartland ranged from \$177 in Missouri to \$380 in North Dakota, a ratio of over 2:1. By FY 1991, this range increased from a low of \$239 in Missouri to a high of \$509 in North Dakota. As shown in Table 7, over this five year period the relative rankings of the Heartland states was far more stable in public higher education funding than in public elementary and secondary education funding.

Among those in the top half of the rankings in FY 1996, both North Dakota (1) and Michigan (5) maintained their ranks in FY 1991. Those increasing in rank were Iowa (3 to 2) and Nebraska (6 to 4). Dropping in rank were Wisconsin (2 to 3) and Kansas (4 to 6). All six states in the bottom half of the rankings in FY 1986 maintained the same rank in FY 1991: Minnesota (7), Indiana (8), Ohio (9), Illinois (10), South Dakota (11), and Missouri (12).

Table 8 shows the state and local expenditures for public higher education as a percent of state personal income for the Heartland states for FY 1986 and FY 1991. Support for public higher education based on ability to pay in FY 1986 was highest in North Dakota (3.1 percent) and lowest in Missouri (1.3 percent). Other high states were Iowa (2.6 percent), Wisconsin (2.6 percent), Michigan (2.2 percent), Kansas (2.2 percent), and Nebraska (2.1 percent). Joining Missouri at the bottom of the spectrum were Illinois (1.4 percent), Ohio (1.7 percent), and South Dakota (1.8 percent).

Public higher education spending as a percent of personal income also remained fairly stable between FY 1986 and FY 1991. Among those in the top half of the rankings in FY 1986, North Dakota (1) and Iowa (2) maintained their ranks over the five year period, while Nebraska improved its rank from 6 to 3, and three states dropped in rank: Wisconsin (3 to 4), Michigan (4 to 6), and Kansas (5 to 7). Of those in the bottom half of the rankings in FY 1986, states improving their ranks were Indiana (7 to 5) and Ohio (10 to 9). Minnesota (8), Illinois (11), and Missouri (12) maintained their ranks and South Dakota dropped in rank from 9 to 10.

Of those states in the Heartland with the best overall records of supporting public higher education, three (North Dakota, Iowa, and Nebraska) are agricultural states and one (Wisconsin) is an industrial state. Of the three with the worst records of support for public higher education, two are trade and financial center states (Illinois and Missouri) and one is an agricultural state (South Dakota). Missouri, with the poorest record of supporting public higher education, had the highest percentage increase in public higher education enrollment in the Heartland over the five year period. North Dakota, with the best funding record, lost enrollment.

### Analysis and Conclusions

An analysis of the findings above shows Wisconsin as the Heartland state with the best and most consistent record of financial support of both public elementary and secondary edu-

cation and public higher education. Wisconsin is an industrial state and has an above average personal income per capita, but it may be political factors rather than economic factors which explains Wisconsin's education funding performance. Wisconsin was a leader of the Progressive Movement in the early part of this century and has supported a strong public sector, as evidenced by a level of state and local government revenue as a percent of state personal income ten percent above the national average. Wisconsin has been a leader in public higher education and was the birthplace of the "Wisconsin Idea" of public service by the state's leading public university.

Michigan also has a strong record in funding both public elementary and secondary education and public higher education. Michigan is a leading industrial state and has a politically strong labor movement that has supported public schools. In higher education, Michigan has been a leader in supporting strong public universities like the University of Michigan and Michigan State University. Michigan lacks Wisconsin's progressive tradition, but still has state and local revenue as a percent of personal income three percent above the national average.

Minnesota, which has a strong record in financial support of public elementary and secondary education, has a less stellar record in support of public higher education. Minnesota has a strong public sector, as evidenced by state and local government revenue as a percent of state personal income that is 18 percent above the national average, but that has not been transferred into strong support for public higher education.

None of the trade and financial center states have strong records in support of public higher education, although Minnesota has the best record of the three. Illinois and Missouri rank in the bottom three of the Heartland states in all higher education finance measures. However, Illinois and Missouri rank extremely low on public elementary and secondary education financial indicators also. Missouri and Illinois both have traditions of weak state governments and a heavy dependence on local governments for services. Both are low tax states and local and state revenues as a percent of personal income rank very low, not only in the region, but nationally. Illinois, in spite of its relative high ability to pay, and Missouri simply do not support public services and do not support public education at any level very well. In Illinois and Missouri traditions of private capital accumulation predominate over a civic culture of community services.

Three states with strong record in public higher education funding, North Dakota, Iowa, and Nebraska, are agricultural states with poorer records in funding public elementary and secondary education. These are states where the relatively ample funding of public higher education may partially be the results of underdeveloped private higher education systems. However, this is also true of other Heartland states with less exemplary records in public higher education finance.

Ohio and Indiana are industrial states with weak records in financially supporting public education, although Indiana has made recent improvements in public elementary and secondary education finance. Kansas and South Dakota are agricultural states with weak public education finance records also.

When considering the economic classifications of states, half of the industrial states have strong records of support for public education and half have mediocre records. One trade and financial services state has a strong record of financial support for public education, but the other two have very poor records. The agricultural states are in the middle range with neither very strong or very weak records. This pattern is too weak to consider drawing too many inferences from it. A conclusion that might be drawn from this study is that history and tradition and political culture and factors may explain more of the variance in financial support of public education among states than economic factors. In particular, the willingness to support public education does not seem to be associated with either personal

income per capita or growth in personal income per capita. Indeed, Illinois and Missouri rank among the best of the Heartland states on these indicators and have the worst records in supporting public education. States with the best records of public education financial support, Wisconsin and Michigan, are high income states, but have low income growth rates.

In determining support for public education in states, whether elementary and secondary education or higher education, politics seems to be a stronger determining factor than economics, at least in the Heartland of America.

**Table 1. The States of the American Heartland**

	1990 Population (in millions)	1991 Personal Income Per Capita	Percent Change in Personal Income Per Capita, 1986-1991
<b>Great Lakes States</b>			
Ohio	11.0	17,767	28.6
Indiana	5.7	17,193	30.7
Illinois	11.6	20,737	33.4
Michigan	9.4	18,642	25.3
Wisconsin	5.0	17,919	28.3
<b>Plains States</b>			
Minnesota	4.5	19,130	28.4
Iowa	2.8	17,251	29.8
Missouri	5.2	17,980	29.2
North Dakota	0.6	15,646	26.6
South Dakota	0.7	16,095	36.7
Nebraska	1.6	17,780	31.7
Kansas	2.5	18,306	26.4

Source: Advisory Commission on Intergovernmental Relations (ACIR), *Significant Features of Fiscal Federalism, 1993*.

**Table 2. The Heartland States: An Economic Typology**

	Personal Income 1991 (millions)	WT/FIRE*	Percent Personal Income, By Industry Manufacturing	Agriculture
<b>Trade and Financial Services States</b>				
Illinois	255.6	16.6	19.8	1.4
Minnesota	91.5	14.4	22.1	2.9
Missouri	99.0	13.5	20.3	1.8
<b>Manufacturing States</b>				
Ohio	207.8	11.7	28.2	1.0
Indiana	104.2	10.5	31.1	1.5
Michigan	185.7	10.7	31.5	1.0
Wisconsin	95.9	11.6	28.2	2.2
<b>Agricultural States</b>				
Iowa	52.1	12.7	20.9	7.6
North Dakota	10.9	12.1	6.4	13.0
South Dakota	12.1	11.1	10.9	15.1
Nebraska	30.4	13.4	13.1	11.1
Kansas	48.8	12.1	18.2	4.8

\*Combination of wholesale trade and finance, insurance, and real estate.

Source: U.S. Department of Labor, Bureau of Economic Analysis, *Survey of Current Business*.



**Table 3. The State and Local Government Finances of the Heartland States Fiscal Year 1991**

	Per Capita Revenues From Own Sources		As Percent of State Personal Income	
	Amount	Index of US Average	Amount	Index of US Average
<b>Trade and Financial Services States</b>				
Illinois	2814	95	14.0	87
Minnesota	3525	119	19.0	118
Missouri	2224	75	12.9	80
<b>Manufacturing States</b>				
Ohio	2596	88	15.0	93
Indiana	2574	87	15.5	96
Michigan	3009	101	16.6	103
Wisconsin	3054	103	17.7	110
<b>Agricultural States</b>				
Iowa	2865	97	17.1	106
North Dakota	2899	98	19.1	119
South Dakota	2283	77	14.8	92
Nebraska	2878	97	16.8	104
Kansas	2781	94	15.7	98

Source: ACIR, *Significant Features of Fiscal Federalism 1993*.

**Table 4. Enrollment in Public Education, The Heartland States, Fall 1985 and Fall 1990 (enrollments in thousands)**

	K-12 Public Schools			Public Higher Education		
	Fall 1985	Fall 1990	Percent Δ	Fall 1985	Fall 1990	Percent Δ
<b>Trade and Financial Services States</b>						
Illinois	1826	1821	(0.3)	520	551	6.0
Minnesota	705	756	7.2	174	199	14.5
Missouri	795	812	2.1	169	200	20.2
<b>Manufacturing States</b>						
Ohio	1794	1772	(1.2)	379	426	12.2
Indiana	966	955	(1.1)	194	223	15.0
Michigan	1603	1582	(1.3)	434	487	12.2
Wisconsin	768	797	3.8	239	254	6.2
<b>Agricultural States</b>						
Iowa	485	484	(0.2)	110	118	7.4
North Dakota	119	118	(0.8)	35	35	(0.3)
South Dakota	124	129	4.0	23	27	14.0
Nebraska	266	274	3.0	81	95	16.5
Kansas	410	437	6.6	127	149	17.2

Source: U.S. Department of Education, *Digest of Educational Statistics, 1993*.

**Table 5. Per Capita State and Local Expenditures for Public Elementary and Secondary Education Fiscal Years 1986 and 1991**

	FY 1986		FY 1991	
	Per Capita Amount	Regional Rank	Per Capita Amount	Regional Rank
<b>Trade and Financial Services States</b>				
Illinois	546	10	760	12
Minnesota	703	2	964	1
Missouri	506	12	762	11
<b>Manufacturing States</b>				
Ohio	613	7	804	7
Indiana	529	11	817	6
Michigan	707	1	945	3
Wisconsin	648	3	957	2
<b>Agricultural States</b>				
Iowa	570	8	820	5
North Dakota	620	5	771	10
South Dakota	569	9	779	9
Nebraska	616	6	890	4
Kansas	620	4	804	8

Source: ACIR, *Significant Features of Fiscal Federalism*, 1993 and 1988 editions.

**Table 6. State and Local Expenditures for Elementary and Secondary Education as a Percent of State Personal Income Fiscal Years 1986 and 1991**

	FY 1986		FY 1991	
	Per Capita Amount	Regional Rank	Per Capita Amount	Regional Rank
<b>Trade and Financial Services States</b>				
Illinois	3.7	12	3.8	12
Minnesota	5.0	4	5.2	4
Missouri	3.9	11	4.4	11
<b>Manufacturing States</b>				
Ohio	4.6	6	4.7	9
Indiana	4.3	10	4.9	7
Michigan	5.2	1	5.2	2
Wisconsin	4.9	5	5.5	1
<b>Agricultural States</b>				
Iowa	4.5	9	4.9	8
North Dakota	5.1	2	5.1	6
South Dakota	5.1	3	5.1	5
Nebraska	4.6	7	5.2	3
Kansas	4.5	8	4.6	10

Source: Same as Table 5.

**Table 7. Per Capita State and Local Expenditures for Public Higher Education—Fiscal Years 1986 and 1991**

	FY 1986		FY 1991	
	Per Capita Amount	Regional Rank	Per Capita Amount	Regional Rank
<b>Trade and Financial Services States</b>				
Illinois	207	10	285	10
Minnesota	260	7	385	7
Missouri	177	12	239	12
<b>Manufacturing States</b>				
Ohio	227	9	291	9
Indiana	245	8	370	8
Michigan	296	5	404	5
Wisconsin	338	2	412	3
<b>Agricultural States</b>				
Iowa	332	3	450	2
North Dakota	380	1	509	1
South Dakota	193	11	243	11
Nebraska	280	6	409	4
Kansas	297	4	391	6

Source: Same as Table 5.

**Table 8. Expenditures for Public Higher Education as a Percent of State Personal Income—Fiscal Years 1986 and 1991**

	FY 1986		FY 1991	
	Per Capita Amount	Regional Rank	Per Capita Amount	Regional Rank
<b>Trade and Financial Services States</b>				
Illinois	1.4	11	1.4	11
Minnesota	1.9	8	2.1	8
Missouri	1.3	12	1.4	12
<b>Manufacturing States</b>				
Ohio	1.7	10	1.7	9
Indiana	2.0	7	2.2	5
Michigan	2.2	4	2.2	6
Wisconsin	2.6	3	2.4	4
<b>Agricultural States</b>				
Iowa	2.6	2	2.7	2
North Dakota	3.1	1	3.4	1
South Dakota	1.8	9	1.6	10
Nebraska	2.1	6	2.4	3
Kansas	2.2	5	2.2	7

Source: Same as Table 5.

The use of the property tax to fund our public schools was once revered as the cornerstone of the American system of education. . . . If the property tax is to continue to serve as the primary source of local revenues, additional corrective measures must be employed to mitigate the taxpayer inequities that result under the current system.

# FINANCING PUBLIC EDUCATION: An Examination of the Public and Private Sector Responses to Perceived Inadequacies of the Property Tax

by Brian O'Neil Brent and David H. Monk

## Introduction

Although it has ancient and European antecedents, the American property tax system is a uniquely indigenous institution. However steeped in American tradition, the cry of baseball, apple pie, and the property tax, is rarely heard. When asked, "which do you think is the worst tax—that is the least fair?"

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respondents have consistently identified the property tax as the least equitable.<sup>1</sup> Why then is this institution, which serves as the primary local taxing mechanism, and accordingly, source of local contribution for our public schools, so vilified?

One of the foremost criticisms of the mechanism is that the illiquid nature of property does not provide an accurate measure of one's ability to pay. Taxation requires the transfer of resources from the taxpayer to the public sector. Therefore, a taxpayer must have sufficient resources available, or convert property holdings into currency or other negotiable instruments, in order to honor his or her obligation. The latter notion of disposing of one's real property to satisfy tax liabilities is rather disturbing to many taxpayers. Accordingly, circuit breakers or homestead credits, which provide targeted tax relief for property owners who do not have sufficient liquid resources to satisfy their property tax liabilities, are employed by 31 and 40 state governments, respectively. The private sector has also responded to the dilemma of the "property rich-cash poor" homeowner. Through the implementation of Reverse Equity Mortgages (REMs), lending institutions now allow elderly homeowners to systematically "convert" the equity in their homes to liquid resources. It is proposed that the income stream generated from these periodic payments will aid the homeowner in satisfying his or her obligations, including taxes.

Education policy makers are currently in the throes of assessing not only reforms in the manner in which educational services are to be delivered, but additionally, the manner in which the resources required to provide such services are to be secured. Accordingly, policy makers must re-examine the traditional use of the property tax as a means to fund our public schools. This paper examines the efficacy, within an educational finance context, of both the public and private sector responses to the aforementioned criticism of the property tax. Section I, examines the role the property tax currently plays in the financing of our public elementary and secondary schools. Section II, addresses the aforementioned criticism of the property tax in reference to theories of taxation. Section III, examines the efficacy of the public sector's implementation of homestead exemptions and circuit breakers to provide targeted tax relief. Section IV, addresses the private sector's use of reverse equity mortgages to mitigate the perceived shortcoming of the property tax system. And Section V, concludes with a discussion of the educational finance policy implications.

## I. Funding Sources of Public Schools

Public schools in the United States are financed through a system of fiscal federalism. That is, the funds used in their operations have been appropriated on the federal, state, and local levels. Nationally, during the last two decades, the combined federal and state support for public education has ranged from 41% to 50%, while the complementary local contribution has ranged from 52% in 1969-70 to 44% in 1986-88 (See Table 1). Therefore, approximately one-half of the resources required by districts has traditionally been provided by local sources.<sup>2</sup>

With regard to the procurement of locally raised revenue, public school systems may be divided into two distinct classes; those systems in which the schools are fiscally *independent*, and those in which the districts are fiscally *dependent* on some other form of local government. Dependent districts are those systems which function as operating segments of larger governmental units (e.g.—counties, cities, etc.). Therefore, support for the subordinated dependent districts is secured through contributions made by the parent government. Accordingly, the dependent district must solicit funds from the same budget that addresses the need for police and fire protection, sanitation, health services, parks and recreation, and other municipal support subunits. In 1987, all school districts in Alaska, Hawaii, Maryland, North Carolina, and Virginia, in addition to some systems in twelve states, were fiscally dependent (See Table 2).<sup>3</sup>

The characteristic that defines independent school districts is their ability to raise revenues autonomously. That is, their ability to secure funds for education independent of the operations of other competing municipal services.<sup>4</sup> This ability may include the establishment of tax rates on a respective tax base, assessment, and the subsequent collection of the proceeds.<sup>5</sup> In districts which have independent taxing authority, the property tax accounts for more than 80% of the local revenues.<sup>6</sup> Additionally, in several states it is the sole tax base upon which districts may levy.<sup>7</sup> Accordingly, in 1988–89, independent school districts obtained 97% of their local tax revenue from the property tax.<sup>8</sup>

The source of local funds for dependent school districts is often less clear, however. As noted, these districts rely on appropriations from the local municipality, which may have in addition to the property tax, other taxing and assessment mechanisms. Among these are local sale taxes, occupation taxes, motor vehicle license fees, mineral extraction and severance taxes, interest income, and proceeds from court fines. However, because property taxes are the single most important source of revenue for local municipalities in the majority of states,<sup>9</sup> for purposes of this analysis it is presumed that they are the primary source of local funding for both dependent and independent districts. Accordingly, approximately one-half of the resources required by a given school district, are secured through the assessment and collection of a locally administered property tax.

## II. The Property Tax and Standards of Equity

*"The property tax's retention can be explained only through ignorance or inertia."*

The above statement, written by tax expert E.R.A. Seligman over seven decades ago, reveals the sentiment felt by the majority of taxpayers throughout the century.<sup>10</sup> What accounts for such widespread dissatisfaction? One of the primary criticisms of the use of the property tax is the potential for the mechanism to violate fundamental principles of taxpayer equity. Adam Smith wrote eloquently about what is required to make a tax equitable:

*The subjects of every state ought to contribute towards the support of the government, as nearly as possible, in proportion to their respective abilities; that is, that is in proportion to the revenue that they respectively enjoy under the protection of the state."*

—Adam Smith

A careful reading of this passage reveals that there are actually two tests that need to be met in order for a system of taxation to achieve equity. Smith asserts that the burden of taxation should be born in proportion to one's "respective abilities" (ability to pay principle), and also in proportion to the revenue one "enjoys under the protection of the state" (benefit principle). Although Smith argues that an "equitable" system of taxation would encompass both of these tenets, upon closer examination these principles are far from complementary.

### *The Benefit Principle:*

The benefit principle asserts, that an equitable system of taxation, is one in which each taxpayer contributes in accordance with the "benefits" he or she will receive. Accordingly, under a strict interpretation of this principle, each taxpayer would be taxed in line with his or her respective demand for services.<sup>12</sup> This notion, the more you benefit, the more you pay, fits nicely into one's sense of fairness. However, it is not always easy to measure levels of benefit, and this seriously limits the applicability of this equity standard.

These measurement problems are particularly serious in the context of public schools. One may assert that it is the family of the student who is receiving the "benefit" provided by the pub-

lic service. Accordingly, the cost of funding public schools should be borne only by those who have children within the institution. However, does not the public as a whole benefit when a child receives an education? That which may be attained in school, not only broadens employment opportunities, but also enables the youth to become both a better citizen and consumer. Therefore, there is a resultant "value" to society when the education system enables a youth to become a scientist, doctor, laborer, or public servant, any one of whom may one day provide services for the "benefit" of the community. How then can we measure and assess the *benefit* each taxpayer receives when a child is educated? Since individual preferences differ, and positive externalities may result, it is unlikely that an absolute measure of value, in a practical sense, can be derived. Accordingly, use of the benefit principle is best reserved for those public services, which more clearly identify the relationship between the individual benefited and the service provided.<sup>13</sup>

### *The Ability to Pay Principle:*

The ability to pay principle is the foundation upon which most systems of taxation, including the property tax, rest. Unlike the benefit principle, whose focus is on the degree to which individuals receive public services, the ability principle seeks to assess each taxpayer based on his or her wherewithal to pay. That is, regardless of the benefits received, each individual is required to contribute to the resource pool, an amount commensurate with his or her fiscal capacity. The three most widely employed measures of ability to pay are income, consumption, and wealth. Income refers to the inflow of resources, from whatever source derived, within a given time frame. *Consumption* based measures are founded on the premise that those who "consume" more, are better able to pay than those who consume less. And lastly, *wealth* based measures seek to determine an individual's wherewithal to pay based upon the "value" of the resources they possess at the time of assessment. Irrespective of the measure of ability employed, contribution is to be determined in accordance with the tenets of horizontal and vertical equity. Horizontal equity requires that equals be treated as equals. Conversely, vertical equity requires that unequals be treated unequally.

## The Property Tax and the Ability to Pay

*"It was the best of taxes, it was the worst of taxes?"*

As stated above, the equity standard on which the property tax mechanism rests, is the imposition of tax in accordance with the taxpayer's respective *ability to pay*. But, does the property tax system employ a suitable means for determining one's ability to pay? For at least the following three reasons, the answer is no.

1. *Inaccurate Definition of Wealth:* The property tax system seeks to assess an individual's wherewithal to pay based upon their "wealth". However, the term wealth in this context is misleading. The tax is universally applied to the assessed fair market value of all non-exempt realty.<sup>14</sup> Thus the property tax system, which disallows the deduction of liabilities and excludes personal property, securities, and deposits, does not accurately reflect the more inclusive financial based concept of "net worth".<sup>15</sup> Rather, the tax looks solely to one component of an individual's holdings to determine his or her ability to pay.<sup>16</sup> Consider the following: All else being equal, two individuals, A and B, both own identical parcels of real property valued at \$100,000 each. Additionally, A owns the property free and clear, while B has a \$100,000 mortgage on his respective parcel. Therefore, A has a net worth of \$100,000, while B has a net worth of \$0 (\$100,000 asset - \$100,000 liability = \$0 net worth). As property tax system presently functions, how-

ever, both A and B's ability-to-pay will be determined to be equal (\$100,000). Accordingly, they will be assessed equal levies. Conversely, if the property tax system measured an individual's net worth, A, whose worth is higher, would be levied an increased amount commensurate with his holdings. Therefore, in this example, unequals are treated equally. Thus, if one subscribes to the concept of net worth as a more representative measure of an individual's "wealth", the property tax system is in violation of the principle of vertical equity.

2. *Elements of a Regressive Incidence:* A second widely espoused criticism of the property tax, as a measure of one's ability to pay, is that the tax is regressive.<sup>17</sup> That is, lower income taxpayers will pay a higher percentage of their income to satisfy property taxes than higher income taxpayers. If this assertion is true, it brings into question the efficacy of the property tax as a means to secure public support. This long-standing assertion, termed the traditional view of property tax incidence, has, however, come into question. In *Who Pays the Property Tax*, a discourse on property tax incidence, Aaron demonstrates that in many ways the tax can have a progressive effect on taxpayer incidence. Thus, the true nature of property's tax incidence is still subject to question.<sup>18</sup>
3. *Illiquid Nature of Real Property Wealth:* A third criticism of the use of "wealth" as a measure of ability to pay centers on the illiquid nature of real property. Taxation requires the transfer of resources from the taxpayer to the public sector. Therefore, a taxpayer must have sufficient liquid resources available, or convert property holdings into currency or other negotiable instruments, in order to honor his or her obligation. Clearly, the notion of disposing of one's real property to satisfy tax liabilities is rather disturbing to many taxpayers.

All men are created equal. But, are they treated equally? The remainder of this article examines both the public and private sector responses to the perceived failure of the property tax system to accurately measure one's ability to pay.

### III. The Public Sector Response—Targeted Tax Relief

Property tax relief includes a melange of mechanisms designed to limit reliance on the tax to secure local resources. These mechanisms may be grouped into two broad categories: general and targeted. General relief attempts to indiscriminately lower property taxes for all classes of property. This may be accomplished by implementing one, or any combination, of the following programs:<sup>19</sup>

- Increased state aid (e.g.-school finance equalization programs at the state level)<sup>20</sup>
- Assumptions of local functions by state government (e.g.-school district transportation)
- Increased local sales and income taxes or user charges<sup>21</sup>
- Tax and spending limitations (e.g.—legislative constraints on school district expenditures)<sup>22</sup>

General tax relief is designed to reduce taxes across all classes of property types and owners. Accordingly, it does not directly address the property tax in relation to an individual's ability to pay, therefore it will not be further examined. In contrast to general relief, targeted relief reduces property taxes for only a select group of taxpayers, generally owners of residential or agricultural property. There are two methods of providing relief in this category:<sup>23</sup>

- Homestead credits or exemptions
- Circuit breakers

Homestead exemptions and circuit breaker programs are designed to give relief to taxpayers within the same class. Accordingly, targeted tax relief is the public sector's response to

the property tax's alleged inability to accurately assess one's ability to pay.

#### *Homestead Exemptions and Circuit Breakers*

A homestead exemption, one of the oldest property tax relief mechanisms, seeks to reduce the property tax for a specific class of taxpayers who own homes. For example Montana provides a homestead credit for individuals, 62 years or older, equal to property taxes paid, less some specified amount based on income. Other states seek to reduce the assessed valuation of property for specific classes of taxpayers (e.g.—elderly). The result, regardless of the means, is that the tax bill of the respective "homestead taxpayer" is reduced. Although some states reimburse local governments for the revenue losses caused by the homestead credit, more commonly the cost is borne by the local unit, or more accurately the local ineligible taxpayer.

Circuit breakers derive their name from the following analogy. They (circuit breakers) are designed to protect a taxpayer against property tax "overload" in the same manner an electrical circuit breaker protects a power line against an overload of current. Overload may be the result of a drop in current year income due to illness, unemployment, or other extraordinary circumstances. Overload may also be the result of a drop in income due to retirement. As such, in the latter case, overload will not likely be mitigated by future increases in income.

Circuit breakers provide payments to taxpayers, usually in the form of income tax credits, equal to the excess residential property tax liabilities over a designated percentage of income. For example the New York State tax code provides the following:

#### *Law 59,072.40-.67 Property Tax Circuit Breaker*

*Credit.*—A resident individual, who occupies the same residence for at least six months and whose household gross income is \$18,000 or less for the tax year, gets this credit. It is given in the maximum amount of \$75, \$375 for persons age 65 or older, for the first \$1,000 of household gross income, and down \$2, or \$17 for the elderly, for every additional \$1,000, to \$41, or \$86 for the elderly, for household income over \$17,000 but not over \$18,000. Credit represents a fraction of the excess property taxes. An owner of a home valued at \$85,000 for property taxation, a tenant whose adjusted monthly rent is \$450 on average, and homes exempt from property tax do not qualify.<sup>24</sup>

In 1989, some type of circuit breaker program or homestead credit were employed in 31 and 40 states, respectively.<sup>25</sup> (See Table 3) The great disparities in circuit breaker and homestead plans reflects the diversity of their objectives. Among the most common objectives of the mechanisms' proponents are the following:<sup>26</sup>

- The programs can decrease the regressive nature of the property tax.
- The mechanisms can operate as an indirect form of revenue sharing if the losses are financed by the state.
- Targeted relief can protect low-income taxpayers with unusually large liabilities or with temporary depressed incomes.
- And, since benefits often accrue to largely low-income households, they can be supported by advocates of greater income redistribution as an interim device until larger welfare programs can be enacted.
- By rebating or crediting taxes, circuit breakers and homestead credits can allow the elderly, who frequently have paid off all mortgages and experience no out-of-pocket costs other than maintenance and property taxes, to remain in their homes.

As noted, the programs differ widely in their structure, and accordingly, in their intentions with regard to the above objectives.

### The Efficacy of Targeted Tax Relief

Although "noble", critics have addressed the validity of several of the programs' general goals. First, the circuit breaker and homestead exemptions are justified primarily on the premise that the property tax is regressive. However, as noted in Section II, several economists assert that the tax is borne largely by the owners of capital, and thus progressive.<sup>27</sup> The second objective, revenue sharing, supports the notion that localities with predominantly low-income residents can transfer a portion of their property tax burden to non-residents through state intervention. The use of targeted tax relief mechanisms as a mean of promoting *revenue sharing* is a matter of political judgment. Third, if temporary decreases in income justify the lessening of taxes, temporary gains, would accord increasing the burden. This notion, however, would not likely be met with overwhelming enthusiasm. The fourth objective of using targeted tax relief mechanisms to provide *maintenance*, until other social programs can be implemented, creates an interesting dilemma. Recall, from the above example (New York State), that taxpayers with higher property tax burdens (presumably indicating higher assessed property valuations), are afforded a larger per dollar credit. Thus, to use relief from the property tax system, as means of "welfare", results in benefits being distributed directly in proportion to wealth, hardly the foundation upon which public assistance programs are built. Thus, the first four objectives of targeted tax relief are not without inherent complications.

The fifth objective of targeted tax relief, credits for elderly homeowners, serves as the primary purpose of the implementation of circuit breakers and homestead exemptions in the majority of states.<sup>28</sup> However, it is through a closer examination of the use of targeted tax relief with regard to the elderly, that, in terms of theories of taxation, cast doubt on the efficacy of the system as it currently functions.

As noted in Section II, the three most widely employed measures of ability to pay are income, consumption and wealth. Traditionally, the property tax system seeks to assess an individual's wherewithal to pay based upon their "wealth". The creation of targeted tax relief, however, served to shift the property tax from a wealth based measure of ability to pay, to a hybrid wealth-income based measure.

Income as a measurement of ability to pay has two primary advantages. First it can be tied to a given period. That is, if one incurs a loss in a given year, his or her decreased ability to pay, and resultant assessment, adequately reflects the singular nature of the event. Thus, targeted tax relief mechanisms, tied to levels of income, could be perceived to adequately address the possibility of temporary decreases in income. Second, income, although not exclusively, has a liquid nature. Remuneration for services provided, the sale of assets, or the receipt of retirement benefits is traditionally in the form of currency or other negotiable instruments. It therefore follows that one could easily transfer these resources to the public sector if a timely assessment were made. Thus, targeted tax relief allows individuals who do not have liquid resources the ability to *exempt* themselves from the payment of a portion of the property tax and accordingly preserve their holdings (i.e.—real property).<sup>29</sup>

Difficulties arise, however, when select groups of taxpayers are able to circumvent the payment of the tax under the guise of a different ability to pay standard. That is, when select taxpayers (e.g.—elderly) receive credits or exemptions, a disparity is created between the designated group, and taxpayers who do not fall within the exempt class. Recall that horizontal equity requires that equals be treated as equals. Targeted tax relief serves to treat equals unequally. Ineligible taxpayers are required to transfer resources to the respective governmental unit, regardless of temporary declines in income or the illiquidity of their assets. Thus, circuit breakers and homestead exemptions create horizontal inequities.

### IV. The Private Sector Response— Reverse Equity Mortgages

The private sector has also, indirectly, addressed to the perceived inability of the property tax to measure one's ability to pay. Response in this sector, however, has not addressed the needs of all taxpayers, but rather only the burdens of elderly residential property owners. The banking industry's implementation of Reverse Equity Mortgages has attempted to mitigate the often espoused dilemma of the "house rich-cash poor" aged.

Approximately three quarters of Americans aged 65 or older own their own homes, with roughly 80 percent of these having fully satisfied mortgages.<sup>30</sup> Although estimates vary, elderly homeowners are said to have approximately \$1 trillion in unencumbered equity that cannot be utilized unless the property is sold.<sup>31</sup> For many, however, the notion of selling one's residence is less than desirable. The American Association of Retired Persons (AARP) purports that 86 percent of senior citizens would prefer remaining in their homes as they age, rather than selling their residences and moving to retirement communities.<sup>32</sup> But, does one have to sell their home to "unlock" the resources the property holds? The answer is no, if one can be convinced of the merits of a reverse equity mortgage (REM).<sup>33</sup>

Reverse equity mortgages are designed to allow the elderly to convert the accumulated equity in their homes into an income stream, without having to move or sell their property interests. Generally, the borrower receives a monthly payment from the lender, to be repaid with interest either upon the borrower's death or the sale of the house, or at a fixed repayment date. The difference from this plan, and a traditional mortgage, is that in the former each disbursement by the lender reduces the homeowner's equity interest in the designated property. Although numerous variations on the theme of REMs are offered, by both the public and private sector, there are four general classes of the debt instrument:

1. *Fixed-Term Reverse Mortgages*: The lending institution will disburse to the homeowner a monthly advance, generally calculated on 80 percent of the appraised value of the home for a predetermined period (generally three to ten years). Upon completion of the designated term, the loan principal, plus interest, must be repaid in full.
2. *Tenure Reverse Mortgages*: The lending institution will disburse to the homeowner a monthly advance, as determined by the assessed value of the property and the life expectancy of the borrower (determined actuarially), until such borrower dies, moves, or sells the residence. Upon the occurrence of any of the aforementioned events, the borrower, or his or her estate, are required to pay the loan balance in full.
3. *Line of Credit Reverse Mortgages*: This instrument is designed to allow borrowers to draw a flexible amount of equity if, when, and to the degree that it is required. The amount of the line of credit is determined by the life expectancy of the homeowner and the assessed value of the designated property. The loan balance will be repaid in full upon the relocation or death of the borrower, or the sale of the residence.
4. *Shared Appreciation Mortgages*: Under this type of arrangement, a variation on all three of the above types of reverse mortgages, the lender agrees to provide the borrower with a larger monthly payment (or credit line) in exchange for a future share in the property's appreciation. However, when you die, move, or sell the residence, you or your estate are required to remit to the lender the agreed upon portion of your home's appreciation, plus the balance of your monthly advances (including interest).

The first REMs appeared on the scene in 1961. Since their inception, however, and through 1992 the mortgage instrument

has not been met with wide spread consumer support.<sup>35</sup> Nor was the concept of such a lending device initially embraced by the banking industry.<sup>36</sup> The failure of the banking industry to aggressively pursue the promotion of the instrument, and resultant negligible consumer demand, was largely due to the fact that no secondary market existed for the factoring or securing of executed loans. Thus, lending institutions were required to manage the entire risk of their REM portfolios, hardly desirable for a product that had not yet demonstrated its earnings potential. In 1988, however, Congress established the Home Equity Conversion Mortgage Insurance Demonstration, the first federal endorsement of home equity conversion (HECM) as a viable option for the elderly.<sup>38</sup> By 1992, Congress had expanded the number of HECMs that the Department of Housing and Urban Development (HUD) could insure from 2,500 to 25,000. In response, Fannie Mae, as part of its \$10 billion affordable housing initiative, has committed to purchase the HUD-insured HECM loans, thereby creating a secondary market for originators who do not want to maintain and continually fund HECM loans in their own portfolio.<sup>37</sup>

#### HUD Insured (FHA) vs. Private Institution REMs:

The arrival of the HUD insurance option has further altered the product mix of available reverse equity mortgages. In addition to the four basic mortgage payment options detailed above (term, tenure, line of credit, and shared appreciation), the loans can be further classified as FHA-insured, lender-insured, and uninsured.

1. *FHA Insured:* Under these arrangements, although HUD insures the loans, it is the private lenders that are responsible for their origination. To be eligible the borrower must be at least 62 years of age, live in a single family residence, and own the residence free and clear (or nearly so).<sup>38</sup> Additionally, the maximum amount of the insurable mortgage is limited by statute. Currently, the allowable amount, which addresses the demographic characteristics of the geographic locale, ranges from \$67,500 to \$124,875 (1992 limits).<sup>39</sup> The terms of the mortgage may also provide for a fixed or adjustable interest rate.<sup>40</sup> The primary advantage of these instruments, with regard to the lender, rests in the provision that the institution will be protected by the HUD insurance feature up to the "maximum claim amount", even if the loan's outstanding balance exceeds the value of the property on the date of sale.<sup>41</sup> In this case, HUD will repay the lenders for any deficiency out of the mortgage insurance premiums (MIP) previously collected under the terms of the HECM loan.<sup>42</sup> Accordingly, provided the borrowers occupy the home as their principal residence, they cannot be forced to sell the home to satisfy the mortgage, even if the value of the property is less than the outstanding balance of the obligation.<sup>43</sup> Therefore, with regard to the borrower or his estate, the lender's recovery will be limited to the value of the home. Thus, HUD insures both the lender and the borrower against risk of loss.<sup>44</sup>
2. *Lender-Insured:* Private lenders offer a multitude of lender-insured REM products. Although variations exist, both within and between institutions, several general characteristics of the arrangements can be outlined. Lender-insured REMs offer tenure or line of credit payment plans. The interest may be assessed at an adjustable or fixed rate. And, like HUD-insured loans, the instrument incorporates a mortgage insurance premium into the balance due. The primary distinction between the two insured arrangements is that the lender-insured plan does not have limits on the value of the property to be mortgaged. Additionally, the lender-insured REM may

also allow the borrower to mortgage less than the full assessed value of his or her residence. This provision affords the opportunity to preserve equity for the homeowner, or his or her heirs. Generally, the loan advances under a lender-insured plan are larger than disbursements under the HUD arrangements. This "premium", however, may be offset by the increased insurance or origination fees that are charged by the private institution.

3. *Uninsured Plans:* The uninsured plan stands in stark contrast to the aforementioned insured arrangements. Under this type of instrument the borrower is given monthly loan advances for a *fixed term* only. Although interest is set at a fixed rate, and no mortgage insurance premium is required, when the disbursements cease, the balance becomes due and payable. Thus, if the borrower is unable to repay the loan from external sources, he or she will be required to sell the home and move.

#### Advantages and Disadvantages of REMs:

Although, currently eagerly marketed by the banking industry, the private sector has not been convinced of the absolute value of the debt instrument. Personal investment and retirement publications are generally split on their support for the REM.<sup>45</sup> Therefore, a brief analysis of the general advantages and disadvantages of the program is warranted.

##### Advantages:

1. The borrower retains title to the property. Therefore, under all plans, except uninsured term-plans, the homeowner may maintain possession of the residence until death or voluntary disposal.
2. The proceeds of the loan can be used for any purpose, including satisfying housing expenses such as taxes, insurance, and fuel, or general living expenses, such as food and health care.
3. The loan advances are a return of equity and not income, accordingly the event is non-taxable. Thus, the inflow of funds will not have an adverse effect on the receipt of other supplemental programs such as Medicare or social security.<sup>46</sup>

##### Disadvantages:

1. Because title to the property is retained by the homeowner, the borrower is responsible for the taxes, repairs and maintenance of the residence. Although the property related expenses will likely increase, the monthly payment will remain static.
2. The liquidation of the property interest will presumably diminish the estate of the borrowers, and accordingly the eventual distribution to their heirs.
3. The interest on the obligation is not deductible until the loan is satisfied in full.
4. As in a traditional forward mortgage, several fees arise during the origination of the REM. Lenders charge an *origination fee* for arranging the mortgage. These fees are generally expressed as a percentage of the home's value or the amount of equity being mortgaged.<sup>47</sup> Insured lenders also charge risk premiums from 2% to 7% of the house's value. Like points on a traditional mortgage, the premiums are charged upon origination.<sup>48</sup> Some lenders also charge a monthly insurance premium to the borrower to cover *risk-related* costs. In addition to the fees charged by the lending institution, the borrower must also account for other third party costs associated with a transfer of residential real property. For example, the homeowner is responsible for appraisals, title search and insurance, inspections, recording fees, servicing fees, and any other profes-

sional costs such as accountants and attorneys fees. Most lending institutions will arrange to have these fees added to the balance of the obligation. However, although they do not represent out of pocket expenditures for the borrower, they do serve to decrease the monthly payment to the homeowner.

- Under all obligations interest is charged. Therefore, although the borrower or his estate will eventually receive a tax deduction for the interest incurred under the arrangement, the resultant monthly payment is lessened by the interest charged. Thus, there is a cost of liquidating the property that would not be realized if the property were sold outright.

As previously noted, financial planners are split as to the relative applicability and merit of the reverse equity mortgage. Some general recommendations can be made however. Uninsured REMs (term mortgages) may be useful to secure interim resources until the homeowner is eligible for pension or social security benefits. However, this type of arrangement is not suitable for those who desire to remain in their homes. Under insured programs, those who outlive their actuarially predetermined life expectancy will benefit. Accordingly, those who predecease or otherwise vacate or dispose of the property prior to the attainment of the targeted life span estimate are unlikely to realize the full value of their asset. The latter situation is a result of the high costs of origination, which places a disproportional amount of debt service in the initial period. (See Table 4 and 5)

**House Rich-Cash Poor:**

The proponents of REMs have envisioned a populace of "house rich-cash poor" elderly citizens. However, upon closer examination, this is not truly reflective of the reality of the aged. Most low-income elderly have very little housing wealth.

Monthly Household Income:	Average Home Equity
Less than \$900	\$37,834
\$900-\$1,999	42,174
\$2,000-\$3,999	48,267
\$4,000 and over	82,535

Source: U.S. Bureau of Census 1984<sup>49</sup>

One can see that housing wealth and income are directly related. Further, Social Security and pension benefits are by far the most important components of wealth for most elderly. The median SS and pension wealth for households with heads in the 65-70 range is \$113.4 thousand (present value) while the median liquid wealth is \$10.0 thousand and the median housing wealth is only \$38.0 thousand.<sup>50</sup> Thus the examples of REM distributions (Table 4), which were based on \$100,000 of housing equity is not reflective of the property wealth of the vast majority of elderly homeowners. Accordingly, the monthly advances are unlikely to significantly improve the standard of living for the low-income, low housing equity elderly (See Table 6).

The demand for REMs has been limited. This may be the result of the public's perception that the mortgages are too costly (fees and interest). As noted above, it may likely be the result that families that have low incomes from other sources, also have low housing equity.<sup>51</sup> Or, it may be that seniors are understandably reluctant to touch the equity nest eggs they have taken their entire lives to build. Regardless of the cause, REMs have been met with little public support, as evidenced by only 12,000 HECMs being originated since 1987.<sup>52</sup> Therefore, as with the public sector's response, the efficacy of the private sector's implementation of REMs to address the problems inherent in the property tax system ability to assess one's ability to pay, is also questionable. The reality is that most low-income

elderly have very little housing wealth. Accordingly, those who are most likely in need of income support do not have the equity to liquidate.

**Section V. Implications for Policy Makers**

Targeted tax relief has converted the property tax system from one that assesses ability-to-pay based on a measure of wealth, to one that measures this ability based upon a hybrid of income and wealth. The result is that both homestead exemptions and circuit breakers create horizontal inequities. That is, eligible and ineligible taxpayers, with comparable holdings, are not treated equally. This result, however, is well hidden in the inherent complexities of, and interactions between, the various taxing mechanisms. Circuit breakers and homestead exemptions are not directly subtracted from the tax bill. Accordingly, most taxpayers fail to see the connection between the relief mechanism and the reduction of the property tax liability for a given homeowner. Further, since the relief is granted on the state level, local units are often unable to derive the overall effect the mechanisms have on their community, namely ineligible taxpayers. Should states get out of the business of targeted tax relief? The answer relies on one's perception of the role of state governments in the redistribution of resources and an assessment of their efficacy in doing so.

Although much has been written regarding the redistribution of wealth from both an economic and moral perspective, it soon becomes evident that the issue is largely encouched in one's personal view point. If one favors distributional policies, targeted tax relief mechanisms have been somewhat effective in increasing income equality.<sup>53</sup> If, however, one does not support the implementation of such programs, the avenue of legislative repeal may prove a troublesome course. For example, some political theorists allege that the complexity of the existing system of taxation is the result of "support maximizing politicians", who attempt to provide tax benefits to easily identifiable interest groups without generating significant opposition from other groups.<sup>54</sup> Accordingly, although the average ineligible property taxpayer is unaware of the existence of property tax relief mechanisms and their impact on his or her personal assessment, the removal of such benefits would likely be met with the affected party's political resistance.

In contrast to the targeted tax relief granted to eligible property owners through homestead exemptions and circuit breakers, the creation of REMs appeared to be a viable means to unlock residential equity, and as a result increase income, for the elderly taxpayer. However, as evidenced, this vehicle has not only failed to be embraced by the public, but also falls short in its attempt to adequately address the needs of the low-income elderly. Thus, currently, both the public and private sectors have been unable adequately address the inability of the property tax system to accurately assess one's ability to pay.

The use of the property tax to fund our public schools was once revered as the cornerstone of the American system of education. However, in a wave of education finance reform that attempts to balance equity in per pupil funding, through an expansion of the tax base, with local control, the use of the property tax to secure revenues has increasingly been subject to closer scrutiny. The above discourse served to provide education policy makers with an additional perspective, that of the taxpayer, in assessing the efficacy of the utilization of the property tax to fund our public schools. Accordingly, policy makers should not limit their analyses solely to examinations of equity issues with regard to students, but also, equity as it relates to taxpayers. As evidenced, both the public and private sectors have failed in their response to the property tax system's inability to accurately measure one's ability to pay. Therefore, if the property tax is to continue to serve as the primary source of local revenues, additional corrective measures must be employed to mitigate



the taxpayer inequities that result under the current system. If such measures are unable to be devised, or implemented, public school systems must then look to alternative sources of revenues to secure support for their operations.

References

1. See "Property Taxation", *National Education Association*, Washington D.C., Research Division, 1985.
2. Although the percentage of local contribution varies among states, with the exception of Hawaii, all states rely on local sources to fund their public school system (See Table 1).
3. The 1490 dependent school systems represent 9.2% of all identified districts.
4. It should be noted, that the classification of a district as dependent or independent will be determined by how one defines "fiscal independence", a definition for which there is no agreed upon meaning. Accordingly, the number of independent versus dependent districts, as reported by the U.S. Bureau of Census, the American Education Finance Association, and the School Finance Collaborative, will generally differ. Although the classification of districts is meaningful to the discourse at hand, a detailed examination of the nuances of the divergent definitions is unwarranted.
5. The notion of independence must be viewed in light of the many restraints that have been placed on the districts' power to raise local revenues. Among these "checks" on the fiscal autonomy of independent local school districts, are state constitutional and statutory provisions that limit tax rates and spending levels, and local referenda which exercise voter control over school taxing and spending decisions.
6. U.S. Advisory Commission on Intergovernmental Relations, *The Structure of State Aid to Elementary and Secondary Education*, (1990) : 15.
7. Ibid.
8. U.S. Department of Commerce, Bureau of the Census, GF-89-5. (February, 1991) Government Finances: 1988-89, Table 2.
9. U.S. Advisory Commission on Intergovernmental Relations, p. 16.
10. National Education Association, p. 14.
11. See Louis Eisenstein, *The Ideologies of Taxation* (New York: The Ronald Press Company, 1961), pp. 26-27.
12. See Richard A. Musgrave and Peggy Musgrave, *Public Finance in Theory and Practice* (New York: McGraw-Hill Book Company, 1984) p. 229.
13. Taxing mechanisms such as fees, user charges, and tolls attempt to apply the benefit principle to those who consume a public good.
14. Exempt realty includes qualified religious, educational, and charitable properties, and property utilized for federal, state, or local governmental operations.
15. Net worth is defined as assets less liabilities. In the financial community it is used as a measure to assess an individual's or entity's financial well being. For example, individuals are required to provide statements of net worth when seeking loans. Additionally, the analysis of balance sheets, a formal statement of net worth for commercial enterprises, is a central endeavor to players in securities markets.
16. Several states do assess taxes on personal and intangible property in addition to real property. Due to the apparent difficulties in administration of the tax, however, the amount of revenue raised by this type of property is negligible compared to that of real property.
17. Discourse espousing the shortcomings of the property tax system are replete with assertions that allege the property tax is regressive. See Frank Ambrosie, "The Importance of Property Taxes to the Future of School Finance," *Journal of Education Finance* 49 (June 1983): 44, 62-63.
18. See Henry J. Aaron, *Who Pays The Property Tax? A New View*. (Washington, D.C.: Brookings Institute, 1978).
19. See Steven D. Gold "Preventing a Property Tax Uprising in the 1990s: Matching Policies with Problems," *Property Tax Journal* 9 (December 1990) : 277-289.
20. See Richard G. Salmon, "State/Local Fiscal Support of Public Elementary and Secondary Education: A Look Backward and Prospects for the Future," *Journal of Education Finance* 12 (Spring 1987) : 549-60.
21. See John Augenblick, "The Importance of Property Taxes to the Future of School Finance", *Journal of Education Finance*, 9 (Winter 1984) : 384-393.
22. See Helen F. Ladd and Julie Boatwright Wilson, "Education and Tax Limitations: Evidence from Massachusetts," *Journal of Education Finance* 10 (Winter 1985): 281-296.
23. Gold, p. 821.
24. It should be noted that where renters are eligible, their property tax liability will be presumed to be some percentage of rent.
25. Many states employ both types of targeted tax relief. Several, however, structure the programs to allow reductions in taxes based upon only one mechanism. That is, double benefits can not be received because a taxpayer qualifies for both forms of credits.
26. Henry J. Aaron and Michael J. Boskin, *The Economics of Taxation* (Washington D.C.: The Brookings Institute, 1980) : 74-75.
27. See Joseph A. Pechman, *Federal Tax Policy* (Washington D.C.: The Brookings Institute, 1983): 266.
28. A close examination of Table 3 reveals that 23 states have circuit breakers, and 15 states have homestead credits, exclusively for elderly homeowners. However, the advantages granted to elderly taxpayers may in fact be more expansive than represented. That is, although several states offer circuit breakers and homestead credits to all-homeowners, preferential treatment is additionally given to the aged. For example, the New York State circuit breaker (outlined above) is listed per Appendix 1 as applying to all homeowners. However, if we re-examine the law, one can see that an additional preference is granted to persons 65 or older. Thus, although targeted tax relief mechanisms do aid non-elderly low-income households, the majority of the programs focus on reducing the property tax burden of the aged homeowner.
29. One must recall that targeted tax relief does not generally exempt an individual from the entire property tax obligation. Rather it provides a credit through the state income taxing instrument based on an inverse sliding scale between property tax paid and income.
30. See William Sullivan, "Sale Leaseback as Elder Care Vehicles," *Small Business Reports* 14 (January 1989) : 91-93.
31. See Paul Muolo, "Are Reverses Set to Advance?," *Unites States Banker* 103 (May 1993) : 28-30.
32. See Arthur B. Axelson and Cheryl S. Moliken, "A Roadmap for HECMs," *Mortgage Banking* 52 (February 1992): 53-60.
33. Also called home equity conversion mortgage (HECM). The potential HECM market is presently comprised of approximately 11 million senior citizens, this figure is expected to increase as the "graying" U.S. population continues. See Axelson and Moliken, p. 54.

34. Muolo, p. 28.
35. Between 1961 and 1991 only about 152,000 REMs have been written, and 90% of those have been made by state and local governments so the elderly can have enough cash to repair their homes. See Lew Sichelman, "A Tough Sell," *Mortgage Banking* 52 (November 1991) : 22-26.
36. Home Equity Conversion Mortgage Insurance Demonstration, 12 U.S.C. 1715z-20 et seq. (Supp. V 1988), 417 of the Housing and Community Development Act of 1987, Pub. L. No. 100-242, 101 Stat. 1815 (1988).
37. Although Freddie Mac has announced its participation in the HECM program, and has promulgated guidelines for the purchasing of HECM loans, it has not yet done so. Axelson and Moliken, p. 54.
38. 12 U.S.C. 1715z-20.
39. 12 U.S.C. 1709
40. Presently, only adjustable rate loans have been originated, due to the fact that Fannie Mae will only purchase this type of HECM (Axelson, 53).
41. The intricacies of the HUD definitions and requirements are beyond the scope of this paper. For additional information concerning the program see the HUD HECM Handbook.
42. The MIPs, which are comprised of an initial 2 percent at closing and .5 percent monthly, are added to the borrower's outstanding balance. Thus it is the borrower who is responsible for the premiums payment.
43. Provided the borrower chooses either a tenure or line of credit program, they can remain in the home until he or she dies, moves, or sells. If the property is sold, he or she may retain any of the proceeds remaining after paying off the mortgage (53 Fed. Reg. 43168 (October 25, 1988)).
44. This plan further protects the borrower by guaranteeing that the loan advances (payments) will continue to be provided even in the event the lender defaults on the obligation.
45. See Walter Updegrave, "Cashing in on your Big Blue Chip," *Money* 18 (Fall 1989) : 83-88; William Sullivan, "Housing Strategies for Your Elderly Parent," *Supervisory Management* 34 (January 1989) : 32-34; Denise M. Topolnicki, "Reverse Mortgages an Idea Whose Time is Finally Coming," *Money* 18 (March 1989) : 169-170; Clint Willis, "How to Retire on Your House," *Money* 17 (May 1988) : 117-118; Joan E. Fairbanks, "HECM Programs: A Housing Option for the "House-Rich, Cash-Poor" Elderly," (Summer 1989) : 481-487; Richard L. Kaplan "Tapping the Equity of Older Homeowners with Reverse Mortgages," *Journal of Accountancy*, 175 (February 1993) : 36-39.
46. Social Security Administration Program Circular No. 09-84-OSSI (Aug. 1, 1984). See also Kaplan, p. 37-39.
47. (e.g.—2% x assessed valuation)
48. Updegrave, p. 88.
49. Adapted from Pat Allen, "Do Seniors Get the Royal Treatment?," *Savings Institutions* 112 (April 1991) : 18-23.
50. Steven F. Venti and David A. Wise, "Aging and the Income value of Housing Wealth," *Journal of Public Economics* 44 (1991) : 371-397.
51. Venti and Wise, p. 372.
52. Muolo, p. 28.
53. See Kathy Hayes and Daniel J. Slottjie, "The Efficacy of State and Local Governments' Redistributive Policies," *Public Finance Quarterly* 17 (July 1989) : 302-322.
54. See Pamela H. Moomau and Rebecca B. Morton, "Revealed Preferences for Property Taxes: An Empirical Study of Perceived tax Incidence," *The Review of Economics and Statistics* (1992) : 176-179.

**Table 1. Source of Origin of School District Revenues**

Location	1969-70			1979-80			1986-88		
	Federal	State	Local	Federal %	State	Local	Federal	State	Local
U.S.	7.2	40.9	51.8	9.2	48.9	41.9	6.4	49.8	43.9
Alabama	15.2	63.3	21.5	12.6	69	18.4	11.7	66.3	22
Alaska	27.1	53.3	19.6	13	70.2	16.9	11.7	63.7	24.7
Arizona	8.2	46.4	45.4	11.1	41.6	47.3	9	48.3	42.7
Arkansas	18.2	44.5	37.3	14.5	53	32.5	11.5	54.8	33.7
California	5.3	37.3	57.4	8.7	71.2	19.1	7.1	69.5	23.5
Colorado	7.6	27.8	64.5	6.1	41	52.9	4.9	39	56.1
Connecticut	2.1	25.2	72.8	6.1	31.5	62.5	4.4	40	55.6
Delaware	7.4	71.3	21.3	13	64.7	22.3	7.7	69.2	23.1
D.C.	30.2	N/A	69.8	15.8	N/A	84.2	10.3	N/A	89.7
Florida	9.5	55.7	34.8	11	55.2	33.7	7.2	54.2	38.6
Georgia	10.5	58.3	31.1	11.8	57.6	30.6	7.1	59.7	33.2
Hawaii	9.7	87.2	3.2	12.5	85.2	2.4	11.8	88.1	0.1
Idaho	8.4	37.8	53.8	9.5	55	35.5	8.9	62.8	28.3
Illinois	5.7	34.6	59.5	12.8	41.2	46	4.3	39.1	56.5
Indiana	6.8	39.4	53.8	6.9	56.1	37	4.9	58.1	37
Iowa	3.6	28	68.4	6.7	42.2	51	5.1	44.5	50.4
Kansas	5.9	31.2	62.9	6.9	43.3	49.8	4.8	42.4	52.8
Kentucky	13.6	56.2	30.2	12.5	69.7	17.8	11.6	64.5	23.8
Louisiana	11.9	56.4	31.7	14.8	54.4	30.8	11.5	55.1	33.4
Maine	6.7	32.5	60.8	9.6	48.9	41.5	6.4	50.2	43.4
Maryland	6.4	35.2	58.4	8	40.2	51.8	5.1	58.5	56.4
Massachusetts	6	20	74	6.5	36.3	57.2	4.9	45.1	50
Michigan	3.9	45.1	51	7.4	42.7	49.9	5.9	34.9	59.3
Minnesota	5.3	46	37.3	6.1	56.6	37.3	4.2	56.9	38.8
Mississippi	21.4	53.1	22.8	24.1	53.1	22.8	10.5	65.2	24.3
Missouri	7.9	33.7	58.4	9.7	36.7	53.6	6.3	41.2	52.5
Montana	8.5	25.4	66.2	8.4	49.3	42.2	8.5	47.8	43.7
Nebraska	6.4	17.6	76	7.9	18.2	73.9	6.1	22.5	71.3
Nevada	8.8	36.5	54.7	8.6	58.5	32.9	4.4	39.5	56
New Hampshire	5.1	8.3	86.7	5.1	6.8	88.1	3.4	5.9	90.7
New Jersey	5.4	27	67.6	4.1	40.4	55.5	4.4	43	52.5
New Mexico	17.7	61.9	20.4	16.6	63.4	20	12.2	75.1	12.7
New York	4.7	46.4	48.9	5	40.6	54.4	4.8	42.4	52.8
North Carolina	15.6	65.7	18.7	15.2	62.4	22.3	7.9	66	26
North Dakota	9.3	25.7	65	7.7	46.5	45.7	9.4	50.8	39.8
Ohio	5	28.3	66.7	7.7	40.6	51.6	5.5	49.6	44.8
Oklahoma	11.8	43.8	44.4	11.8	43.8	44.4	5.6	63.5	30.9
Oregon	6	20.8	73.2	9.9	35.5	54.6	6.6	28246	65.4
Pennsylvania	6.2	46.2	47.6	8.5	45	46.5	5.1	46.3	48.6
Rhode Island	5.9	38.8	55.4	5.9	38.8	55.4	4.5	42.6	52.9
South Carolina	14	59.5	26.4	14.9	56.8	28.3	8.9	56	35.1
South Dakota	11.7	13.1	75.2	13.9	20.8	65.3	11.8	27.2	61
Tennessee	11.9	48	40.1	14	48.3	37.7	11.1	44.5	44.4
Texas	9.3	46.4	44.3	11	50.1	38.9	7.1	47.1	45.8
Utah	7.6	52.8	38.2	7.8	54	38.2	6.1	54.4	39.6
Vermont	2.9	37.1	60	7.7	28	64.2	5.1	34.4	60.6
Virginia	11.1	36.4	52.5	9.5	40.9	49.6	6.7	32.9	60.3
Washington	6.6	56.6	36.8	8.6	70.8	20.6	6.3	72.4	21.3
West Virginia	12.4	48.2	39.4	10.6	60.1	29.3	7.5	69.8	22.7
Wisconsin	2.5	31.6	65.9	5.5	37.6	56.8	4.7	34.5	60.8
Wyoming	20.2	24.8	55	6.6	29.6	63.8	3.7	43	53.3

Source: Advisory Commission on Intergovernmental Relations, Significant Features of Fiscal Federalism, 1988 edition, Volume II (Washington, D.C., 1988), Table 56; and U.S. Department of Education, National Center for Education Statistics, Digest of Education Statistics 1989 (Washington, D.C., 1989), Table 139.

**Table 2. Number of Fiscally Dependent and Independent School Districts**

	Independent	Dependent		Independent	Dependent
Alabama	129		Nebraska	952	
Alaska		55	Nevada	17	
Arizona	227	12	New Hampshire	160	9
Arkansas	333		New Jersey	551	71
California	1098	53	New Mexico	88	
Colorado	180		New York	720	35
Connecticut	16	149	North Carolina		198
Delaware	19		North Dakota	310	
Florida	95		Ohio	621	
Georgia	186		Oklahoma	636	
Hawaii		1	Oregon	350	
Idaho	118		Pennsylvania	515	
Illinois	1029		Rhode Island	3	37
Indiana	304		South Carolina	92	
Iowa	451		South Dakota	193	
Kansas	324		Tennessee	14	128
Kentucky	178		Texas	1113	
Louisiana	66		Utah	40	
Maine	88	194	Vermont	272	
Maryland		41	Virginia		140
Massachusetts	82	354	Washington	297	
Michigan	590		West Virginia	55	
Minnesota	441		Wisconsin	433	9
Mississippi	171	4	Wyoming	56	
Missouri	561				
Montana	547				

Source: U.S. Department of Commerce, Bureau of Census, Government Organization, 1987 Census of Governments, Volume 1, Number 1 (Washington, D.C., 1989), p. xii.

**Table 3. Property Tax Relief Mechanisms**

States	Circuit Breakers	Homestead Exemption or Credit	States	Circuit Breakers	Homestead Exemption or Credit
Alabama			Montana	EHR	DV, LI
Alaska		EHR, W	Nebraska		D, DV, EH
Arizona	AR, EH		Nevada	EHR	B, DV, O, V, W
Arkansas	EH		New Hampshire		B, DV, E
California	EHR	AH, DV	New Jersey		AH, D, DV, E
Colorado	DHR, EHR	LIED	New Mexico	EHR	AH, V
Connecticut	EHR	D, DV	New York	AHR	
D.C.	EHR	AH	North Carolina		DV, LIE, D
Delaware		E, LI	North Dakota	DHR, EHR	B, E, D
Florida		AH	Ohio	D, EH	AH
Georgia		AH, LIE, V	Oklahoma	D, EH	AH, V
Hawaii	AR	AHR, D, DV, E	Oregon	AHR	DV
Idaho	D, EH	AH	Pennsylvania	D, EHR	B, D, DV
Illinois	D, EHR	AH, EV, V	Rhode Island	EHR	
Indiana		AH, DV, LIE	South Carolina		B, D, DV, E
Iowa	DHR, EHR	AH, DV	South Dakota	DHR, EHR	
Kansas	B, D, EHR		Tennessee		DV, EDH
Kentucky		E, D	Texas		AH, D, EH
Louisiana		AH	Utah	EHR	B
Maine	AHR	B, V	Vermont	AHR	V
Maryland	AH, D, ER	B, DV	Virginia		D, EH
Massachusetts		AH, EV, LI	Washington		LIED
Michigan	AHR	DV	West Virginia	EHR	D, E
Minnesota	AHR	AH	Wisconsin	AHR	
Mississippi		AH, D, EH	Wyoming	D, EHR	
Missouri	EHR				

**KEY:**

AHR All Homeowners and Renters  
 AH All Homeowners  
 AR All Renters  
 B Blind  
 D Disabled Homeowners  
 DV Disabled Veterans  
 DHR Disabled Homeowner/Renter  
 E Elderly  
 EDH Elderly Disabled Homeowners  
 EH Elderly Homeowners  
 EHR Elderly Homeowner/Renter

ER Elderly Renters  
 EV Elderly Veterans  
 LI Low-Income  
 LIE Low-Income Elderly  
 LIED Low-Income Elderly Disabled  
 O Orphans  
 V Veteran Homesteaders  
 W Widows or Widowers  
 AV Assessed Valuation  
 NA Not Available

Adapted from: Robert D. Ebel and James Orthal, "Direct Residential Property Tax Relief," *Intergovernmental Perspective* 15 (Spring 1989): 9-14.

**Table 4. Scheduled Monthly Payments Under the Various Options:**

These tables show the estimated monthly payments that an owner of a \$100,000 house would receive under different types of reverse mortgages. In these examples, 10% interest is charged on all but the shared-appreciation loan, which charge 8.5%. The lower interest rate allows the lender to claim up to 25% of the home's appreciation.

## FHA Insured Plan

Age	Tenure	Tenure Shared-Appreciation	Five Year Term	Ten Year Term
65	\$207.00	\$249.00	\$496.00	\$312.00
75	\$347.00	\$381.00	\$790.00	\$496.00
85	\$599.00	\$623.00	\$1,166.00	\$731.00

## Lender Insured Plan: Capital Holding Inc.

75	\$450.00	N/A	N/A	N/A
85	\$747.00	N/A	N/A	N/A

## Uninsured Private Loan:

All Ages		\$1,025.00	\$387.00
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\*Source: Ken Scholen, *Retirement Income on the House* (Marshall, NCHC Press, 1997), pp. 157, 252.

N/A—not available

**Table 5. Loan Programs**

	Uninsured REM	FHA-Insured REM	Lender Insured REM
Offered by	Private Lenders in AZ, CA, CT, MA, MN, NJ, NY	Private lenders in 32 states at 6/91; approx. 10,000 lenders are eligible.	Capital Holding in CA, FL, KY, MD, VA, IL; other plans currently being developed.
Loan Advance Types	Monthly for a fixed term; optional lump sum	monthly tenure or term; stand-alone or optional credit-line or lump sum.	monthly tenure or term; stand-alone or optional credit-line or lump sum.
Repayment Requirement	when loan advance stops	at death, sale or permanent move.	at death, sale or permanent move.
Start Up Costs	closing costs, origination fees	closing costs, origination fees, insurance	closing costs, origination fees, insurance
Interest	market rate fixed	market rate; fixed or adjustable	market rate; adjustable

Source: Adapted from Ken Scholen, *Retirement Income on the House* (Marshall, NCHC Press), pp. 285–286.

**Table 6. Aging, Income and Housing Wealth**

Income Interval		Age				
		60–65	65–70	70–75	75–80	85+
1	REM Payment*	\$1,130	\$1,401	\$1,898	\$2,780	\$4,106
	Income*	\$10,959	\$9,234	\$6,990	\$5,916	\$4,434
	Housing Equity	\$43,000	\$37,000	\$35,000	\$32,750	\$31,000
2	REM Payment	\$1,335	\$1,515	\$2,110	\$3,005	\$4,887
	Income	\$23,553	\$18,495	\$14,880	\$12,648	\$9,612
	Housing Equity	\$50,250	\$49,500	\$48,800	\$45,000	\$40,000
3	REM Payment	\$1,549	\$1,902	\$2,800	\$3,631	\$5,175
	Income	\$45,246	\$34,491	\$29,586	\$27,384	\$22,710
	Housing Equity	\$68,960	\$62,000	\$65,000	\$60,000	\$45,000

Source: Steven F. Venti and David A Wise, "Aging and the Income Value of Housing Wealth," *Journal of Public Economics* 44 (1991):371–397.

Note: Income and Housing Equity—Adapted from U.S. Bureau of Census Data 1984

Authors did not disclose REM source data.

All REM and Income figures annualized.

For some, Senate Bill 1 was a bold and courageous move that held hope not only of breaking the twenty year legislative impasse on school finance reform, but also of providing a once-in-a-lifetime opportunity to reform public education. For others, it was a totally irresponsible act, the most stupid thing the Legislature had done in twenty years.

# THE DARK (OR THE LIGHT) SIDE OF THE MOON? Michigan's Elimination of the Local Property Tax

by C. Philip Kearney

In late July of this year, in lightning-like fashion, the Michigan Legislature eliminated entirely the local property tax as a source of operating revenue for the public schools. The public school establishment awakened on the morning of July 22, 1993 to find, as a result of the Legislature's adoption of Senate Bill 1, fully two-thirds of its operating revenues wiped out and no immediate prospects for how that revenue was to be replaced. The Legislature not only had thrown out the local property tax as a source of school funding, it had done so without making any provision whatsoever for replacing the \$6.5 billion lost as a consequence of its action. Michigan literally had departed from the fold, becoming the only state in the nation other than Hawaii that apparently would not be looking to the local property tax as a major source of school operating revenues. The Michigan Legislature, by any measure, had taken a giant step into the unknown.

For some, it was a bold and courageous move that held hope not only of breaking the twenty year legislative impasse on school finance reform but also of providing a "once-in-a-lifetime" opportunity to reform public education. As Governor John Engler noted at the time of Legislature's action, citizens will soon see "stunning improvements" in public education as a

consequence of this daring stroke—a journey, if you will, to the light side of the moon. For others, it was a totally irresponsible act, the "most stupid thing the Legislature had done in twenty years."<sup>1</sup> As one long-time political observer from another state put it, "The Michigan Legislature has attained heights of irresponsibility hitherto attained only by the supreme court of the state of Texas."<sup>2</sup> For him, and others, it was a journey to the dark side of the moon.

How did Michigan come to this? Where will it lead? Will Michigan end up with a system that is fully state-funded, that depends not at all on the local property tax as a revenue source? Will the Governor be successful in his bid to turn to the sales tax as the major source of replacement funds? Or will he and the Senate Republicans compromise with a bipartisan House and look to an increase in the state income tax, and a restoration of the local property tax (at a much reduced rate), should the sales tax fail to receive voter approval?<sup>3</sup> Will Michigan citizens actually see "stunning improvements" in public education? Will the Governor be successful in establishing schools of choice and charter public schools as the centerpiece of his reform program? Or will the educational establishment, and particularly the powerful teachers' union, the Michigan Education Association (MEA), be successful in thwarting that effort? Will citizens see, in the long run, little substantive restructuring and change in public education in Michigan? Or will they witness a new, different, more effective and more efficient system of public schooling?

We turn first to the initial question raised, namely, how did Michigan come to this? What led up to the fateful July decision? To fully understand how this came about, we need first to comment on the fiscal situation that faced the state in mid-1993, and then retrospectively to examine the history of past legislative actions and inactions—and the consequences for Michigan taxpayers and pupils. Equally important is a review of the spate of reform efforts that followed the 1990 gubernatorial elections and the ascent of John Engler to the Governor's Office, and which eventually culminated in mid-July 1993 in the passage of Senate Bill 1.

## The Fiscal Situation

Two major fiscal problems continue to plague the State of Michigan. The first is that Michigan is no longer a relatively wealthy state, yet public spending has continued at relatively high levels. This, in turn, has resulted in state government operating with a permanent budget deficit on the order of ten percent of normal state spending.<sup>4</sup> The second problem, which flows from the first, is that Michigan citizens in mid-1993 were faced with a higher than average tax burden compounded in turn by a substantial imbalance among the three major sources of tax revenues. The property tax was over utilized, the sales tax was under utilized, and individual and corporate income taxes were substantially higher on a per capita basis than the U.S. average.

## The State's Failure to Fund Public K-12 Education

The major reason for the heavy reliance on the property tax has been the state's failure to assume its share of the responsibility for funding public K-12 education. There is today a strong feeling in Michigan, initially articulated some years ago in the formation of a coalition of educational organizations under the banner of "Equal Partners," that state government at the least ought to match dollar for dollar local school property tax revenues in the aggregate. In 1992, this feeling was given voice in the "50/50 Plus the Lottery" slogan that was the driving force behind a statutory initiative petition campaign aimed at property tax reduction and school finance reform.<sup>5</sup> The "50/50 Plus the Lottery" supporters contended that the state's K-12 funding responsibility was to provide annually state revenue equal to

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50 percent of local revenue, plus additional revenue equal to the net proceeds of the state lottery. This contention rested on three premises.

First, twenty-five years ago in 1966–67, the local-state ratio was 50/50.<sup>6</sup> Since that time the state's share had declined to its present level of some 30 percent. Second, 50/50 is the local-state ratio across the nation, i.e., on the average state governments are matching local sources in covering the costs of public K–12 education.<sup>7</sup> This 50/50 ratio is the consequence of a long-term trend across the United States that has seen state governments increasingly assume a larger share of the costs. Michigan is an anomaly in this respect, running counter to the trend. In only four states—Nebraska, New Hampshire, Oregon, and South Dakota—does the state contribute a smaller share.<sup>8</sup> Third, in the early 1970's, when the Michigan legislature adopted the state lottery, the promise was made to the citizens of Michigan that the net proceeds of the lottery would go to improve and enhance public K–12 education, to supplement the state dollars that already were going to the schools. While the net proceeds of the lottery by statute do go to the schools, these dollars do not represent a supplement to state school aid. Rather they supplant state dollars previously provided. In effect, the legislature has been involved in a "shell game;" to the degree that lottery proceeds were funnelled into the school aid fund, a like amount of state general-fund/general-purpose dollars was pulled out of the fund.

### The Consequences For Taxpayers

Michigan's heavy reliance on the local property tax as the major source of K–12 funding has driven school property tax rates sky-high in many districts, while in other districts taxpayers enjoy relatively low rates. In the latter case, the literal explosion of assessed residential property values that began in the late 1980's and carried through the 1990's is the major contributor to the relatively low rates yet high yields. At the extremes, in the 1992–93 fiscal year the Bridgman school district was levying only 8 mills for operations and generating \$6,351 per pupil, while the Wayne–Westland district levied 47 mills and generated \$4,879 per pupil—a disparity or range of some 39 mills and \$1,472 per pupil. Even if one excludes the extremes, taking the districts at the 5th and 95th percentiles, the range in levied mills still is large—from 22 mills to 42 mills.<sup>9</sup> And the disparities over time have been increasing rather than decreasing. In 1976–77, the range was 31.2 mills—the highest district was levying 39.6 mills and the lowest 8.4 mills. By 1988–89, the range had increased to 41.8 mills—the highest district was levying 48.2 mills, the lowest 6.4 mills. When we discount the extremes and look only at the restricted range, the differences don't appear quite as excessive as an examination of Table 1 will reveal. In 1976–77, the restricted range was 13.7 mills. The district at the 95th percentile was levying 35.7 mills; the district at the 5th percentile, 22.0 mills. However, in the next three years the spread increased to 16 mills but then, through the remainder of the period, tended to level off bouncing back and forth between 15 and 16 mills.

Thus, we might conclude that the restricted range has tended to stabilize over the last nine years of the period. However, we temper this finding with the finding that, over the full thirteen year period, the range has increased by almost two mills. In terms of horizontal equity as measured by the restricted range, sizable differences in operational millage rates do exist and over the full period these differences have increased by almost two mills—or some 13 percent.

Some will argue, and rightly so, that the Michigan school aid formula was not designed to produce identical operational millage rates. On the contrary, it leaves the choice of millage rates to the voters in local school districts. In theory, those who choose to levy higher millages, should realize higher revenue levels. Thus, we might well expect to see differences in millage rates. Still one might ask two questions. First, should we be willing to accept a restricted range as great as 15 mills (or some 41 mills if we use the range)? Second, do higher millages in fact result in higher revenues per pupil? The first question depends on one's values or preferences for what should be or not be.

To answer the second question, we need to bring into play, in addition to *levied mills*, *local + state membership aid* as a second variable or equity object.<sup>10</sup> Since we were interested in the nature of the relationship between the two, we chose to use the *correlation coefficient* as the equity measure. However, in contrast to examining equity for pupils (which we address below), we were not interested in this instance in finding no relationship or a diminishing relationship over time between the two variables. Rather, we wanted to know if there was a positive relationship, i.e., for the state as whole, as *levied mills* increase does *local + state membership aid* also increase? Thus, we were looking for relatively high correlations as well as an increase in the correlation coefficients over time.

In examining the data in Table 2, we find that in 1976–77 the correlation coefficient was quite high, 0.77, indicating a strong positive relationship between *levied mills* and *local + state aid membership per pupil*. Very definitely, as a district levied higher millages higher revenues per pupil were a result. Across the state, 59 percent of the differences among districts in *local + state aid per pupil* was accounted for by the differences in *levied mills*.<sup>11</sup> One might conclude that the power equalizing formula was working reasonably well, i.e., the more mills a district levied, the more revenue per pupil it was able to generate.

However, in the following year the correlation coefficient decreased and, after a slight bounce back in 1978–79, it generally decreased quite rapidly over the next ten years. It reached its low point of 0.05 in the final year of the period, 1988–89. Less than 1 percent of the differences in *local + state membership aid per pupil* were accounted for by differences among districts in *levied mills*.<sup>12</sup> Put another way, in 1988–89 factors other than *levied mills* accounted for 99 percent of the differences in *local + state membership aid per pupil*. Assuming that higher millages should be accompanied by higher revenues, equity for taxpayers has been seriously eroded in Michigan over the past several years. Higher millage districts in general have not en-

Table 1. Levied Mills—Restricted Range

Year	76–77	77–78	78–79	79–80	80–81	81–82	82–83	83–84	84–85	85–86	86–87	87–88	88–89
Restricted Range	13.70	14.00	13.99	16.02	15.81	15.86	15.00	15.26	15.90	15.37	15.01	15.77	15.45
5th Percentile	22.00	22.65	22.77	22.34	22.56	23.54	24.10	24.50	24.75	25.53	26.00	26.13	26.55
95th Percentile	35.70	36.65	36.76	38.35	38.38	39.40	39.10	39.76	40.65	40.90	41.01	41.90	42.00

Table 2. Levied Mills—Correlation Coefficient (with Local plus State Aid Membership Per Pupil)

76–77	77–78	78–79	79–80	80–81	81–82	82–83	83–84	84–85	85–86	86–87	87–88	88–89
.768	.661	.700	.620	.490	.0347	.0243	.276	.290	.249	.234	.179	.0532



**Table 3. Local plus State Membership Aid Per Pupil Correlation Coefficient (with SEVpp)**

76-77	77-78	78-79	79-80	80-81	81-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89
.577	.570	.567	.588	.611	.707	.738	.708	.665	.683	.689	.727	.790

**Table 4. Current Operating Expenditures Per Pupil Correlation Coefficient (with SEVpp)**

76-77	77-78	78-79	79-80	80-81	81-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89
.402	.320	.291	.308	.348	.442	.534	.521	.529	.491	.484	.550	.619

joyed higher revenues per pupil as a result of their greater tax efforts. And the situation has continued to deteriorate.

### The Consequences for Pupils

The consequences of state government's failure to assume its share of the responsibility for funding K-12 public education also has led to a substantial loss in equity for Michigan pupils over the past thirteen years.<sup>13</sup> The level of resources available to pupils is becoming increasingly dependent on the relative tax wealth of the local district in which they happen to live and attend school. An examination of the data in Table 3 provides ample evidence to support this statement.

In conducting an equity analysis, one is interested among other things in determining whether "suspect" factors such as tax wealth, gender, or race have an undue influence on the distribution of an equity object. The "suspect" factor in the present case is *state equalized valuation per pupil* and the equity object is again *local + state membership aid per pupil*. Thus, we wanted to raise two questions: Was the relative tax wealth (*state equalized valuation per pupil*) of a district related to how many dollars—in a combination of local and state membership aid per pupil—the district had available? If so, was the situation getting better or worse over time?

What did we find? Over the thirteen-year period, there indeed was a strong positive relationship between *state equalized valuation per pupil* and *local + state membership aid*, as can be seen from an examination of the data in Table 3. The correlation coefficients are quite high, ranging from .58 to .79, indicating both a positive and a relatively strong relationship. The relative tax wealth of a district does determine to a considerable extent how many dollars per pupil will be available. And the general trend over time has been an increase in the correlation coefficients. Equity for pupils has worsened over the thirteen year period.

This is particularly troublesome since one of the avowed policy goals of the Michigan program is to guarantee an equal dollar yield for an equal tax effort. The basic concept undergirding Michigan's so-called Equal Yield Plan, adopted in 1973, is that—irrespective of a school district's taxable wealth—the state will guarantee the district the same basic revenue per pupil as any other district levying the same tax rate. In effect, if the policy goal were being attained, there should be no relationship, i.e., a near zero correlation, between property tax wealth and basic revenues per pupil. Not only did we find a relationship, but its strength generally has been increasing over the thirteen-year period—producing a clear pattern of decreasing equity for pupils. The major policy goal embedded in Michigan's Equal Yield Plan has not been achieved; what's more, it was further from attainment in 1988-89 than it was in 1976-77. A "suspect" factor, local tax wealth, has exhibited a strong and increasing influence on the per pupil revenues available to local districts.

We asked, what is the case when we look at a second equity object, *current operating expenditures per pupil*? Do we find the same or a different picture? The bad news, seen from an examination of the data in Table 4, is that we found generally the same picture. There was a positive and strong relationship between tax wealth per pupil and operating expenditure per pupil, particularly in the final year of the period where the correlation coefficient reaches 0.62. And the trend is generally upward, i.e., away from equity. The wealthier the district, in terms of its tax base, the higher the per pupil expenditure level.

But there also appears to be some good news. *Current operating expenditure per pupil* includes almost all the expenditures of a local district—expenditures from local + state membership aid revenues, state special and categorical revenues, and federal categorical revenues. Because districts with high needs tend also to be districts with relatively low per pupil tax bases, the inclusion of these added dollars—mostly marked for high needs districts—might be expected to result in appreciably lower correlation coefficients. And we did find this. The correlation coefficients are from 0.17 to 0.28 points lower than those found in the case of *local + state membership aid*. In this sense then, we might say that the inclusion into the mix of state and federal categorical aid provides evidence of attention to vertical equity, i.e., to special needs. Districts with high concentrations of pupils with special needs appeared to be receiving additional dollars to meet these needs. Whether the additional dollars were adequate to fully meet these needs remains an unanswered question. Still, lest we forget, these districts, with their low per pupil property tax bases and generally higher millage rates, started out on an uneven playing field and a playing field that is getting increasingly uneven over time.

The unevenness of the playing field is readily apparent when one invokes the principle of horizontal equity and examines the spread among school districts in available revenues (and other resources) per pupil. In Table 5 we present such information, choosing again *local + state membership aid per pupil* as our revenue variable and selecting the restricted range as our measure of spread or dispersion. The restricted range, as opposed to the range, ignores the upper and lower tails of the distribution, thus eliminating extreme "outliers" that may unduly influence the range. It tells us the size of the difference between the district at the 95th percentile and the district at the 5th percentile. Since the restricted range is a measure highly susceptible to inflation, we price-adjusted the dollar figures using 1988-89 as the base year. Thus all dollar figures are held constant and expressed in terms of 1988-89 dollars.

In this case, the choice of equity object—*local + state membership aid*—is an important one. There are some who would argue that one of Michigan's policy goals, through its state aid formula, should be to reduce disparities among school districts in per pupil revenues available. If the state aid

**Table 5. Local plus State Membership Aid Per Pupil—Restricted Range**

Year	76-77	77-78	78-79	79-80	80-81	81-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89
Restricted Range	1248	1407	1449	1670	1744	2027	2099	2154	2182	2075	2263	2449	2641
5th Percentile	2060	2167	2258	2214	2196	2197	2173	2288	2348	2425	2522	2548	2642
95th Percentile	3308	3575	3707	3884	3939	4225	4272	4442	4530	4501	4785	4998	5283

formula was working as these persons would envision, we would expect to find the restricted range decreasing over the thirteen year period—particularly in terms of constant dollars. We didn't find this. Instead we found a consistent increase in the restricted range over the thirteen year period and, correspondingly, a consistent trend away from horizontal equity. The restricted range more than doubled in constant 1988–89 dollars. At the start of the period, the restricted range was \$1,248; at the end of the period, it had risen to \$2,641.<sup>14</sup> There is twice as much horizontal inequity in 1988–89 as there was in 1976–77.

However, under a power equalizing formula one might expect to see this, i.e., districts are "free" (providing they have voter approval) to levy higher millages and thus realize higher revenues per pupil. Consequently, one could argue that increases in the restricted range, rather than providing evidence of decreasing equity, are simply providing evidence that local voter choice is at work. However, this argument only holds if one finds a strong positive correlation (and probably large and consistent values in the simple slope and simple elasticity) between mills levied and available revenues per pupil. As we noted above, we didn't. The power equalizing formula wasn't working; the inequities, by whatever equity principle and measure, were continually increasing. Thus, in Michigan, in mid-1993, the state of the state in equity terms, both for taxpayers and pupils, was quite dire.

### Past Attempts to Reform the System

Michigan policy makers, educators, and other citizens are not impervious to the fiscal and educational inequities that abound in the K–12 system for both pupils and taxpayers. It is a problem that has been addressed continually over the past several years. In the late 1960's, the legislature commissioned a comprehensive study, the so-called "Thomas Report," which identified several alternatives for reforming the Michigan school finance program, including a "radical proposal" to levy a state-wide property tax and distribute the proceeds equally among the school districts of the state.<sup>15</sup> Following on the heels of the Thomas Report, in 1969 Governor William Milliken appointed a Commission on Educational Reform which led in turn to a gubernatorial proposal for a state-wide property tax to generate the revenues needed to support the public schools. The Governor also proposed the so-called "Equal Quality Plan," based on classroom units, as the method for allocating the revenues that would be raised through the statewide property tax.<sup>16</sup> The State Board of Education entered the picture by advancing its

own separate recommendations. However, in spite of these many efforts, there were no major changes made in the way state aid for schools was raised and allocated.

In 1972, Governor Milliken supported a proposal, developed by the Michigan Education Association, to place on the November ballot a constitutional amendment calling for a 26 mill limit on the property tax to replace the existing 50 mill limit, the retention of 6 mills for "educational enrichment" at the local level, and an increase in the income tax to finance the basic operating expenses of the schools.<sup>17</sup> This proposal, if enacted would have moved the state to virtual full-state funding of education. However, the proposed amendment was defeated by the voters—the first in a long line of defeats of school finance reform ballot issues.

Governor Milliken, however, did not place all of his eggs in the constitutional amendment basket. Following the lead provided by the 1971 *Serrano* decision in California, the Governor joined with the Attorney-General to file suit against the State Treasurer seeking a declaratory judgment that Michigan's deductible millage was unconstitutional in that it denied the equal protection of the law as guaranteed by Article I of the Michigan Constitution. The Michigan Supreme Court, on December 29, 1972, in a 4–3 decision held that the Michigan system violated the equal protection clause of the Michigan Constitution.<sup>18</sup> Two days later, on January 1, 1973, Justices Black and Adams replaced Justices Coleman and Levin and a re-hearing of the case was granted by the court. Twelve months later, on December 14, 1973, the Michigan Supreme Court dismissed the lawsuit brought by the Governor and the Attorney-General and vacated its decision.<sup>19</sup> A later attempt in the early 1980's to seek judicial remedy, advanced by a group of low valuation districts, also was unsuccessful.<sup>20</sup>

However, during this same period, the Michigan legislature was acting to reform the school finance program by adopting the Gilbert E. Bursley School District Equalization Act of 1973. The Bursley Act reformed the system of membership aid, moving Michigan from a foundation grant system to a power equalizing or guaranteed tax base program.<sup>21</sup> Governor Milliken, on signing the bill, stated: "This Act will virtually eliminate property tax based on wealth as a factor in school finance among districts."<sup>22</sup> Unfortunately, it didn't. And the equity situation, as we noted above, has continued to deteriorate.

But it was not for want of trying. Over the period from 1972 to 1989, Michigan voters were presented with nine opportunities either to change statutorily or constitutionally the

**Figure 1. Proposed Amendments to the State Constitution School Finance Reform and Property Taxes**

Proposal	Date	Percent For	Percent Against
Limit property taxes and establish state school tax	November 1972	42.2%	57.8%
Abolish property taxes for school operations and establish voucher plan	November 1978	25.7	74.3
Reduce property taxes and allow school income tax with voter approval	November 1978	37.3	62.7
Reduce property tax maximums and increase state aid (Tisch)	November 1980	44.2	55.8
Reduce property tax maximums and increase state aid	November 1980	21.2	78.8
Reduce property taxes and raise sales taxes	November 1980	25.7	74.3
Reduce property taxes, increase aid to schools, and raise sales tax	May 1981	27.9	72.1
Reduce property taxes, revise school aid formula, and raise sales tax to 6 percent	November 1989	23.9	76.1
Increase education spending and raise sales tax to 4.5 percent	November 1989	27.7	72.3

SOURCE: *Michigan in Brief: 1992–93 Issues Handbook*, Public Sector Consultants, Inc., Lansing, 1992.

means of financing schools and to reduce property taxes. As can be seen from an examination of Figure 1, all of these measures were rather soundly defeated.

Thus, as the decade of the 1990's began, the financing of Michigan's public schools continued to be a troublesome problem. And it was a problem no closer to resolution than it was some twenty years before, or even ten years before when a major state newspaper set forth its dimensions:

... statewide school financing remains a major piece of unfinished business for Michigan. The inequities are unconscionable and getting worse. The formula year by year becomes obviously vulnerable to judicial challenge. As the problem worsens, the State's capacity to avoid action on it—even in times when new initiatives seem unthinkable—will be sorely tested. We hope a way can yet be found to reopen the debate and start a process that would lead to justice in school finance.<sup>23</sup>

As the decade of the 1990's opened, following the defeat by wide margins of the two reform proposals that appeared on the November 1989 ballot (see Figure 1), school finance reform still remained "a major piece of unfinished business." As we noted above, the defeats of these two proposals brought to nine the number of times reformers had tried—and failed—to reform the state's system of school finance through the constitutional and statutory amendment route.

### More Recent Attempts to Reform the System

#### *Proposals A and C*

In the 1990 Michigan gubernatorial campaign, Republican candidate John Engler narrowly defeated two-time incumbent Democratic governor James Blanchard. One of the main planks in John Engler's campaign platform was the promise of a hefty cut in property taxes if elected. Once elected, he did move quickly to set in motion an initiative petition drive to place on the November 1992 ballot a proposed constitutional amendment aimed at providing an across-the-board cut in local property taxes, accompanied by a cap on future increases in the assessed valuation of property. Known as the Republican leadership's (or more properly the Governor's) "Cut and Cap" program, Proposal C would have slashed school property taxes by 30 percent over a five year period and capped future assessment growth on all property at the lesser of 3 percent or the annual inflation rate. The state would reimburse the schools, dollar for dollar, for lost property tax revenues. The generation of the reimbursement revenues, some \$2 billion over the five-year period, was linked neither to a tax shift nor to an increased tax rate, but rather to expected annual growth in state general-fund/general-purpose revenues.<sup>24</sup>

Not to be outdone, in what became essentially a political game rather than a public policy venture, the Democratic leadership in the House proposed an alternative property tax package and launched their own initiative petition drive. The Democratic proposal would have provided school property tax relief, with reimbursement for lost revenues to come from eliminating a capital gains deduction currently enjoyed by business. In what one legislator termed "a blatant political move,"<sup>25</sup> the Democratic proposal was ruled off the ballot by the Board of State Canvassers for lack of sufficient valid signatures. Still, the legislature, through its own action, did move to place on the November 1992 ballot a proposed constitutional amendment that would provide not a tax cut but rather an assessment cap. Known as Proposal A, the amendment would have limited annual assessment increases on homestead property to the lesser of 5 percent or the annual inflation rate. Both Proposal A and Proposal C were soundly defeated by large margins. This brought the score for voter approval of property tax and school finance reform proposals to 0–11, a pretty lousy batting average in any league.

### The Olmstead/Kearney Plan

Concurrently, and for the prior three years dating back to the end of Governor Blanchard's administration, a grass-roots effort had been underway that came to be known as the Olmstead/Kearney or O/K Plan. Initially aimed at amending the Michigan Constitution, the plan subsequently was set forth in statutory language during the summer and fall of 1992. On January 12, 1993, an initiative petition drive was launched. The drive was aimed at securing some 200,000 plus signatures by mid-summer of 1993 with subsequent presentation of the statutory initiative petition to the legislature in early Fall 1993. Under Michigan law, the legislature would have 40 session days to respond. Its response would be limited to one of two actions: adoption without amendment, or rejection. If rejected, the statutory initiative automatically would go on the November 1994 ballot for a vote of the people.

The O/K initiative, in brief, called for (1) the state to assume responsibility for at least 50 percent of the costs of public K–12 education, (2) property tax relief through a roll back of tax rates for school operations to 30 mills, (3) new money for pupils in low valuation "in-formula" districts, (4) holding harmless high valuation "out-of-formula" districts, and (5) phasing in the plan over six years without linking it directly to a voter approved tax shift or tax increase.

### Senate Bill 146

Following the November 1992 defeat of Proposals A and C, and as the O/K initiative petition drive was being launched, Governor Engler had introduced into the State Senate a property tax relief proposal, Senate Bill 146, for good reason labeled "Son of C" by some and "C Minus" by others. Senate Bill 146 was an attempt to accomplish through legislative action what the Governor had failed to accomplish through the ballot, namely, deliver on his 1990 campaign promise of a hefty cut in property taxes if elected. The bill provided for property tax relief through the device of rolling assessment ratios back from their current level of 50 percent of market value to 40 percent over a period of three years. The bill also provided for reimbursing school districts for lost tax revenues; again expected annual growth in general-fund/general-purpose revenues was seen as the source of the dollars needed for reimbursement. The Republican Senate did pass the bill and sent it to the House which, following unanticipated upsets in the November election, had moved from a Democratic majority to a 50/50 Democratic/Republican split.

### The Bipartisan Legislative Team Proposal

During the months prior to and following the November 1992 elections, a bipartisan team of House legislators had been at work fashioning what eventually came to be known as the Bipartisan Legislative Team Proposal. Unlike the Governor's proposal, it linked property tax reform with school finance reform, rather than dealing only with the former. Property tax relief was to take the form of a roll back of tax rates for school operations to 17 mills and subsequently to 16 mills in 1995 on residential and agricultural property. The schools were to be reimbursed for lost revenues through an increase in the state personal income tax from 4.6 percent to 6.0 percent. A basic per pupil grant was to be set at \$4,850 in FY 1993–94.

The BLT plan, as it came to be known, temporarily derailed the House's consideration of Senate Bill 146. Political pundits were predicting a return to gridlock. Even if the House was able to report out and pass the BLT plan, it seemed a sure bet that the Republican Senate would reject it, particularly with its provision for an increase in the personal income tax. And for certain, even if it somehow passed the Senate, the Governor would veto any proposal that included an increase in the income tax. A "mid-air collision" was imminent and the predicted return to legislative gridlock on the property tax and school finance issue seemed a reasonably sure bet.

**STAR**

At this point, Governor Engler stepped in once again. But this time he fooled everyone. Whether out of a desire to finally resolve the issue that had plagued the state for some twenty-five years or out of the realization that his 1994 reelection was contingent on delivering on his campaign promise, the Governor jettisoned his support for Senate Bill 146 and offered, what was for him, a radical substitute. He asked the legislature to place on the ballot at a special election on June 2, 1993 a constitutional amendment that would provide both property tax relief and school finance reform. In a marathon round of what one journalist termed "... a week of hard-nosed negotiations between lawmakers and Governor John Engler,"<sup>26</sup> both houses of the legislature garnered the two-thirds votes necessary to put the proposal on the ballot. By a strong bipartisan vote, the House passed the measure 74-22 at 2:30 a.m. after a seventeen hour marathon session. The Senate followed the later the same day with a 31-4 vote giving final approval to the ballot measure, which came to be touted as the "School Taxpayer Agenda Reform" or STAR for short.

STAR, if it had been adopted by the voters, would have (a) rolled back school property tax rates to 18 mills and establish that rate by charter, (b) provided for the district levying the full 18 mills a \$4,800 per pupil foundation grant indexed to revenue growth, (c) included in the \$4,800 per pupil foundation grant all existing state retirement and categorical payments to districts, (d) provided a local option of an additional 9 mills equalized at \$100 per pupil per mill, and (e) raised the sales tax from its current rate of 4 percent to 6 percent to cover the costs of the program.

Coming from a Governor who was virtually fixated on providing only property tax relief, and that only by way of across-the-board rollbacks of assessment ratios, Proposal A truly was a radical departure. What remained to be seen was whether the electors of Michigan would go against their past 0-11 record and vote themselves a 2 percent increase in the sales tax, even in the face of some substantial property tax relief. Needless to say, on July 3, Proposal A went down to defeat—55 to 45 percent margin. Michigan's batting average was now 0 for 12. Concerns now turned to what would happen next. Would the Governor come back again with his plan to reduce assessment ratios? Would the supporters of the O/K initiative petition be able to step into the breach and become successful where so many others have failed? Or would some other action follow?

**Senate Bill 1**

There was little question in anyone's mind but that Governor Engler, and the Republican dominated Senate, were absolutely committed to seeing a property tax reduction enacted into law during the Governor's first term. They had been thwarted by the voter's rejection of Proposal C in November of 1992; they were thwarted once again by the voter's rejection of Proposal A. But not yet ready to give in, they came back again in mid-July 1993 with a plan to provide property tax relief by reducing assessment ratios. It was at this point that Democrat State Senator Debbie Stabenow stepped to center stage and challenged the Governor and her Republican colleagues. If the Governor and his supporters were so intent on providing property tax relief, why not go all the way and eliminate entirely the local property tax as a source of funding for school operations! And, to give substance to her challenge, she introduced Senate Bill 1 to do just that. Whether it was a bold stroke by Senator Stabenow to break the twenty year logjam on school finance reform (as she later argued), or a somewhat foolhardy action aimed at forcing the Governor and her Republican colleagues to moderate their proposal (as others argued), the results were startling. The Governor and the Senate Republicans leaped to the challenge (some say called Stabenow's bluff)

and in a quick 29-5 vote late on July 20 adopted Senate Bill 1. The next day, the House, on a 69-35 vote, quickly followed suit. In one fell swoop, the legislature had eliminated entirely local property taxes for school operations—some \$6.8 billion. The Governor was ecstatic and, with great fanfare, signed Senate Bill 1 into law on August 19 noting that the citizens of Michigan not only would now see the largest property tax cut in the state's history, but also could look forward to "stunning improvements" in public schooling.

As we noted at the beginning of this piece, for some Senate Bill 1 was seen as a bold and courageous move that held hope not only of breaking the twenty year legislative impasse on school finance reform but also of providing a "once-in-a-lifetime" opportunity to reform public education. For others, it was a totally irresponsible act, the "most stupid thing the Legislature had done in twenty years." In their view, Senator Stabenow had gotten into a poker game with the Governor, a master poker player who called her bluff and came up with the winning hand. Irrespective of which view is more accurate, the enactment of Senate Bill 1 put the Governor back in the driver's seat. He was to have first crack at providing answers to the three key issues facing the legislature, namely, how to replace the lost revenues, how to allocate those funds to schools, and how to bring about quality reforms.

There were a good many, including the Governor, who argued that Michigan now had an unequalled opportunity to redesign the public school system, not only in terms of how it was funded but also how it was governed and organized. They envisioned sweeping reforms that would make the system more accountable and ensure a world-class education for all Michigan youngsters. Others were not as sanguine, noting that time was short, perhaps too short. Senate Bill 1's major impact would be first felt in the summer of 1993 when summer property tax collections would no longer provide any operating money for the schools. If replacement funds were not put in place prior to that time, chaos likely would ensue. It would be difficult enough for the Legislature to address the funding issue in so short a time, much less undertake comprehensive reform of the entire system.

Nevertheless, the Michigan Legislature—or at least a majority in both houses—said it could be done, and with the adoption of Senate Bill 1 set for themselves a deadline of December 31 to accomplish both quality reform and funding reform. What happened in the remaining months of 1993 will provide ample grist for policy analysts for some time to come. The policy agendas continue to be multiple, the policy makers and those who would influence policy makers represent a broad spectrum of interests and, to further compound the situation, the outcomes promise to have a significant impact on the upcoming 1994 gubernatorial elections. To plumb fully these goings on is far beyond the purview of this paper; indeed, it is much too early even to draw a complete picture of post-Senate Bill 1 happenings.<sup>27</sup> Still, one can outline, in broad strokes, what has happened in the five months since the passage of Senate Bill 1.

**The Aftermath of Senate Bill 1**

Moving rapidly to capitalize on the opportunity presented by Senate Bill 1, Governor John Engler delivered a Special Message to a Joint Session of the Legislature on October 5, 1993. In the special message, he set forth a general framework centered on four principles: empowering children, empowering families, empowering teachers and empowering tax payers. This was followed almost immediately by the release of a detailed three-part plan for (1) replacing the revenue lost by the elimination of the local property tax, (2) creating a new mechanism for allocating funds to the schools, and (3) setting in place the policies and actions seen as necessary to achieving meaningful education reform.<sup>28</sup> The plan, entitled *Our Kids Deserve Better:*

*New Schools for a New Century: Governor John Engler's Plan to Reform Michigan Schools*,<sup>29</sup> ran some 50 pages and laid out a fairly extensive and seemingly comprehensive set of proposals. The release of the plan was followed quickly by introduction in the Senate and the House of an equally extensive package of legislative bills.

The centerpiece, as far as the quality issue is concerned, was a proposal to establish charter public schools and inter-district choice. The Governor and the Republican Senate viewed the introduction of a market-driven mechanism into public education as the *sine qua non* of any meaningful reform—a view immediately supported by many in the business community. The linch-pin of the Governor's funding proposal was a two percent increase in the state sales tax, an increase that could not be effected statutorily but would have to be approved by a vote of the people. John Engler and the Senate Republicans were staunchly opposed to any increase in the state income tax or any reimposition of the local property tax.

Counter proposals were slow in coming and, with one exception, seemed to have little immediate impact. Democratic State Senator Debbie Stabenow, an announced candidate for the democratic nomination for Governor, issued a much less extensive quality plan, and later a funding proposal that proposed "splitting the difference" between a one percent sales tax hike and a one percent income tax increase. Democratic State Senator Lana Pollack, an announced candidate for U.S. Senator Don Riegle's vacated seat, rejected the sales tax increase approach and turned to a statutory solution, an increase in the state income tax and a reimposition of the local property tax levied in part on a regional basis. The House Democrats issued a report that set forth a number of principles that should guide reform efforts, but no definitive program. It was left to a bipartisan team of legislators in the House to fashion and put forth a two-option funding plan that appears to offer a promising counter to the Governor's one-option sales tax proposal.

### What Will The Future Bring?

As the end of the calendar year approaches and the self-imposed deadline set by Governor Engler and the Michigan legislature draws ever nearer, it appears that things *may* be coming together. We say *may* advisedly; negotiations continue at a heated pace—both on the quality side and the funding side. Indeed, the two sets of issues are inextricably entwined; concessions on quality become conditions for movement on funding and vice-versa.

The Governor has prevailed in his efforts to see the adoption of charter public school legislation, albeit in somewhat modified form from his original proposal. Yet, the legislature is still balking on inter-district choice, with Republicans and Democrats lining up on opposite sides of the question. The ever-powerful MEA, thwarted on the charter school issue, is still driving a hard bargain on other elements in the so-called quality package including its version of a state-mandated core curriculum.<sup>30</sup> The business community continues to push hard for increased accountability measures. The religious right fights hard to exclude the teaching of "beliefs, attitudes, behavior, and values" from the curriculum.

But, not surprisingly, the major struggle centers on funding. The Governor and the Senate Republicans, having put all of their eggs in the sales tax basket, are balking at any increase in the state income tax or any reimposition of a local property tax. Democratic State Senator Debbie Stabenow's proposal to "split the difference," i.e. an increase of one percent on the sales tax, still floats out there somewhere. A third proposal, State Senator Lana Pollack's bid to reject the sales tax in favor of upping the income tax and reimposing a limited local property tax, also still waits in the wings. But the center of attention has become the House Bipartisan Plan. This plan

gives the voters the choice of raising the sales tax but, unlike the Governor's plan, provides a "safety net" if the voters turn down the sales tax increase. Under the Bipartisan Plan, passage of the sales tax, coupled with a statewide tax on commercial and industrial property plus other adjustments, would provide the dollars needed to fund the schools. Failure of the sales tax initiative, in effect, would trigger statutory increases in the income tax and the small business tax, plus reimposition of a local property tax albeit at a much reduced rate.

The question now becomes whether Governor Engler and the Senate Republicans will be willing to accept his middle ground and join with the House in resolving the revenue issue. Both sides are not that far apart on the allocation question, opting for a foundation-like per pupil grant and a substantial decategorization of state school aid. There appears to be some hope that a compromise reform package can be agreed upon by the December 31 deadline. At least, the editorial writers of one of the state's major newspapers think so:

For all the roadblocks thrown up by narrow ideologues and self-interested school lobbies, there appears the tantalizing potential for compromise among both legislative houses and Gov. Engler that genuinely would make Michigan's public schools, and the way we pay for them, a lot better. Keep at it. Nail it down.<sup>31</sup>

Will they be able to nail it down? Will the quality of public education improve? Will Michigan schools be funded adequately? Will the consequences lead to increased equity for pupils and for taxpayers? Will Michigan's pupils and taxpayers stand in the light or the dark of the moon? Stay tuned.

### References

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2. Bill Hobby, "Texas shadows Michigan's nightmare," *Austin American-Statesman*, August 9, 1993, p. A9.
3. In Michigan, the sales tax rate is set in the Constitution; any increase must be approved by the voters. The income and most other taxes can be raised, or lowered, statutorily.
4. Edward M. Gramlich, "What Should be Done About Michigan's Local Property Taxes," paper prepared for Educators United for O/K, The University of Michigan, Institute for Public Policy Studies, February 1993.
5. "Olmstead/Kearney Proposal for School Finance Reform and Property Tax Relief," *Educators United for O/K*, Wayne, Michigan (undated).
6. In 1966-67, the local share was 46.8%, the state share 47.7%. The federal government contributed the remaining 5.5%. J. A. Thomas, *School Finance and Educational Opportunity in Michigan* (Lansing: Michigan Department of Education, 1968), p. 177.
7. In 1989-90, on average, local sources were responsible for 46.6% of public K-12 revenue, state sources were responsible for 47.2%, and federal sources 6.1%. National Center for Education Statistics, *Digest of Educational Statistics 1992* (Washington, D.C.: Government Printing Office, 1992), p. 151.
8. See, National Center for Education Statistics, 1992, loc.cit.
9. In this and the discussion that follows, we are drawing on previous work that we undertook utilizing the equity framework developed by Berne and Stiefel. See C. Philip Kearney and David M. Anderson, *Equity Trends in Michigan School Finance: 1976-77 through 1988-89* (Ann Arbor: The University of Michigan, School of Education, 1991); and Robert Berne and Leanna Stiefel, *The Measurement of Equity in School Finance* (Baltimore: Johns Hopkins University Press, 1984).

10. *Local revenue plus state membership aid per pupil* includes the dollars generated within the school district, principally from local property taxes, plus the dollars received from the state under the membership formula, divided by the number of pupils.
11. A "rule of thumb" for interpreting the correlation coefficient is to square the coefficient with the resulting product being the percent of change in the dependent variable (*local + state membership aid*) accounted for by the independent variable (*levied mills*). Thus, in 1976-77 squaring the coefficient of 0.77 results in 0.59 or 59 percent.
12. See footnote 12 above.
13. See footnote 10 above.
14. If we had not corrected for inflation, the difference would have been substantially greater.
15. J. Alan Thomas, *op. cit.*
16. Office of Planning Coordination. "A Chronology of Educational Reform in Michigan" (Lansing: Bureau of Policies and Programs, 1970).
17. Gene Caesar, Robert N. McKerr, and James Phelps, "New Equity in Michigan School Finance: The Story of the Bursley Act" (Lansing: The Senate Committee on Education, 1978).
18. *Milliken v Green*, 389 Mich 1, 203 N.w.2d 457 (1972).
19. *Milliken v Green*, 232 N.W.2d 711 (1973).
20. *East Jackson v. State*. Many argue that until the education clause in the Michigan Constitution is strengthened, the chances of success in the courts is negligible. The current education clause provides: "The legislature shall maintain and support a system of free public elementary and secondary schools as defined by law. Every school district shall provide for the education of its pupils without discrimination as to religion, creed, race, color or national origin." (Article VIII, Sec. 2)
21. Caesar, McKerr, and Phelps, *op. cit.*
22. *Ibid.*, p. 9.
23. "School Equity: State Funding is Falling Behind the Needs." *Detroit Free Press*, November 13, 1981, p. 8A.
24. "State Ballot Proposals A and C—Proposed Property Tax Amendments," Council Comments, No. 1012, (Detroit: Citizens Research Council of Michigan, September 1992).
25. Stephen P. Dresch, "Property Tax Assessment Cap: Prescription for Economic Disaster." A White Paper. Lansing: House of Representatives, September 22, 1992.
26. Chris Christoff, "Engler-backed tax plan will face voters," *Detroit Free Press*, April 1, 1993, p.1.
27. I write this in mid-December as the Michigan Legislature approaches its self-imposed deadline of December 31.
28. Shortly after the passage of Senate Bill 1 in mid-July, an in-house task force created by the Governor set work to lay out a detailed plan of action. The point person on the task force was the State Treasurer, Douglas Roberts. Roberts had been appointed State Treasurer by Engler and had behind him a long record of state service, having filled several offices including Director of the Senate Fiscal Agency, Deputy Superintendent of Public Instruction, and Deputy State Budget Director of the Senate Fiscal Agency, Deputy Superintendent of Public Instruction, and Deputy State Treasurer; and Michael Addonizio, Assistant Superintendent for Research and Planning in the Department of Education; and Mark Hilpert, Michigan Tax Tribunal Member. Addonizio had served as Engler's Education Policy Advisor prior to his appointment as Assistant Superintendent.
29. John Engler, *Our Kids Deserve Better: New Schools for a New Century: Governor John Engler's Plan to Reform Michigan Schools* (Lansing: Office of the Governor, October 5, 1993.)
30. For the MEA, a *core-curriculum* appears to include everything that has been and might be taught in the schools, rather than a sharp focus on academic subjects such as reading and writing, science, math, and social studies. The business community, and others, argue for the adoption of an *academic core curriculum* which focuses on these five subject areas.
31. "School Reform: Progress in Lansing Looks Promising." *Detroit Free Press*, December 12, 1993, p.2F.

There have been very few studies of how school districts spend money and allocate resources.

# ESTIMATING THE DETERMINANTS OF PUPIL/TEACHER RATIOS: Evidence from the Schools and Staffing Survey

by Lawrence O. Picus

Spending on K-12 Public Education in the United States approaches \$300 billion dollars a year. These funds are used to employ 2.4 million teachers and some 400,000 additional instructional staff to educate over 42 million children.<sup>1</sup> Despite this tremendous commitment to the education of our children, we know surprisingly little about how these funds are actually used, or how new or additional funds are likely to be spent by the nearly 16,000 school districts and more than 100,000 schools across the nation. While school districts are required to maintain detailed revenue and expenditure budgets for their operations, state level fiscal reporting requirements vary dramatically, making comparisons difficult. Moreover, there are generally few state level requirements governing the level of detail for which districts must keep school level fiscal information. While a few states, most notably Florida, have begun requiring uniform school level fiscal reporting, they are the exception, not the rule.<sup>2</sup> This means that very little information is available to policymakers interested in understanding how resource allocation patterns differ across schools, districts, states, and the nation; and with what effects.

While there are a number of national data collection efforts undertaken on a regular basis, Barro points out that incompatibilities across the major collection efforts result in a situation where "there is not a fully satisfactory way to answer even so seemingly straightforward a question as 'how much of total expenditure for elementary and secondary education in the United States goes to pay teachers' salaries?'"<sup>3</sup> Odden and Picus argue that there is a great deal of information about how dollars are distributed to school districts, but insufficient data on how to put dollars to productive use in districts, schools, and classrooms.<sup>4</sup> Moreover, there is little information on the equity of resource distribution to school districts across states.

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To better understand these important issues, the Finance Center of the Consortium for Policy Research in Education (CPRE) has developed a strategy for improving the current state of knowledge on the distribution of revenues to school districts across the nation, and to understand current resource allocation patterns in elementary and secondary schools. Called the Integrated, Multi-level Resource Allocation study, the Center is conducting a multi-year, multi-faceted study of "what dollars buy" in education. Specifically, Center researchers are conducting analyses of spending and resource allocation patterns at the national, state, district and school levels. The work reported here was conducted to fill a gap in the current state of knowledge about the allocation of resources within the nation's school districts. This paper discusses specifically our findings regarding the determinants of pupil/teacher ratios in schools and school districts across the United States. It relies on data from the Schools and Staffing Survey and the Census Bureau's Census of Governments to estimate how different district and school characteristics impact the pupil teacher ratio.

This paper begins with a discussion of the current state of knowledge regarding resource allocation patterns in schools. It follows with a summary of the study questions we sought to answer, and offers a brief description of the sources of data for our work. Following this discussion, our findings regarding pupil/teacher ratios and how district and school characteristics impact those ratios are described.

## Current Knowledge About Resource Allocation Patterns

Over the years, only a few detailed studies of school district resource allocation patterns have been conducted. Odden, Palaich and Augenblick analyzed district spending patterns in New York for the 1977-78 school year.<sup>5</sup> They found that spending for instruction represented about 60 percent of state/local operating expenditures per pupil, with high spending districts devoting a slightly higher percentage of their resources to instruction than low spending districts (63 percent for the highest decile compared to 58 percent in the lowest spending decile). Odden, Palaich and Augenblick also found that higher spending districts paid teachers more and hired teachers with greater education and experience, while the pupil/teacher ratio remained approximately the same across spending levels. They did find that a slightly lower portion of instructional expenditures was devoted to teacher salaries in the high spending districts, making it possible for those districts to spend more on curriculum development, supervision and pupil services. Their study did not look specifically at variation in pupil/teacher ratios however.

A study by Hartman in Pennsylvania found similar spending patterns, with two exceptions.<sup>6</sup> Instructional spending as a percent of total expenditures was approximately 60 percent, but the higher spending districts tended to spend a slightly lower percentage of their funds on instruction compared to the low spending districts (58.1 percent in the high spending districts, compared to 61.3 percent in the low spending districts). Also, Pennsylvania districts seemed to spend more on reducing class size and less on increasing teacher salaries as the level of funding increased.

A related area of inquiry has been to estimate what districts will do if they receive more money. This research has typically been done with cross-sectional data bases, allowing researchers to identify how high spending districts use additional resources as compared to lower spending districts. Two of these studies, Alexander<sup>7</sup>, and Barro and Carroll<sup>8</sup>, analyzed data for districts with different spending levels in California and Michigan respectively. Their purpose was to determine how higher-spending districts within a state used the additional resources at their disposal. The findings from the two studies were remarkably similar. In general they found that per-pupil expenditures for teachers and for administrators increased at a slower rate than total current operating expenditures, and that

expenditures for specialists and for supplies and equipment increased at a rate faster than total spending. Barro and Carroll found that as the total budget increased by 1 percent, teacher expenditures per pupil increased by only 0.75 percent, while Alexander's research concluded that only 41 percent of each additional dollar was spent on teachers.

Interestingly, both studies found that much of the increased expenditures on teachers was not used for increased salaries. Rather most of the new money, 63 percent in Barro and Carroll's study and just over half in Alexander's, was used to hire more teachers, effectively reducing the pupil/teacher ratio. The studies also found that beginning teacher salaries were similar across spending levels.

Kirst analyzed how spending changed in five low spending districts that received 15 percent funding increases as a result of the school finance reforms enacted in response to *Serrano*.<sup>9</sup> Kirst found that most of the new funds were used to hire additional instructional personnel, either to reduce class size, add more class periods, or provide new specialists. In all five districts salary increases were relatively small, and most of the funds were spent on hiring additional staff.

A just completed study of eight school districts across the country by Bruce Cooper looked closely at district and school spending patterns by function.<sup>10</sup> Within eight sample districts, Cooper found that between 79.6 and 94.1 percent of total per-pupil expenditures were spent at school sites, and that overall between 57.9 and 62.8 percent of total expenditures were devoted to instruction. Cooper also found that virtually all instructional expenditures were made at the school site. His research also found that expenditures for administration varied from 8.1 to 17.1 percent of total district expenditures, and that in six of the eight districts, school site administrative costs represented the larger share of total administrative costs. There does not appear to be any relationship between the level of spending per pupil and the percent spent for either instruction or administration in Cooper's sample.

In a time series analysis of unified school districts in California between 1980–81 and 1985–86, Picus found that the proportion of total expenditures devoted to instruction increased in response to fiscal incentives designed to increase the length of the school day and school year.<sup>11</sup> He also found evidence that as the incentive funds were integrated into district general revenues, there was a tendency for spending on instruction to revert to previous proportional levels.

In a recently completed comparison of three major data sets, the NCES Common Core of Data, the NCES Schools and Staffing Survey (SASS), and the expenditure, salary and staffing data provided by the National Education Association (NEA), Barro found a number of differences in estimates of how much money is available, and more importantly, how educational resources are used.<sup>12</sup> He shows that in 1988–89, per pupil expenditures for current operations varied from a high of \$6,888 in the District of Columbia to a low of \$2,413 per pupil in Utah, a ratio of 2.9:1. When these figures are adjusted for price differentials across states, the ratio decreases to 2.3:1 with cost adjusted expenditures in the District of Columbia of \$6,064 (still the highest), and \$2,638 in Utah (still the lowest).<sup>13</sup>

Perhaps more important than how much is spent is how those resources are used. The single largest expenditure item for school districts is teacher salaries. On average, teacher salaries account for 45 to 50 percent of a school district's budget. Teacher compensation (salaries and benefits) generally amount to between 55 and 60 percent of expenditures.<sup>14</sup> Average teacher salary in 1991–92 ranged from a low of \$23,300 in South Dakota to a high of \$47,300 in Connecticut.

Equally important is the access students have to a teacher's time and attention. This is most directly measured through analyses of pupil/teacher ratios which provide an estimate of average class size.<sup>15</sup> Barro's analysis of spending pat-

terns in 1988–89 shows that the pupil/teacher ratio varies dramatically across the states.<sup>16</sup> The average pupil/teacher ratio in 1988–89 across the United States was 17.3 pupils per teacher. This ranged from a low of 13.0 in Connecticut to a high of 24.5 in Utah. When teachers, other professional staff and teacher aides were considered as a group, the ratio of pupils to instructional personnel dropped to 13.4 for the United States as a whole, and ranged from a low of 10.1 in Connecticut to a high of 19.5 in Utah.

Barro also looked at the relationship between per pupil spending and the pupil/teacher ratio. He found that on average, the pupil/teacher ratio decreases by about six percent for each ten percent increase in per pupil expenditures. Moreover, Barro attempted to measure the marginal propensity of schools to spend additional resources on teachers. Specifically he found that for each \$100 increase in per pupil spending, a state with U.S. average expenditures per pupil would devote approximately \$42.50 to additional teacher compensation, of which \$32.90 would go to reducing class size, and \$10.60 would be used to increase teacher salaries. The balance of these funds would be expected to be used for the compensation of other professional staff members and to other personnel and non-personnel expenditure items.

Picus analyzed school district level expenditure patterns and found that there is substantially less equity in educational expenditures per pupil across school districts than is apparent when analyzing state level fiscal data bases.<sup>17</sup> District per pupil expenditures for education ranged from under \$1,000 per pupil to over \$50,000 in 1987–88, the most recent year for which SASS data are currently available. The coefficient of variation for per pupil expenditures was 0.524. When adjusted for differences in the cost of education across states, the coefficient of variation declined to 0.476. Even this cost adjusted figure is considerably larger than the coefficient of variation found in any individual state. This implies that a considerable school funding equity problem continues to exist across our nation.

Picus also found that most districts spent approximately 60% of their resources on direct instruction (as defined by the Census Bureau). Moreover, there was considerably less variation in the share of expenditures devoted to instruction, than in the total spending per pupil. The coefficient of variation was only 0.106, indicating very little variation exists in the share of total resources that are devoted to instruction. Not only is this an important finding, its consistency is surprising. It means that as districts get more funds, they continue to spend each additional dollar in roughly the same proportion as the dollars they received previously. The strength of this finding is remarkable. Cooper, using a methodology that analyzes school district spending from the "bottom up" by aggregating school level expenditures, has also found that instruction consistently accounts for 60 percent of a district's spending.<sup>18</sup>

This finding does not mean that all children are treated equally however. As the data presented above indicate, there are dramatic disparities in the level of per pupil expenditures across school districts. This means that a district spending \$10,000 per pupil still has twice as much money to spend on instruction as a district spending \$5,000 per pupil. Not surprisingly, we found that as a district's expenditures increase, the average class size declines, and average teacher increases somewhat. Moreover, one would expect that additional services for children are more readily available in high spending districts than in low spending districts.

These findings imply that efforts to force districts to direct new funds to preferred programs, such as instruction, may face considerable difficulty. Picus' study of the use of incentive funds in California in the first half of the 1980s lends further evidence to the finding that districts continue spending in the same proportions regardless of the amount of money available.<sup>19</sup>



Picus' 1993 district level analysis also found that spending tends to be higher in larger metropolitan areas. Specifically, Picus found that as the size of a central city increased, so did per pupil spending.<sup>20</sup> Moreover suburban districts surrounding large and very large cities tended to spend more than the central cities they surround. The opposite was true in medium size cities, but for small and medium cities, overall spending levels were below those for large and very large cities and their suburbs. Finally, rural areas had the second lowest per pupil spending level, exceeding only the average spending of school districts in small cities.

Picus and Bhimani analyzed the SASS teacher questionnaire and found evidence to support teacher arguments that they have much larger classes than most national and state specific pupil/teacher ratio data indicate.<sup>21</sup> They found that at the district and school level, the pupil/teacher ratio for elementary grades (K-6) is between 17.68 (district) and 18.77 (school) pupils per teacher. However, the mean teacher reported class size for self-contained classrooms is 24.21, some 29 to 36 percent larger than estimates based on district and school data.

Similarly, the average secondary school pupil/teacher ratio as reported on the district level SASS questionnaires was 14.41. At the school level, the mean pupil/teacher ratio was 16.38 for intermediate schools and 16.55 for secondary schools. On the other hand, the self reported average class size for departmentalized classes amounted to 22.65. The difference between self-reported class size and the pupil/teacher ratios computed through district and school averages, while disconcerting, was not unexpected given that teachers have been making similar claims for a number of years. As this brief review shows, there have been very few studies of how school districts spend money and allocate resources. What the few studies have shown is that allocations for instruction are remarkably consistent across districts and over time, averaging approximately 60 percent of total expenditures. Unfortunately, it is hard to draw any general conclusions about school district resource allocations given the few studies and small samples involved. Also, there has been little research on how factors such as average teacher salary, the pupil/teacher ratio and per pupil expenditures impact these patterns.

### Research Questions

The research summarized above shows there has been relatively little research on how resources are allocated and used by school districts. One of the most important resources used in education is teachers. In fact, expenditures for teacher salaries and benefits are the single largest component of school district spending.<sup>22</sup> The work described in this paper represents an initial step in adding to that knowledge by analyzing pupil/teacher ratios for a nationally representative sample of school districts and schools. The specific questions this research was designed to answer are:

1. How do pupil/teacher ratios vary among school districts and schools?
2. How do variations in pupil/teacher ratios relate to district and student characteristics and community type?

### Description of the Data Base

The analyses described in this paper rely on data from a number of sources. Primary among them are two large-scale federal data bases, the NCES Schools and Staffing Survey (SASS) for 1987-88, and the U.S. Census Bureau's 1987 Census of Governments. The Census files contain expenditure data for the 1986-87 fiscal year, one year before the data collected through the SASS. Similar expenditure data for the universe of school districts is not available for 1987-88.

Although the merged data base has a one year lag between the expenditure variables and the staffing variables, this analysis still provides valuable information to educational poli-

cymakers because school district spending habits and resource allocation patterns generally show relatively small incremental changes from year to year as evidenced by the few studies that have been conducted in the past and summarized above. Consequently, the relationships found between spending and staffing patterns are unlikely to vary dramatically from what would be expected if fiscal and staffing data were available for the same fiscal year.

By merging the expenditure data from the Census Bureau with the staffing and enrollment information from SASS, it is possible for the first time to analyze educational resource allocation and staffing patterns at the state, school district and school and even individual classroom level. Detailed information on each of the data bases is provided below.

### The Schools and Staffing Survey

The 1987-88 Schools and Staffing Survey (SASS) is a comprehensive, nationally representative, survey conducted by the National Center for Education Statistics of 5,592 public school districts, 9,317 public schools in those districts, and over 56,242 teachers at these same schools. Similar surveys of private schools were conducted. Since resource allocation patterns in the public school system is the focus of this paper, this discussion is limited to the public school component of the SASS. The SASS sample was not designed to be representative of individual states. As a result estimates of individual state level resource allocation patterns in school districts can not be undertaken with these data.

The public school component of SASS consisted of four separate questionnaires. They include:

1. Teacher Demand and Shortage Questionnaire for public School Districts, distributed to school district administrators.
2. Public School Questionnaire, distributed to school principals
3. School Administrator Questionnaire, distributed to school principals
4. Public School Teachers Questionnaire, distributed to public school teachers.

### Census

Data on school district expenditures were taken from the Census of Governments, 1987: Finances of Public School systems - File D, which provides data for the universe of 16,921 public elementary-secondary school districts and local institutions of higher education. Available data include district expenditures and revenues including breakdowns on the source of revenue and current expenditures for instruction, support services, food services and all others. Data on capital expenditures are also available. Data on current expenditures were the primary focus of the research reported here.

### Merged Data Set

The first step in creating an analysis data set was to merge the data from the four SASS questionnaires. This was accomplished by comparing the control numbers on each form of the SASS data tapes provided by NCES. The second, and more complicated process was to merge this data set with the Census data. With the help of NCES staff, we were able to combine our merged SASS file with the Census of Governments—File D. Our final sample contained a total of 30,362 teachers in 6,388 schools and 4,370 districts. The fall-off in number of districts, and consequently schools and teachers, results from two factors—non-response rates on the SASS questionnaires and inability to find matches for all of the SASS districts in the Census data. According to NCES, the response rate for the questionnaires was 89.4 percent for the District level survey of teacher supply and demand; 91.9 percent for the public school

questionnaire and 94.2 percent for the administrator questionnaire, both of which went to school principals; and 86.5 percent for the teacher survey. For a district to be included in our sample, responses from all four levels had to be available.

#### Variation in Pupil/Teacher Ratios at the District Level

The largest single item of expenditure in school districts is for the compensation of teachers. Barro states that teacher compensation (salaries and benefits) accounts for 53 percent of all current spending by school districts.<sup>23</sup> Thus, studying the number of teachers employed, and the salaries they are paid provides a great deal of information on how school systems choose to allocate the resources available to them. This section describes how teacher staffing patterns, specifically pupil/teacher ratios vary across school districts and schools in the SASS/Census sample.

#### *Variation in Pupil/Teacher Ratios at the District Level*

Pupil/teacher ratios were calculated for districts as a whole, and for elementary and secondary groupings. Using the district level Teacher Demand and Shortage questionnaire from SASS, the number of pupils in grades K–12 was divided by the reported number of teachers in each district. In addition, for all school districts that reported having students in any of grades K–6, a similar pupil/teacher ratio was calculated, as was the ratio for all districts reporting any enrollment in grades 7–12. Table 1 summarizes the overall pupil/teacher ratios for the SASS sample of 4,370 school districts. The mean pupil teacher ratio for the sample is 16.59, ranging from a low of 2 to a high of 40.50. The standard deviation is 3.92 and the coefficient of variation 0.236. Table 1 also displays similar data for the pupil teacher ratio in grades K–6 and grades 7–12. The table shows that the average pupil/teacher ratio in the lower grades is more than three pupils per teacher larger. The table also shows more variation in the pupil teacher ratio for the two sub-groups than for the sample as a whole. The standard deviation for K–6 is 7.92 and for 7–12 it is 6.23. Moreover, the coefficient of variation for both subgroups increases to over 0.36.

Tables 2 and 3 summarize the demographic characteristics of the SASS sample districts. Table 2 provides the means and standard deviations for student and teacher variables, while Table 3 provides information on the type of community in which each school district is located. Table 2 shows that the average district in the sample had 5,742 students in 1987–88. Across districts, an average of 28.68 percent of the students qualify for free or reduced price lunches, and on average 13.15 percent of the students are minorities. The SASS Teacher Demand and Shortage Questionnaire asked respondents to indicate what their district's average teacher salary was, as well as to provide information on their district's salary schedule at three points—bachelor's degree with no previous teaching experience, master's degree (or its equivalent in credits beyond the bachelor's degree) with no previous teaching experience and master's degree with 20 years of teaching experience. The average teacher salary that year was \$25,431. Table 2 also displays the average salary at three steps on the salary schedule—BA with no experience, MA with no experience and MA with 15 years of experience. Interestingly, the standard deviation of the salary schedule variables increases with education and experience. This indicates that beginning teacher salaries vary less across the nation than do salaries for teachers with more education and experience.

To determine the impact of location on school district resource allocation patterns, the type of community in which a district is located was also used in the models described below. Table 3 shows the distribution of districts by community type. As the table shows, the largest group of school districts are rural, representing over 43 percent of the total sample. The next largest group is districts in small cities, which make up nearly 30 percent of the districts in the sample. Only 1.21 percent of

the districts in the sample, 53 districts, are in cities with over 500,000 residents. Even smaller numbers of districts are located on military bases and Indian reservations. Because a district can only be assigned to one community type, a set of nine dummy variables were used in the regression models for community type. In the regressions, rural districts served as the base case to which all other community types were compared. Consequently, in the regressions that follow, a dummy variable for rural districts does not appear. The next section of this paper looks at these district characteristics affect variations in per pupil expenditures, pupil teacher ratios and teacher salaries.

The SASS data collection allows analysis of variations in pupil/teacher ratios from a number of perspectives. The discussion that follows provides a picture of how staffing patterns are related to a variety of variables including district size, geographic region, community type, percentage of pupils receiving free or reduced price lunches (a proxy for poverty level), the minority enrollment of the district, and expenditure levels. To ascertain the impact of these district characteristics on the teacher/pupil ratio, a series of multiple regressions were estimated. Using the teacher/pupil ratio as the dependent variable and district characteristics as the independent variables, the individual impact of each factor, holding the others constant, was estimated.

Three separate regression equations were estimated, and the results are displayed in Table 4. The first used the teacher/pupil ratio for grades K–12 as the dependent variable, while the second and third used the ratios for elementary (K–6) and secondary (7–12) grades respectively.<sup>24</sup> The independent variables included price adjusted per pupil expenditures, school district enrollment, the percentage of students qualifying for free or reduced price lunches, the percentage of students in each district who are ethnic minorities, the district average salary, and a series of dummy variables to reflect community type.

The last row of Table 4 displays the  $R^2$  for each of the three equations. That row shows that the equation for K–12 teacher/pupil ratio accounted for over 29 percent of the variation in the ratio, while the elementary and secondary grade equations explained a much smaller share of the variance in the respective ratios for those grade levels. The secondary equation only explains about 6 percent of the variation in the teacher pupil ratio found in grades 7–12, whereas the elementary equation accounts for nearly 19 percent of the variation in grades K–6.

The impact of expenditures per pupil (PPEXP) shows the expected positive sign for all three equations, and although the coefficients appear very small, they are statistically significant at the 0.01 level. For example, the coefficient of 0.0000033 in the K12 equation implies that when per pupil expenditures increase by \$1,000 the teacher/pupil ratio increases by 0.0033. At the mean, this corresponds to an increase in the teacher/pupil ratio from 0.0603 to 0.0636, or a decrease in the pupil/teacher ratio of 0.84 students. The corresponding pupil/teacher ratio decrease for a \$1,000 increase in per pupil spending at the elementary level is 0.91 pupils and in secondary schools 0.23 pupils. This means at the elementary school level each additional \$1,000 in per pupil spending results in pupil/teacher ratios that are almost one student smaller, while at the high school level, it would take just over \$4,000 to achieve the same result. This is no doubt in part because the secondary school pupil/teacher ratios are already considerably smaller than the elementary grade classes.

Not surprisingly, districts with higher enrollments have higher pupil/teacher ratios. However, these increases are quite modest. The coefficient for enrollment (LEAENR1) in the K–12 equation is -0.00000064, and is statistically significant at the 0.01 level. This coefficient indicates that an additional 1,000 students in a school district (a substantial influx of new students for most school districts across the nation) leads to, at the mean, a reduction in the

teacher/pupil ratio of -0.000064, from 0.0603 to 0.0602. This translates to an increase in the pupil/teacher ratio from 16.59 to 16.61. Similarly small effects can be found in the equations for the elementary and secondary grades, although the secondary finding is not statistically significant.

The negative signs associated with the coefficients for average teacher salary (SALAVG) indicate that higher salaries are associated with larger classes. The coefficients are statistically significant at the 0.01 level in all three equations. The Coefficient of -0.00000555 for SALAVG in the K-12 equation implies that in districts where the average teacher salary is \$1,000 above the mean, the teacher/pupil ratio is -0.000555 lower. This corresponds to an increase in the pupil/teacher ratio of 0.13 students. Thus, even salary differentials of as much as \$8,000 lead to pupil/teacher ratio increases of only one student, indicating that districts make greater efforts to maintain those pupil/teacher ratios than pay teachers more.

With the exception of a small increase in pupil/teacher ratio as the proportion of students who qualify for free and reduced price lunches goes up in the K-12 equation (significant at the 0.05 level), neither this proxy for poverty nor the district minority enrollment have a statistically significant impact on a district's pupil/teacher ratio. In the K-12 equation, if the share of students qualifying for free and reduced price lunches increases by 10 percent, the corresponding increase in the pupil/teacher ratio is a negligible 0.06 students. Across the spectrum this translates into a pupil/teacher ratio increase of 0.3 students for districts with half of their students qualifying for free or reduced price lunches compared to districts with no students meeting the income level qualifications for this program.

Interestingly, the effect of community type on the teacher/pupil ratio was most obvious in the K-12 equations, where all of the coefficients were statistically different from zero at least at the 0.05 level. The negative coefficients reported for all of the community type variables imply that the smallest classes are found in rural areas. In fact, with the exception of military bases and Indian reservations, the magnitudes of the coefficients have the same ranking as the magnitude in the difference between rural pupil/teacher ratios and the pupil/teacher ratios in other types of communities. This finding did not hold up for Indian reservations and military bases due to the small number of districts in each of those groups and the fact that these schools typically operate under different circumstances than other school districts in the United States.

These results show that the pupil/teacher ratio is related to a number of school district characteristics. Specifically, districts that spend more money per pupil tend to have lower pupil/teacher ratios. Those districts that pay more for their teachers, tend to have higher pupil/teacher ratios, and as shown above, the pupil/teacher ratio is consistently smaller in secondary schools than in elementary schools. Although rural districts tend to have the lowest pupil/teacher ratios, and suburbs seem to have lower ratios than cities, the differences across medium, large and very large cities or suburbs are not as pronounced. As district size increases, so does the pupil/teacher ratio.

#### *Variation in Pupil/Teacher Ratios at the School Level*

To ascertain the impact of the individual factors reported above on the pupil/teacher ratio at the school level, a second series of multiple regressions were estimated. Using the teacher/pupil ratio as the dependent variable and the factors cited above as independent variables, the impact of each, holding the others constant can be estimated.<sup>25</sup> Three separate regression equations were estimated, one for elementary schools, one for intermediate schools and one for secondary schools. Independent variables included district per pupil expenditures, school enrollment, the percentage of students qualifying for free or reduced price lunches, the percentage of students in each school who are ethnic minorities, and a series of dummy vari-

ables to reflect community type. Since rural districts represent one of the largest community groups, they were again used as the basis for comparison with the other dummy variables. Descriptive statistics for the variables are displayed in Table 5, and the results of the modeling are presented in Table 6.

This model is virtually identical to the model used to estimate the determinants of the teacher/pupil ratio at the district level. Left out of the model is average teacher salary, a variable for which we only had district level data. Because average salary is correlated with per-pupil expenditures, and both are district level variables, only one per-pupil expenditure was included in the final model. The results of this analysis are similar to the district level modeling efforts.

The factors that have the most impact on teacher/pupil ratios at the school level are the school's enrollment, the percent of pupils qualifying for free and reduced price lunches and the district's per pupil expenditures. Community type seemed to have less impact on pupil/teacher ratios at the school level than at the district level, and as Table 6 shows, the coefficients on the various community type variables were generally not significant. Moreover, there was no pattern to the significant coefficients for community type across the three equations.

As anticipated, the signs on the coefficients for per pupil expenditures are positive, indicating that as expenditures increase, the number of teachers per pupil also increases, or conversely, the number of pupils per teacher declines. Although the coefficients are very small, there is an impact to be discerned. For example, the coefficient of 0.000002232 for per pupil expenditures in the elementary school equation implies that a \$1,000 increase in per pupil expenditures is associated with an increase in the teacher pupil ratio of 0.002232. At the mean this corresponds to a change in the teacher/pupil ratio from 0.05432 to 0.05209 or a decrease in the pupil/teacher ratio of 0.73 students.

Similarly, in intermediate schools, this model predicts that a \$1,000 increase in district level per pupil expenditures would result in a reduction of the pupil/teacher ratio by 1.5 students, and at the secondary level such an increase in spending would also lead to a reduction of 1.5 students. This finding seems to imply that increases in revenues are more likely to be used to reduce the pupil/teacher ratio at intermediate and secondary schools, than to reduce elementary school pupil/teacher ratios.

The coefficients on enrollment are all negative, implying that as school enrollments increase, so does the pupil/teacher ratio (the teacher/pupil ratio declines). It is not clear why the teacher/pupil ratio increases with the percent of children qualifying for free and reduced price lunches, although it does so at all three school levels. The most likely explanation for this is that schools with higher proportions of children qualifying for free and reduced price lunches are schools where family income is low, and thus also qualify for Chapter 1 funds. If those funds are used to purchase additional teacher resources, we would expect the pupil/teacher ratio decline. Since the expenditure data do not provide detail on the source of funds, it is impossible to test this theory at the present time. Future data from the 1990-91 Census of governments and the 1990-91 SASS may enable us to answer this question.

The results of this analysis of pupil/teacher ratios at the school level are not as clear as our results from the analysis of this important variable at the district level. The data presented above confirm our most important finding that pupil/teacher ratios are higher at the elementary level than at the secondary level. This analysis found little evidence of differences by community type, although in secondary schools the pupil teacher ratio was still lowest in rural areas.

As with our district findings, it seems that schools with the lowest percent of students qualifying for free and reduced price lunches and the schools with the highest percent of such children seemed to have the lowest pupil/teacher ratio, with mixed

results for those in-between. Interestingly, our modeling found a stronger relationship between pupil/teacher ratio and this proxy for income levels than did our district level models.

### Conclusion

The analyses presented above offer some insight into how school districts allocate teacher resources. It is clear from the results of our modeling that the impact of such variables as per pupil expenditures, student enrollment, and percentage of students from low income households or who are ethnic minorities is discernible, but relatively small. For example, at the secondary level, a decrease in the pupil teacher ratio of one student per teacher was associated with a \$4,000 increase in per pupil spending. At the elementary level, a similar decrease was associated with a spending increase of approximately \$1,000 per pupil, still a substantial jump in available resources.

It is unfortunate that we are unable to estimate spending at the individual school level. This is particularly disappointing since the factor that seems to have the most substantial impact on the pupil/teacher ratio is school type. Secondary schools have a pupil/teacher ratio that is on average three pupils per teacher lower than do elementary schools. Attempting to control for these differences by estimating separate equations resulted in models that only explain a small portion of the variation found in these ratios. It is possible that if the per pupil spending at each school were available, a larger portion of this variation could be explained. We are currently working with data from the state of Florida to see if this theory yields any important new information. However, because Florida has succeeded in reducing the variation in per pupil spending across districts (and most likely as a consequence across schools), it is unlikely that we will find a definitive answer to this question until more states make school level expenditure data available.

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13. It is important to take interstate variations in the cost of education into account in analyzing revenue and expenditure data. Unfortunately, little work has been done to estimate what those variations are. In this section, all data have been cost adjusted using either Barro's cost of education index (See Barro, 1992), or an index prepared by the American Federation of Teachers based on differences in personnel salaries (Nelson, 1991).
14. NEA, *Op. Cit.*
15. Note that the figures reported in the discussion that follows indicate class sizes substantially smaller than the average teacher reports. This is because the teacher counts reported to NCES and the NEA include teachers of special education classes which typically have fewer children, and teachers in various "pull-out" programs. Unfortunately, the nationally available data sets do not make it possible to separate these teachers from those in regular classrooms. While the data presented may thus underestimate the number of students a teacher sees in a day, the relative rankings of the states are unlikely to change significantly.
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24. It should be noted that for the purposes of this analysis, the teacher/pupil ratio is used as the dependent variable rather than the pupil teacher ratio reported above. Although this may cause readers some confusion, the teacher/pupil ratio makes the analysis of multi-variate models more straightforward since the signs on the coefficients are easier to interpret. For example, higher spending would be expected to correlate with lower class size, and thus negative coefficients. Since the teacher/pupil ratio is the reciprocal of the pupil/teacher ratio, as expenditures increase, the teacher/pupil ratio would also be expected to increase (more teachers for a given number of students and thus smaller classes), resulting in positive signs for the coefficient. The more traditional pupil/teacher ratio was used above as it is easier for most readers to interpret.
25. Note that the teacher pupil ratio is again used as the dependent variable.

**Table 1. Summary Statistics for Pupil Teacher Ratio: 1987-88**

Statistic	Pupil Teacher Ratio Grades K-12 PTLK12	Pupil Teacher Ratio Grades K-6 PTLK6	Pupil Teacher Ratio Grades 7-12 PTL712
Mean	16.59	18.54	15.47
Standard Deviation	3.92	7.92	6.23
Maximum	40.50	40.50	40.50
Minimum	2.00	2.00	2.00
Median	16.40	17.85	14.97
Inter-quartile range	4.66	5.18	5.68
Coefficient of Variation	0.236	0.367	0.398
Number of Observations	4,370	4,225	4,257

**Table 2. Summary of School District Demographic Characteristics**

Variable	Mean	Standard Deviation
Per Pupil Expenditures (PPEXP)	\$3,698	\$1,759
Enrollment (LEAENR1)	5,742	18,484
Percent of Students Qualified for Free/Reduced Lunch (POVL)	28.68%	23.78%
Percent Minority Enrollment (MINPUL)	13.15%	21.24%
Average Teacher Salary (SALAVG)	\$25,431	\$5,393
Teacher Salary, BA With No Experience (SALBA0)	\$17,543	\$2,277
Teacher Salary, MA With No Experience (SALMA0)	\$19,188	\$2,738
Teacher Salary, MA With 20 Years Exp. (SALMA20)	\$29,441	\$5,835

**Table 3. Distribution of Sample School Districts by Community Type**

Community Type	Number of Districts	Percent of Districts (%)
Rural <sup>1</sup>	1921	43.96
Small City	1292	29.57
Medium City	283	6.48
Medium Suburb	207	4.74
Large City	112	2.56
Large Suburb	266	6.09
Very Large City	53	1.21
Very Large Suburb	198	4.53
Military Base	20	0.46
Indian Reservation	18	0.41

<sup>1</sup>Note that in the regressions, rural districts served as the "base case" to which all other community types were compared. Consequently a dummy variable for RURAL does not appear in Table 5.

**Table 4. Determinants of Teacher/Pupil Ratios:**

Independent Variable	Dependent Variable Teacher Pupil Ratio		
	Grades K-12 TPLK12	Grades K-6 TPLK6	Grades 7-12 TPL7-12
Intercept	0.06987* (0.00140)	0.061* (0.002)	0.0831* (0.0054)
Per Pupil Expenditures (PPEXP)	0.0000033* (0.00000009)	0.0000028* (0.0000001)	0.00000093* (0.00000066)
Enrollment (LEAENR1)	-0.00000064* (0.00000001)	-0.00000043* (0.000000020)	-0.00000095 (0.00000060)
% Free/Reduced Lunch (POVL)	-0.0000257** (0.0000120)	-0.000009 (0.000013)	0.0000779 (0.0000463)
% Minority Enrollment (MINPUPL)	-0.0000222 (0.0000132)	0.000004 (0.000015)	-0.000072 (0.000051)
Average Salary (SALAVG)	-0.00000555* (0.000000050)	-0.00000046* (0.00000006)	-0.00000159* (0.00000023)
Small City (COMMUN2)	-0.0041* (0.0006)	-0.0015** (0.00067)	-0.0072* (0.0023)
Medium City (COMMUN3)	-0.0060* (0.0011)	-0.0033* (0.0012)	-0.0092** (0.0041)
Medium Suburb (COMMUN4)	-0.0048* (0.0012)	-0.0022 (0.0013)	-0.0072 (0.0046)
Large City (COMMUN5)	-0.0077* (0.0016)	-0.0045** (0.0019)	-0.0114 (0.0063)
Large Suburb (COMMUN6)	-0.0041* (0.0011)	-0.0018 (0.0012)	-0.0061 (0.0043)
Very Large City (COMMUN7)	-0.0057** (0.0024)	-0.0038 (0.0028)	-0.0076 (0.0093)
Very Large Suburb (COMMUN8)	-0.0031** (0.0013)	-0.0009 (0.0015)	-0.0032 (0.0051)
Military Base (COMMUN9)	-0.0082** (0.0038)	-0.0074 (0.0041)	-0.0066 (0.0143)
Indian Reservation (COMMUN10)	0.0214* (0.0041)	0.0099** (0.0045)	0.0245 (0.0160)
R-Square	0.296	0.189	0.060

Standard Errors are in parentheses

\*Significant at the 0.01 level

\*\*Significant at the 0.05 level

**Table 5. Summary of School Demographic Characteristics**

Variable	Mean	Standard Deviation
Elementary Schools (N=3415)		
Enrollment (ELENR)	429.15	800.72
% Free and Reduced Price Lunch (PPOVS)	26.71	67.38
% Minority Enrollment (PMINPUPS)	35.99	86.97
Intermediate Schools (N=1204)		
Enrollment (MIDENR)	568.53	904.66
% Free and Reduced Price Lunch (PPOVS)	30.77	67.38
% Minority Enrollment (PMINPUPS)	26.20	86.97
Secondary Schools (N=1876)		
Enrollment (SECENR)	823.37	1677.04
% Free and Reduced Price Lunch (PPOVS)	22.46	72.40
% Minority Enrollment (PMINPUPS)	23.02	52.88

Table 6. Determinants of Teacher/Pupil Ratios at the School Level

Independent Variable	Dependent Variable Teacher Pupil Ratio		
	Elementary Schools	Intermediate Schools	Secondary Schools
Intercept	0.0586* (0.0013)	0.0499* (0.0031)	0.0605* (0.0019)
Per Pupil Expenditures (PPEXP)	0.000002232* (0.00000024)	0.000006357* (0.00000065)	0.000005888* (0.0000004)
Enrollment (ELENR, MIDENR, SECENR)	-0.0000226* (0.0000016)	-0.0000253* (0.0000026)	-0.0000133* (0.0000009)
% Free/Reduced Lunch (PPOVS)	0.0000603* (0.000015)	0.000308* (0.000036)	0.0000927 (0.0000303)
% Minority Enrollment (PMINPUPS)	-0.0000053 (0.0000151)	-0.000174* (0.000032)	-0.0000473** (0.0000240)
Small City (COMMUN2)	-0.0016 (0.000959)	0.0041** (0.0019)	-0.0058** (0.0014)
Medium City (COMMUN3)	-0.00299** (0.00130)	0.0041 (0.0027)	-0.0039 (0.0022)
Medium Suburb (COMMUN4)	-0.00163 (0.00167)	0.0071** (0.0033)	-0.0047 (0.0024)
Large City (COMMUN5)	-0.00144 (0.00138)	0.0028 (0.0028)	-0.0045** (0.0023)
Large Suburb (COMMUN6)	-0.00055 (0.00152)	0.0093* (0.0030)	-0.0062* (0.0022)
Very Large City (COMMUN7)	-0.00021 (0.00176)	0.0050 (0.0040)	-0.0054 (0.0028)
Very Large Suburb (COMMUN8)	0.00369** (0.00180)	0.0068** (0.0034)	-0.0052** (0.0025)
Military Base (COMMUN9)	-0.00579 (0.00442)	-0.0037 (0.0088)	0.0114 (0.0211)
Indian Reservation (COMMUN10)	0.00412 (0.00643)	-0.0092 (0.0164)	-0.0008 (0.0122)
Adjusted -Square	0.105	0.198	0.270

Standard Errors are in parentheses

\*Significant at the 001 level

\*\*Significant at the 0.05 level

Education and the national economy are intertwined . . . Taxpayers are likely to resist increases at a time when their own real incomes are declining or increasing less than they did in the past. The myth of increasing real resources for schools needs special attention.

# “The Myth of Increasing Real Resources for Schools”

by Eugene P. McLoone

## Introduction

Education and the national economy are intertwined. When the national economy is expanding, it is easy to provide more funds for schools and for other things. In an economy of growth and abundance, choices can be easily made. The major choice is where to devote the increasing share of the economy. When the national economy is stagnant, state and local economies reflect this and raising funds at these governmental levels becomes difficult. This is an economy of scarcity. The choice is for more of one thing and less of another. State governments look to reduce services or to increase taxes. Some governmental services suffer as others absorb scarce resources.

The national economy grew at 1.6 percent a year from 1929 to 1982.<sup>1</sup> Education accounted for a quarter of this increase or 0.4 percent a year. The increased number of years of education of the American workers accounted for the increase in productivity due to education through this period. The higher productivity of additional years of schooling is measured by examining the differences in earnings among people with different amounts of education. It is estimated that 65 to 75 percent of these differences in earnings are attributable to education.<sup>2</sup> Since 1973, average family income has grown slowly and has almost stagnated. From 1979 to 1991, adjusting for inflation, real earnings declined by 2.3 percent for college graduates, 16.1 percent for high school graduates, and 23.2 percent for high school dropouts.<sup>3</sup> As a result, the difference in earnings among groups by education attainment increased.<sup>4</sup> Furthermore, the income distribution of the nation has become more unequal. During the decade of the 1980's, the inequality of the

income distribution increased for the first time in the 20th century. During most of this century, the income distribution in the United States tended toward greater equality.

From 1980 to 1990, only the top five percent of the income distribution and the group in which it is included—the Highest Fifth—increased their share of the nation's income. The other four groups by fifths of the population saw their income share decline in the 1980's. The top 5th percent increased their share by 2.1 percentage points from 15.3 in 1980 to 17.4 in 1990. The Highest Fifth increased their share by 2.8 percentage points from 41.5 to 44.3 in the same period. The Fourth Fifth declined by 0.5 percentage points from 24.3 to 23.8. The Third Fifth declined by 0.9 percentage points from 17.5 to 16.6 percent. The Second Fifth declined by 0.7 percentage points from 11.5 percent to 10.8. The Lowest Fifth lost 0.6 percentage points from 5.2 to 4.6.

Declining real income affects perception of the tax burden even when the same percentage of income is taken in taxes. Education like health and other labor intensive services are likely to need revenue at an increased percentage of income.<sup>5</sup> To maintain the same quality of the labor force, wages in the public sector need to increase at the rate of wages in the economy. The same quality of labor means that wages must increase with both the changes in productivity and the Consumer Price Index (CPI). Against this background of changing economic conditions for the nation, expenditures for public elementary and secondary education are examined over the decade of the 1980's.

## Price Deflator

One question facing citizens, taxpayers, school board members, legislators and educators is whether the funds available to schools are keeping pace with increases in workload and price? A widely accepted measure of workload is pupils in average daily attendance (ADA); thus, dividing current expenditures by ADA allows for change in workload. The resulting current expenditure per pupil in average daily attendance deflated by a price index permits measurement of real changes in spending. The increase in current expenditures per pupil in average daily attendance from \$3,345 in 1979–80 to \$4,960 in constant 1989–90 dollars as measured by the CPI.<sup>6</sup> This is an increase of 48.3 percent in constant dollars for current expenditures per pupil. Some cite these data to affirm that schools have had sufficient funds for a quality increase. The comparable increase in constant dollars as measured by the CPI for average salary of the instructional staff is 19.7 percent.<sup>7</sup> Some would see this as a quality increase in education as the change in current expenditures from one period to the next is the product of workload, price, and quality changes.<sup>8</sup> No change in average salary of the instructional staff measured in constant dollars adjusted by the CPI, or a constant average salary in CPI adjusted dollars, is seen as comparable quality from one period to the next. When price and workload changes are accounted for, the remaining residual, if any, is viewed as a change in quality.

Others would indicate that for the decade of the 1980's that there was no real gain, no quality change, and possibly even a decrease in quality. These would expect that the average instructional staff salary should increase with the changes in per capita personal income in the nation or a state.<sup>9</sup> The proposition here is that average salary has to increase not only with the changes in CPI but also with the changes in productivity in the economy. Unless compensation increases with both these measures, there will be a diminution in quality of the work force in an industry or firm. Senator Moynihan has recently raised this question in the hearings on health reform. This proposition presently raised by William J. Baumol<sup>10</sup> was first raised years ago by Melvin and Anne White. Under this approach, there is likely to be a diminution in the quality of the instructional staff as

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national per capita income increased 102 percent from 1979 to 1989 and average instructional salary by less, 96 percent. Furthermore, average instructional staff salary by state increased faster than state per capita personal income in 22 of the 50 states, and less than per capita personal income in 28 states and the District of Columbia.

This standard for constant quality of staff can also be expressed as a point elasticity of unity or one, i.e. the percentage change in average instructional staff salary for a time period should be equal to the percentage change in per capita personal income for that same period. When this standard is applied to current expenditure per pupil, then there is a quality gain of 16 percent for the nation and 43 states have quality gains, with 29 states having gains greater than the nation's. A point elasticity for average instructional staff salary reveals a decline of 6 percentage points for the nation and 20 states with an increase in quality. All but one of these states—Mississippi—had quality increases whether measured by the current expenditure or the average salary point elasticity.

It does not seem to be a simple matter to say that public elementary and secondary education has had a quality increase. Those results appear from using only the change in current expenditure per pupil adjusted to constant dollars by the CPI. Another missing element is the changing work load of the schools. Many of the students attending school at the end of the decade were more costly to educate than those at the beginning of the decade.

#### Difference in Cost of Educating Students

Cost differentials have been recognized for sparsity and density of student populations, for program such as vocational education, and for many students with special needs. These differences are rarely portrayed in current expenditures per pupil in average daily attendance. Special studies from time to time examine the extent to which these differences vary among states and localities. By and large these differences do not seem to warrant constant attention for general reporting. The decade of the 1980's, however, may require attention to these students that cost more than the average or "regular" student.

Special education students as a percentage of the total enrollment in K-12 public schools increased from 9.62 percent in 1979-80 to 11.30 percent in 1989-90. Children in poverty in the same period increased from 24.0 to 29.8 percent of the population. If one assumes that special education children are twice as costly to educate as "regular" children and that poverty children are one and a half times as costly as "regular" children, then the increasing proportion of the school's children coming from more costly groups of children would have raised the workload over the period by 4 percent.

If the increase in funding in constant dollars is near 50 percent as deflation by the CPI alone indicates, then this increased demand of the workload is easily handled. If the increase is 16 percent when current expenditures per pupil are adjusted by change in per capita personal income, the increased workload remains within reason. When one deflates wages and consequently has a decline in quality of the workforce, the increase in workload becomes serious. The more costly to educate population potentially can be much more serious when perceived by parents of average or "regular" students as taking funds from these children. Taxpayers often object when they see the cost of programs for targeted populations as so much beyond what is spent generally per pupil.

To illustrate these differences among pupils classification: when current expenditure per pupil in average daily attendance was \$3,345 in 1979-80 in constant 1989-90 dollars as measured by the CPI, the amount spent for a "regular" or average student would be \$2750 with \$4125 spent for poverty children and \$5500 spent on special education pupils. Although these

amounts may not have been spent in practice, these amounts are what would be spent under the assumed costs for poverty and special education pupils using the national percentage of these "extra cost" students. Students who cost more than the average or "regular" student increase the overall per pupil expenditure. As the number and percentage of special populations has grown, more and more taxpayers and parents question the differences in spending among pupil classifications. When these differences above and below the average amount spent by a school district exists, parents question whether or not their children are being treated fairly as the difference in spending among schools and pupil classifications becomes greater.

#### Income Distribution

The income distribution depends on the distribution of the ownership of factors of production and rate of return to each of these factors. One of these factors of production is human capital produced by schools. There are differences of opinion about the contribution of schools to the increasing inequality of the income distribution. Some people see the growing gap in earnings between high school graduates and college graduates as a failure of the high schools. Others see it as a failure of business. Those who see the schools as failing indicate that high schools do well for college bound students but fail for high school graduates who go to the world of work. Employers have established low wage jobs because the quality of high school graduates has fallen.<sup>11</sup> This may prevail because of how employers and students respond to the present situation. Employers have no means of judging the differences in quality of high school graduates and students have no incentive to do well in high school if they are not going to college. Assuming that this is a cause for the increasing inequality of the income distribution, then schools bear some responsibility for increased inequality. Nonetheless the schools do not have complete control. The income distribution depends not only on what schools do but also what the economy and private business firms do.

Some see that the growing inequality between high school and college graduates in earnings are the result of schools failing to educate those students at the bottom of the income ladder while doing very well for those students who go to college. Some would call for schools to do more for high school dropouts and high school graduates. Some economists call for greater incentives to high school students by making differences in high school performance and attendance meaningful to employers. Then employers would offer earnings according to student performance in high school. These economists see the growing gap in earnings between high school graduates and college graduates resulting from the lack of a meaningful way to measure either the knowledge and skill abilities of high school graduates or the differences in abilities among graduates today.

These economists do not believe, as some others do, that the earnings gap is either the result of exporting high wages jobs or the artificial creating of low paying jobs by business and industry. For these, the earnings gap comes from both a lowering of the quality of schooling among graduates and the inability of employers to assess differences in quality among high school graduates. Schools are responsible for some of the growing inequality in the income distribution but the extent is not known. If schools are failing, they are doing so for persons at the lower end of ability scale or the income scale. Schools do not seem to fail the talented.

If the desired goal is an equal distribution of income, taking the increases in income during the decade of the 1980's from the Highest Fifth of the income distribution and redistributing this amount to the other four Fifths according to their loss from 1980 to 1990 would restore the more equal 1980 income

distribution. In other words, there are redistribution policies of taxes and distributions that can maintain any degree of equality in the income distribution that is desired. The major question is whether the taxed group, in this case the Highest Fifth of the income distribution, would value redistribution. In a situation where the overall gains for everyone was greater with the more unequal distribution of income, the taxed group might agree. The situation of the past decade where almost everyone's income fell in real terms makes the acceptance less likely.

The major conclusion of this analysis is that the size and the degree of inequality of the income distribution while depending on education is affected by many other factors. The degree of acceptance of redistribution of income by all persons is one such factor. Acceptance of redistribution of income may depend on whether or not the economy is growing and whether or not real earnings are rising for most.

A policy that devotes more funds to children in poverty should be a good investment to make incomes more equal and to improve economic growth as a potential part of the lost workforce is saved.<sup>12</sup> Since those children that fail in early grades are more likely to be high school dropouts, this policy of devoting funds to poverty children should attack this problem as well.

### Economic Growth

As the economy has slowed in growth, education's contribution to growth has been questioned. The general decline in real incomes for almost all groups on person by education and in particular, the decline in real incomes for persons with less than a college degree has had some claim that all that schools do is sort individuals among educated groups and that schools even do that task badly. Schools have a task in promoting economic growth but it is with identifying those who presently are poorly served and serving them better so that they reach their economic potential.

As educated workers become unemployed, education is no longer seen as the tool to protect workers from unemployment. The role of education remains important but no longer is it a direct one to economic progress. Business and industry must be served and workers must have demanded skills and be of an appropriate age. Training and retraining are important. The amount of education is important but the kind and quality also matter. The simple relationship of the past does not hold.

### Adequate Spending Level

Whether or not the current expenditures per pupil are adequate for schools can be answered in many ways other than the comparison across time as done in Table 1. As long as the investment in the education of poverty children brings a greater return than other investments in education or elsewhere, then an inadequate amount is being spent on that group. Educators might not prefer this answer of the economist. Educators might call for funds for all children to fulfill their potential even when there is no economic return. This view justifies spending on students with handicaps who may not receive the return that one might obtain elsewhere within education or elsewhere in the economy. An economic justification of these programs for the handicapped arises when the program can show a benefit for the program, e.g. students who are so educated require fewer services as an adult, or students who are so educated do perform in the economy even though to a limited degree while those who do not are institutionalized.

When workload is constant and no change in quality is desired, a point elasticity of unity, or one is adequate for current expenditures per pupil. This implies a constant percentage of Gross Domestic Product (GDP). Education maintains its relative position in the economy. A slightly increasing share of GDP becomes necessary if the productivity in education is less than that in the overall economy. If Baumol is correct, then education like health and other public services demanding labor intensive services requires a growing percentage of GDP.

### Conclusion

Taxpayers are liable to resist such increases at a time when their own real incomes are declining or increasing less than they did in the past. A task of today is to explicate these relationships of the economy and schools and the causes of declining real incomes and the growing unequal income distribution. The myth of increasing real resources for schools needs special attention.

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**Table 1. Point Elasticity for Current Expenditure Per Pupil and Average Instructional Staff Salary from 1979–80 to 1989–90, State Current Expenditure Elasticity as a Ratio of the National Average Current Expenditure Elasticity and State Salary Elasticity by State, United States, 1979–80 and 1989–90**

State	Current Expenditure Per Pupil Elasticity 1980–89	State Elasticity as Ratio of National Elasticity	Average Instructional Salary Elasticity 1980–90	Ratio of Salary to Expenditure Elasticity
Alabama	1.60	0.91	1.00	0.94
Alaska	1.00	0.86	0.74	0.74
Arizona	1.26	1.08	1.28	1.02
Arkansas	1.36	1.17	0.88	0.65
California	1.05	0.91	1.25	1.19
Colorado	1.00	0.86	0.94	0.93
Connecticut	1.52	1.31	1.04	0.68
Delaware	0.91	0.78	0.97	1.06
District of Columbia	1.57	1.35	0.81	0.52
Florida	1.50	0.03	0.94	0.63
Georgia	1.39	1.19	1.05	0.76
Hawaii	0.88	0.76	0.59	0.67
Idaho	0.99	0.85	0.87	0.88
Illinois	1.02	0.87	0.89	0.87
Indiana	1.64	1.41	1.07	0.65
Iowa	1.13	0.97	0.93	0.82
Kansas	1.51	1.30	1.37	0.91
Kentucky	1.30	1.12	0.89	0.68
Louisiana	1.55	1.33	1.06	0.68
Maine	1.47	1.26	0.77	0.53
Maryland	1.11	0.96	0.84	0.76
Massachusetts	0.83	0.72	0.77	0.93
Michigan	1.26	1.08	0.92	0.73
Minnesota	1.07	0.92	0.99	0.93
Mississippi	0.92	0.79	1.12	1.22
Missouri	1.31	1.13	0.94	0.72
Montana	1.09	0.93	1.14	1.05
Nebraska	1.48	1.28	1.06	0.72
Nevada	1.24	1.06	1.08	0.87
New Hampshire	1.22	1.05	0.79	0.65
New Jersey	1.04	0.90	0.68	0.66
New Mexico	0.96	0.83	0.89	0.92
New York	1.03	0.88	0.74	0.72
North Carolina	1.63	1.40	1.14	0.70
North Dakota	1.79	1.54	1.12	0.62
Ohio	1.65	1.41	1.13	0.69
Oklahoma	1.21	1.04	1.14	0.94
Oregon	1.30	1.11	1.10	0.85
Pennsylvania	1.31	1.13	0.94	0.72
Rhode Island	1.24	1.07	0.88	0.71
South Carolina	1.38	1.19	1.12	0.81
South Dakota	1.08	0.93	0.79	0.73
Tennessee	1.19	1.02	0.93	0.78
Texas	1.49	1.29	1.20	0.80
Utah	0.78	0.67	0.51	0.66
Vermont	1.62	1.40	0.96	0.59
Virginia	1.11	0.96	0.96	0.87
Washington	0.97	0.83	0.72	0.74
West Virginia	1.75	1.51	0.91	0.52
Wisconsin	1.29	1.11	1.04	0.80
Wyoming	1.71	1.47	1.05	0.61
United States	1.16	1.00	0.94	0.81

Source: Calculated from data on state per capita personal income from *Survey of Current Business* p. 17–29, Vol. 65, No. 8., August 1985 and p. 29–43, Vol. 71, No. 8., August 1991 and current expenditure per pupil from National Center for Education Statistics, *Digest of Education Statistics, 1992*. (Government Printing Office, Washington, D.C., 1992) Table 157, p. 160–161 and average salary for instructional staff from Table 76, p. 86.

[I]n most cases better-off Americans simply have a narrow view of what they are doing . . . They do not want poor children to be harmed; they simply want the best for their own children. That is the point of our dilemma—how do we get past the concern for one's own children and move on to a concern for all children?

# EDUCATING ALL OF THE CHILDREN OF ALL OF THE PEOPLE: Will School Choice Help or Hinder?

by Van D. Mueller

This essay is drawn from several presentations made during the past 12 months. The approach is probably less formal than a typical academic presentation. However, the ideas incorporated here represent careful thought and genuine commitment to principle and are best delivered in this more conversational style.

Children cannot pull themselves up by their bootie or boot straps. We cannot expect children to organize, fund and deliver their own education; to make it on their own. Someone must educate all the children just because they are children. I believe children are the "walking wounded" of the school finance equity wars and could become the casualties of the choice movement. Now too many children attend schools which are impoverished due to wealth-based disparities and inadequate state finance systems. Children are not born to poor schools but bred there. They are the victims of failure of adult policymakers. I believe there are ready solutions to the injustices in our public school systems. I also believe that the needed resources exist. What we lack is the commitment to all children not just our children; and the will to act on this commitment. I believe Americans have the capacity to have both choice and community reflected in our policies. Educating All of The Children of All of The People is what equity and justice in school financing is all about.

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It is also what I believe can be accomplished if both organizational change (choice) and resource distribution fairness (school financing) are considered together, as mutually supportive and necessary reform strategies.

My thoughts about this topic have been heavily influenced by several factors:

- (1) By my 40 years experience as a professional educator;
- (2) By my visits (1988–93) to rich schools and poor schools in Minnesota, North Dakota, South Dakota, Missouri, Kansas and Wyoming; and
- (3) By my almost 20 years as an active parent advocate (state and national PTA) working with hundreds and hundreds of caring and committed parents in 15 or so states and hundreds of school districts.

More than ever I believe that for schools to be good and strong they must be just. How we treat the "bottom layer"—the children—will determine our success as a nation. The remainder of this article will be organized around several themes/questions: (1) What is equity as it relates to children? (2) Does money really make a difference in providing education to all children? (3) Does choice really make a difference in the educational lives of children? and (4) What can each of us, lay and professional, policymakers and implementer, do to assure that all children can receive high quality educational services? Also included is a summary update of choice activity in Minnesota.

*First, what is equity as it relates to children?* The more diverse our population and schools have become the more we talk about equity and the less we equalize. The school equity discussion has focused on race and gender equity and has neglected class and age equity. The school financing discussion has too frequently centered on equity for school districts or equity for teachers or for school buildings. This focus has placed the attention on adults and adult-built organizations rather than children. The debate on choice has taken on some of these same characteristics. Another dark cloud over the discussion of equity has to do with it being a "zero-sum" game. That is if some people "win" some other people must "lose." If adults win on issues like "local control" must children lose? Is equity different when thinking of individuals rather than of people in groups? Does the debate on choice reflect some of the same "win-lose" thinking? Another area of interest with respect to equity is the tendency to constantly change the rules. Just when plaintiff parents and children in some school finance equity lawsuits (Note: there are active cases in at least 13 states at the present time<sup>1</sup>) have assembled compelling evidence of disparities on input measures the defendant states attempt to change the rules and want to focus on outcomes—or at least those "outputs" which can be easily measured such as achievement tests. Is this fair? Webster defines equity as *fairness, impartiality and justice*. Can these principles provide a useful working guide? Can we educate all of the children of all of the people by accepting these notions for policy development in choice and school financing? They seem to me to provide a useful start. It seems clear to me that neither equity nor choice has commanded significant attention or has been a major goal of U. S. education regardless of which definition is employed.

According to the Children's Defense Fund, 25 percent of our children live in poverty.<sup>2</sup> It is a massive national disaster of epidemic proportions. If a disease affected 25 percent of our population we would be up in arms! Do we truly care about our children? Are the motives back of movements to provide school choice and to equalize school funding designed to benefit children or adults? What is our evidence here? Adults are clearly in control of the educational and policymaking institutions of our society, children are most often without voice or representation. Schiller's comment that "the voice of the majority is not proof of justice" probably applies. Our school finance systems and school organization systems are not fair or just to children.

*Second, does money make a difference in educating all children?* Over 25 years ago Arthur Wise raised two important questions—important questions in 1967 and maybe more important in the 1990s. Wise asked: Why does the widespread condition of inequality of education exist?<sup>3</sup> The immediate answer is that public schools are locally financed, states do not equalize, and localities differ in their ability and willingness to support schools. This is only half the question, it does not only ask why such inequality is allowed to exist? Wise also asked why has there been no public outcry against the inequalities which exist? Is it because the poor do not complain or because no one listens when they do complain? We continue to ponder why children from more advantaged families do better in school than children that grow up in poverty. Certainly part of the discrepancy results from what the advantaged family is able to offer its children in terms of adequate nutrition, a stable home, books and trips.

But part of the discrepancy results from the schools and education that our states and school districts provide. For decades the gulf has been widening between the "have's" and "have not's." By relying on local property taxes we have created a caste system of public education that is increasingly separate and unequal. The states which have the ultimate responsibility for equity and fairness have often shirked their responsibility. Will choice solve or exacerbate this unequal condition? What is needed to provide a level-playing field where market forces can work to improve for all rather than continue to discriminate? How widespread is the public attitude represented by the 1993 Texas bumper sticker which reads "Robin Hood was a Thief" or the newsheadline which read, "Texas Voters Jail Robin."

To be sure educational quality is not solely determined by the level of funding a school receives. Money can be squandered and facilities and personnel put to unproductive uses. On the whole, however, schools with more money can buy more and better resources—teachers, buildings, equipment and books. When the advantaged have the better financed schools and the disadvantaged the poorly financed schools, we continue to provide unequal education to those who most need what the public schools have to offer. Must we first fix this broken system of school financing before choice can serve all children?

In many places across our country, these discrepancies are especially stark. Consider Kozol's exposé of the extremes of wealth and poverty in America's school system and its effect on poor children, especially those in the cities.<sup>4</sup> From San Antonio to New York City's South Bronx, Kozol describes inner-city schools as bleak fortresses with rotting classrooms and few amenities to inspire or motivate the young. In painful detail Kozol describes inner-city schools in images which stand in stark contrast with the descriptions of the luxurious facilities in suburbs such as Winnetka, Illinois, Edina, Minnesota or Clayton, Missouri.

There is no denying the key role that access to resources plays in creating the vast education gap between such rich and poor. In the affluent Texas district of Glen Rose, the children benefit from expenditure of \$9326 per student, three times as much as in Rio Grande Valley's Roma district. In my own experiences I have visited schools such as suburban St. Louis's Clayton schools where they have over \$5000 more per pupil per year to spend than the neighboring Jennings district, even though Jennings' taxpayers levy a higher rate. In rural North Dakota the Billings County Schools provide their children with all of the human and material advantage that money can buy—excellent facilities, small class size; varied materials, well-stocked libraries and extensive technology to support instruction. In another North Dakota district (Bell) the students attend classes in substandard buildings where committed teachers valiantly struggle to overcome large class sizes, outmoded

equipment and ancient textbooks. It is indeed a tragedy that the components needed to provide excellence in education for all children are not more widely shared. All of our children ought to be allowed a stake in the enormous richness of America. Will choice help achieve this goal? Do resources (money) make a difference in the quality of education for our children? You bet money makes a difference!

One can go on and on with stories of the discrepancies in educational opportunity between the have and have-not school districts. It makes little difference which state one visits, the disparities in access to educational services are shocking. Since 1988 I have had opportunities to visit schools in Minnesota, Missouri, North Dakota, South Dakota, Wyoming and Kansas while working with the plaintiffs on their respective school financing lawsuits. I have seen the same pattern of advantage and disadvantage in each of these states—the same pattern documented by Kozol, Wise and others over the past several decades. I believe the same pattern of unequal opportunity for children is present in all 50 states and is well known to most educators and policymakers. Are these differences driven by the presence or absence of resources? Of course they are!! Necessity may be the mother of invention but it has some severe limits. I have not come across many educators or parents who can work miracles.

*Now, finally I want to address school choice directly—will it strengthen or weaken public education in America?* Among educational reformers and policymakers, choice is a commonly heard buzzword. Supporters say the entire education system would benefit if parents could choose their children's schools. In this view, competition for students would force schools to improve. Better schools, in turn, would prod students to do better. And parents, having set the whole process in motion, would take a greater interest in the schools and in their children's academic progress. But many people, including teachers and school administrators are deeply skeptical. They fear that choice plans will siphon money and interest from the public schools, will create elite schools for the few and second-rate schools for the many, will lead to increased segregation of students by race and class and will cost taxpayers more money. The choice concept (the symbolism if not the reality) has caught on in many quarters throughout the country. Minnesota has what is probably the most comprehensive statewide program and I will provide a brief status report a bit later. You should know that I have been an advocate of the controlled-choice program in Minnesota. As a volunteer lobbyist for the Minnesota PTA I testified in support of the original legislation and subsequent amendments. Also I have spoken in support of the concept at National Governors' Association hearings, the NEA Board of Directors and other forums. It is appropriate also to acknowledge that I was the named plaintiff in the challenge to Minnesota's tax deduction law which diverts public monies to non-public schools but was upheld by the U.S. Supreme Court on a five to four decision in 1983.<sup>5</sup> This is one reason why I continue to believe that totally uncontrolled choice is wrong.

Before attempting to relate the choice and school financing issues in a common policy mode there are a number of questions raised by choice which are worthy of review:

1. Will school choice lead to improved student achievement in the classroom? This is a key contention of choice advocates that competition for students will create more stimulating classroom environments and surely yield high overall scores on standardized tests. In addition advocates argue that parental involvement in their children's education and the act of choosing a school can serve as a catalyst for increased parental commitment. But critics contend that many school choices will not have anything to do with academics and that if choice schools draw brighter and higher mo-

tivated students higher test scores would just reflect the different students rather than better school curriculum or program.

2. Will choice programs lead to the creation of segregated or elitist schools with the best students being lured to the best schools and the less gifted left behind? Choice critics warn that the "skimming" or "creaming" of the best students is inevitable. They argue that choice will create an even larger gap between rich and poor, between motivated and the unmotivated; and push our country even further toward a two-tier society. Proponents argue that this does not have to happen, that transfers which undermine desegregation plans can be prohibited. Both proponents and opponents are in agreement that unless there is diversity available in educational programs there is no possibility of any real choice being available.
3. Should secular and church-related private schools be included in a choice program designed primarily for public school students? This is among the most sensitive issues surrounding the school choice policy debate. Many experts, including choice advocates argue that including private and parochial schools in a choice system could destroy public education in America. Others suggest that if parents abandon the public schools it reflects how bad they are and how desperately parents want to see improvements. This debate also touches on the question of whether inclusion of parochial schools in choice plans would violate the U.S. Constitution's doctrine of separation of church and state. In Minnesota Governor Perpich's assurance that choice would be public school choice only was a pivotal factor in its adoption in 1985. The support of the Minnesota PTA and other organizations and individuals would have evaporated had choice been broadened to include private schools.
4. Will choice undermine the current education establishment and transfer responsibility for choosing curricula, setting graduation standards and running the schools? Empowering parents to choose their children's schools without doubt changes the entire power dynamic in schools. Accompanied by the empowerment of teachers, principals and parents under school-based management plans the existing school structures will be weakened and/or be substantially revised. Power and influence issues and questions of who will or should control the schools add additional questions about employee unions, the role of school boards, competition between lay persons and professional educators as well as policy issues with respect to state-mandates v. local initiative and control.
5. Will choice programs increase or decrease educational expenditures?<sup>6</sup> Supporters and critics of school choice differ sharply on its budgetary impact. Critics say choice programs would end up adding to educational expenditures in several areas. One of the most expensive areas is student transportation. Even supporters of choice agree that choice will not work unless school districts provide student transportation or reimburse parents for these costs. Other areas of increased expenditures include the need to provide improved and diversified educational programs, to provide for improved communication and public information about available choices and to train all parents to make informed choices for their children. In addition to transportation costs each of those areas would create new resource demands to increase the current capacity of most school districts to provide diverse programs of quality and to inform con-

stituents. A final cost-related issue is associated with the loss of funds in those districts where substantial numbers of students leave for other districts and take along their eligibility for state aids. Choice certainly does not appear to be a money-saver.

Before bringing this paper to a close with some summary remarks I want to give you a brief progress report on the status of choice programs in Minnesota since its choice program history is somewhat longer than elsewhere. Minnesota's K-12 enrollment options programs (open enrollment across district lines and other programs) are not a Minneapolis/St. Paul metropolitan area or super-star phenomenon.<sup>7</sup> A significant number of students from around the state (36,000 or about 4 percent) are using one or more enrollment option programs. Some programs are more heavily used by non-metro students while some seem to better meet the needs of metro students. And well over half of the students using choice programs are students at risk of failing in traditional school settings.

The programs students participated in during 1992-1993 included:

1. Attending school outside their home district;
2. Attending multi-district area learning centers for students at risk;
3. Attending public or private alternative programs for at-risk students;
4. Taking classes at public or private post-secondary institutions; or
5. Taking college level courses in their own schools.

About 42 percent, or over 15,000 students who used enrollment options programs in 1992-93 had either dropped out of school previously or were at risk of dropping out. The next largest group of students, about 8,000 or 22 percent used the post-secondary enrollment options program to attend post-secondary institutions. The state picks up the bill for their tuition. Over 13,000 students or 36 percent chose to attend school outside of their resident district under the open enrollment program. State funding follows the student. Non-metro students accounted for almost two-thirds of the open enrollment transfers.

In 1992-93 about 8 percent of the state's 11th and 12th graders took post-secondary courses under the Post-secondary Enrollment options program. The students came from 75 percent of Minnesota's school districts.

The impact of Minnesota's school choice programs is difficult to measure. At its core school choice in Minnesota remains more a question of ideology than evidence. Neither proponents nor opponents have been very accurate in their predictions of impact. School choice programs have certainly influenced the destiny of certain individual school districts, mostly smaller rural districts. Choice has affected the types of programs schools are offering in a large number of instances. The number of school settings serving at-risk students has tripled in the last seven years. A number of districts have added magnet schools or "schools within schools." Teachers and parents have put together over 20 proposals for chartered schools. All of the eight charters authorized under the original law were approved by the State Board of Education. During the 1992-93 school year only two charter schools were in operation. What is probably becoming clearer over time is that the impact of choice programs in Minnesota is understated due to the overemphasis on transfer to other school districts and the lack of data on people who make choices within districts or who become informed, consider options and choose to stay put.

In sum, there are a number of important policy relevant conclusions which follow from the issues and ideas presented here. They are:

- 1) Even the most effective school choice plans will not solve all of our education problems. Clearly we need to learn more and practice more completely what we

know about children's learning. We need to implement the best curriculum, employ the best technology, retrain teachers to meet new student needs and help parents take charge of their children's learning. In and of itself choice provides only a shell—a mechanism—to encourage these activities.

- 2) All choice plans will probably help some families more than others. The challenge which we face is to make certain that those children most at risk become the first recipients of the new efforts to improve our schools and that choice be used to leverage a closing of the gap between have's and have not's.
- 3) Choice is not a money-saver. There are advocates of choice who stress competition to the neglect of cooperation or collaboration, who stress the cost-savings of the market philosophy, and whose ulterior motives have little to do with children. If educational choice is to work for all of the children of all of the people some up-front development capital is needed. This is true because improved diversity in program options, transportation of students, better communication about choices and training of all parents in making sound choices all cost money. While this new expenditure could and should be considered as an investment there will be little in the way of a dividend as value-added from an organizational change like choice without accompanying resources.
- 4) Doing nothing to improve the education for all children may be more dangerous than doing something. The public school systems in America are strong and resilient. The fear that choice within the public sector will destroy the public schools is not well-founded. In both human and organizational terms the wastefulness of continuing to under-educate or miseducate a substantial segment of the youth of our nation is by far the higher risk.

Finally, what can each of us, lay and professional alike, do to assure that all children receive high quality educational services?

It probably would be well for us to begin by publicly acknowledging the persistent condition of unequal education which plagues our nation. Unless we admit this problem we are unlikely to address solutions and remedies. The irony of this is played out in state after state as public dollars are used to defend unfairness in access to education. Can we redress the longstanding problems of distributing better education to some children and youth and worse education to others? What place do new organizational arrangements have in bringing about quality education for all children? Can choice work or gain broad public acceptance without the provision of a "level-playing field" for the market competition? Should we continue to allow stu-

dents to attend schools which we would not permit our own children or grandchildren to attend? How many teachers and school administrators work in one district and either send their children to non-public schools or to other public schools because they know of the inferior conditions and programs in their district of employment? Many years ago John Dewey suggested that the quality of education which we should provide all children is the quality of education demanded by the best and wisest parent. Why can't we do this? Kozol pointed out in *Savage Inequalities* that in most cases better off Americans simply have a narrow view of what they are doing. He wrote, "they do not want poor children to be harmed. They simply want the best for their own children." This is the point of our dilemma then. How do we get past the concern for "one's own children" and move on to a concern for all children? Is choice at all compatible with concepts of community, of concern for all children? If it truly takes a whole community to educate a child how do we balance the common good with individual initiative?

Surely we can together find the resources, organizational know-how and political will to enable all of our children to begin their lives with the support of the best education we know how to provide. We all have a stake in assuring that justice prevails for each child in each classroom and in each school district across America. For as the lyrics at the beginning of Act 2 of the musical *Miss Saigon* so eloquently illustrate: "they are the living reminder of all the good we have failed to do for we know deep in our heart that they are all our children too!"

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The vast majority of education finance researchers would concede that cost of living issues are legitimate variables for any education finance distribution program. Equally important, however, is that the cost of living variables be properly measured and accounted for in the formula

# Funding Public Education Based on the Concept of Cost of Living

by R. Craig Wood and David C. Thompson

## Introduction

Generally, it is assumed that the cost of providing public education varies within most states. Thus, equal educational opportunities may not, in fact, be present within a given state if the costs of providing educational services were not accounted for within the state aid distribution formula. Often, it is argued that the state aid distribution formula fails to reflect the true costs of providing educational opportunities to students in rural as well as urban school districts. Thus, perfect equality of spending is flawed on two fronts. The first flaw would be that different classifications of students obviously need different educational services. These classifications, by necessity lead to various weightings in order to reflect the costs of providing those specific services. This concept is generally accepted within many state aid distribution systems. The second concept is much more difficult to properly operationalize in that school districts, and potentially each school therein, provides educational services that must be accounted for based on the cost of providing public education in that community operationalized on what those services cost within the given community.

## School Districts as Consumers

At any point in time, given their income, individuals in society have a certain degree of purchasing power. This degree of purchasing power is a reflection of income as well as the rela-

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tive cost of goods and services within the community in which they reside. The cost of living reflects the cost of goods and services which varies throughout our society.<sup>1</sup> However, its quantification, as to actual application to a given community, is exceedingly difficult because research does not fully explain all the relevant variables and interactions. To move this theoretical overview and then to apply this concept to public agencies is even more difficult since research clearly indicates that school districts are not typical "consumers." Thus, despite the general acceptance of a market basket approach to determining relative differences in consumer prices, both over time and between localities, creation of a counterpart index focused on the cost of educational inputs has proven far more elusive.

Numerous states have expressed concern regarding the cost of educational resources in relation to a perceived inequality of educational opportunity. In fact, at various times the states of Alaska, California, Florida, Georgia, Idaho, Illinois, Kentucky, Maryland, Missouri, Nevada, Ohio, Pennsylvania, Tennessee, and Texas have studied this issue in relation to public education finance.<sup>2</sup> Despite these forays, no studies have "... been reported that adequately explain the causes of differences in the costs of educational resources."<sup>3</sup> Further evaluation of the research indicates that no study has yet to emerge in the research literature that adequately explains these differences. It should be noted that the authors are not stating that such differences do not exist but simply that there is no research evidence that explains them. The difficulty in explaining why the cost of providing education in one locality varies from that in another is perhaps best illustrated by examining teacher compensation—the largest component of the public elementary and secondary educational expense.

## Teacher Compensation Component of School Expenditures

A school district's primary purchases involve labor. Obviously, public education is a highly labor intensive industry. Most studies conclude that the typical school district in America spends more than two thirds of its general budget on salaries and fringe benefits for its employees. This is perfectly understandable given the nature of the teaching and learning process in American public schools. All other purchases are relatively minor once this category, specifically salaries and fringe benefits associated with classroom teachers, is fully met. Moreover, it is vital to understand that the cost of hiring and retaining public classroom teachers is not a function of the cost of living of the local community. It is instead a function of those individuals who are in the labor pool. Those individuals who possess, or are qualified to possess, valid teaching certificates as public classroom teachers are within the applicable general labor pool. There also are discrete subpools, since districts need to employ teachers with certification to teach specific topics.

The major cost for public school districts is a function of the classroom teacher market of the state, the region, and even perhaps the nation. In reality, however, explaining or predicting such cost is made exceedingly complex by virtue of the collective bargaining process that exists within a given state. The cost of an educational input, i.e., classroom teachers, thus may not be a function of the labor market at all but a function of the scope, intensity, as well as the sophistication, or lack thereof regarding the collective bargaining process that exists within a given school district.

This collective bargaining process has been, and is, highly affected by the price of teacher inputs in neighboring or similarly situated school districts. The collective bargaining model assumes that both sides, teachers as well as the local school board, will take into account the competing wage scales of other school districts.<sup>4</sup> In doing so, an upward spiral is created that is independent of internal market forces. These observations are supported by the work of Dunlop and Ross as far back as 1948.



Dunlop observed that the concept of job clusters existed in which wages were paid to individuals holding relatively stable positions over time. Ross observed that the existence of an orbit of similar comparisons indicated that salaries were largely a function of what other employees received in similar organizations.<sup>5</sup> This research suggests that wage levels seek a form of equilibrium only in part affected by supply and demand principles.

Equally questionable is a direct correlation between teacher salaries and ordinary cost of living measures. Studies have shown that teachers' salaries may not be a function of external variables, such as the Consumer Price Index.<sup>6</sup> These data suggest there is no evidence that, where cost-of-education measures are utilized by a given state, they result in commensurate teacher salaries, higher or lower.

Specifically, the higher cost of living concept argues that a school district with a higher cost of living must pay more for the same teacher input than a district with a lower cost of living. In reality, urban school districts that may have a higher cost of living status also possess a greater number of individuals who are in the qualified specific labor pool by virtue of the size of the community. Further, if a community had a higher cost of living index and if it were to have an effect it would be reflective of the existing salary scales within affected school districts. Thus, it should be expected that salary levels will have already reached the appropriate equilibrium if this relationship does, in fact, exist. Thus, it can be suggested that if this cost of living data were an accurate predictor, teachers' salaries would be highly statistically correlated with such indices.

Research reflects that demand is a function of income and overall demand by the change of population. As the demand rises, the cost of goods and services also rise due to a lack of perfect elasticity. With a larger population, economies of scale should set in and lower the price of goods and services. However, this generally does not prevail in that the costs of services rise in terms of police, fire, transportation, sanitation services, as well as in a variety of social services. This is particularly evident in large urban areas that suffer from municipal overburden in which the necessary governmental services simply cannot meet the demand. Table 1 reflects teachers' salaries for 1988-89 in terms of average teacher salaries for each state divided by an interstate cost-of-living index in order to calculate an "adjusted average salary." The authors of this research strongly caution that these data do not reflect the fact that employers recruit employees for specific job assignments and that individuals seek remuneration "according to their perceptions of working conditions and amenities and disamenities of where they must work and live."<sup>7</sup> Further, the authors state, "[t]he average teacher salary in a particular state also depends on the experience level of the average teacher, which is influenced by enrollment trends, pay practices, and demography. The academic and credentialing standards for entry to the professions and a variety of other supply and demand conditions also affect average teacher salaries."<sup>8</sup>

A number of interpretations could be suggested for these data and such comparisons:

- Classroom teachers, as a whole, are either underpaid or overpaid in relation to the cost-of-living; classroom teachers should immediately receive a pay raise, in order to make them "average." On the other hand, one could argue the opposite point of view of reducing salaries in certain states, in order to make classroom teachers "average." The third view would be to maintain relatively higher salaries in all states, in order to create a given salary structure that reflects societal commitment to public education.
- In below average states, classroom teachers, as a whole, are not as experienced as that of the nation;
- In a below average state, one could argue that classroom teachers have chosen to live in that state for various personal reasons including lifestyle;

- In below average states, classroom teachers have not experienced success during the collective bargaining process;
- The cost of living concept has no merit in that, if these pressures were indeed meritorious, the average adjusted salaries would not exist as they do, and/or
- The cost of living concept has no merit in that the fiscal ability of a given state must be accounted for in such comparisons.

It is important to note that these observations, singularly or in any combination, may be offered. No one can tell conclusively why a difference between teacher salaries and cost of living exists. Nonetheless, classroom teachers, in certain states, are underpaid in terms of the cost of living as measured by the CPI. These specific classroom teacher salary data are shown in Table 1. The relative changes of such data may be seen in Table 2.

Where cost of education indices have been employed, or at least formulated for study, teachers' salaries were the overriding issue. In a California study it was noted:

[T]eacher cost differences tend to be the major driving factor of the overall differences in education costs, since teachers account for almost 60 percent of the school district budgets . . . . The metropolitan areas of the state tend to exhibit relatively higher costs of school personnel than the nonmetropolitan areas although certain remote areas (with low population density and only small or no urban population) tend to have relatively high personnel costs.<sup>9</sup>

It is reasonable to conclude that in other states it is the relatively higher density populated areas, i.e., urban school districts, that will have higher cost indices. If this were true, those districts that possess high cost indices would have to show that they received less moneys than appropriate.<sup>10</sup>

The dilemma with this type of methodology is apparent. On the one hand, if school districts truly cannot afford to pay appropriate salaries due to legitimate inequities and inadequacies of the distribution plan, their salaries will in fact be relatively and consistently low. Those districts that have high cost of living issues will theoretically pay in kind in order to compete within the appropriate workforce. All cost of education plans are inherently based on what school districts spend in previous times. Thus, by its very nature expenditure data cannot truly reflect the costs of providing an education if, in fact, poor districts are unable to provide those services. Moreover, were such an index developed, a number of issues would have to be quantified and examined whenever salaries were adjusted.

An examination of cost of living research reveals several key points for consideration. In one state, 88 percent of the variance in resource costs among public school districts were related to the differences in the beginning salaries of classroom teachers.<sup>11</sup> No evidence exists that the CPI has been a determinant of teacher salaries over time within the United States.<sup>12</sup> Thus, when one examines national data that clearly reflects the massive costs associated with classroom teachers in relationship to educational expenditures, the concept of a cost of education index becomes somewhat suspect from any perspective. This is not to say that there is not a phenomenon occurring. It is to say, that given the present state of knowledge and research, there is more that is not explained, as compared to what can be explained, regarding these interrelationships.

Simple cursory observations based on individualistic and intuitive feelings will not resolve issues of such magnitude. If one were to assume that there is truly a cost of living impact on public school districts and that school districts are attempting, in however a modest fashion, to meet a supply and demand function of public classroom teachers, there would exist an overall positive association between the CPI and public classroom teachers salaries. However, on a national level over a ten year period between the years 1969-79, only the 1974-75 salaries were found

**Table 1. Average Teacher Salary Adjusted by the Interstate Cost-of-Living Index\***

State	Average Salary (\$)	Index	Adjusted Av. Salary (\$)	Adjusted Rank	Original Rank
Michigan	35,530	95.4	37,247	1	4
California	35,172	105.9	33,220	2	5
Minnesota	31,395	95.6	32,849	3	11
Wisconsin	31,046	95.4	32,530	4	14
New York	36,654	113.2	32,369	5	3
Rhode Island	34,234	106.8	32,067	6	6
Illinois	31,195	97.4	32,038	7	13
Indiana	29,169	92.9	31,396	8	17
Oregon	29,385	94.2	31,186	9	16
Pennsylvania	31,248	101.3	30,835	10	12
Maryland	33,900	110.8	30,609	11	7
Delaware	31,585	103.2	30,595	12	10
Ohio	29,166	95.8	30,441	13	18
Washington	29,146	97.0	30,062	14	19
Connecticut	37,659	125.8	29,947	15	1
Virginia	29,056	97.1	29,930	16	20
Wyoming	27,689	93.4	29,650	17	23
Colorado	29,557	99.8	29,612	18	15
Nevada	28,836	98.1	29,406	19	21
Georgia	26,920	94.1	28,605	20	25
Vermont	26,819	93.9	28,565	21	26
DC	36,787	129.8	28,341	22	2
Kansas	25,992	91.7	28,330	23	29
Arizona	28,499	100.8	28,272	24	22
Texas	26,513	94.1	28,168	25	28
Missouri	25,981	92.9	27,974	26	30
Florida	26,937	97.3	27,671	27	24
Iowa	25,884	93.6	27,662	28	31
Tennessee	25,619	93.1	27,530	29	33
Alabama	25,190	91.9	27,420	30	34
North Carolina	25,650	93.6	27,410	31	32
Maine	24,938	92.0	27,116	32	36
South Carolina	25,060	92.6	27,063	33	35
Kentucky	24,920	92.1	27,053	34	37
Montana	24,421	91.1	26,793	35	39
Massachusetts	32,200	121.8	26,430	36	9
New Mexico	24,554	92.9	26,416	37	38
New Jersey	32,862	125.8	26,121	38	8
Nebraska	23,845	92.9	25,659	39	40
Oklahoma	23,400	92.5	25,304	40	41
Mississippi	22,579	90.3	25,000	41	44
Idaho	22,732	91.3	24,903	42	43
Utah	23,023	92.9	24,779	43	42
New Hampshire	26,703	107.9	24,753	44	27
North Dakota	22,249	92.2	24,138	45	46
Louisiana	22,469	93.4	24,063	46	45
Arkansas	21,736	90.9	23,901	47	48
West Virginia	21,904	91.9	23,831	48	47
South Dakota	20,525	91.6	22,408	49	49
U.S. Average	29,614	100.0	29,614		

\*F. H. Nelson "An Interstate Cost-of-Living Index," *Educational Evaluation and Policy Analysis*, Spring 1991, vol. 13, no. 1 109.

to have a statistically significant relationship between the CPI and classroom salaries in America.

Specific research regarding beginning teachers' salaries in the state of Florida yielded several observations of importance. Regional salary leaders were those districts offering beginning teachers' salaries higher than any contiguous district. In the seven year period under study, only one of the sixty-seven school districts was found to be a regional salary leader for the entire period of time. "[T]he assumption of an equilibrium existing among districts in relation to salaries offered teachers was rejected. It was concluded that competition among districts in terms of beginning teachers' salaries was dynamic rather than static."<sup>13</sup>

The research demonstrated that school districts "tend to pay salaries close to those of their neighbors, but those having greater revenue generating potential than their neighbors are likely to pay higher salaries than their neighbors."<sup>14</sup> In particular it was noted:

More recent analysis of data from the Florida study has produced additional evidence against the use of cost of living differentials to adjust state school finance plans. When the mean beginning teachers' salaries of abutting districts, Price Level Indices (PLIs) for each district, and district revenue potentials were entered into regressions on beginning teachers' salaries for each district for each

**Table 2. State Rankings by 1990-91 Average Teacher Salary Adjusted by the 1990 AFT Interstate Cost-of-Living Index\***

State	Average Salary (\$)	Index	Adjustment	Adjusted Av. Salary (\$)	Adjusted Rank	Original Rank
Michigan	\$37,800	94.3	2,265	\$40,065	1	8
New York	42,080	113.4	(4,981)	37,099	2	13
California	39,118	108.2	(2,974)	36,144	3	5
Illinois	34,642	96.5	1,274	36,916	4	14
Minnesota	33,128	92.9	2,524	35,652	5	16
Wisconsin	33,077	92.9	2,523	35,600	6	17
Indiana	32,931	93.4	2,331	35,262	7	19
Pennsylvania	36,057	103.6	(1,258)	34,799	8	11
Nevada	35,269	101.5	(507)	34,762	9	12
Maryland	38,312	110.7	(3,707)	34,605	10	7
Rhode Island	38,220	111.0	(3,779)	34,441	11	9
Connecticut	43,398	126.3	(9,044)	34,353	12	2
Virginia	32,692	95.6	1,499	34,191	13	20
Delaware	35,246	103.9	(1,338)	33,908	14	13
Oregon	32,295	95.7	1,460	33,755	15	21
Ohio	31,964	95.7	1,449	33,413	16	22
Washington	32,975	99.5	158	33,133	17	18
Kentucky	29,115	89.4	3,461	32,576	18	29
North Carolina	29,165	91.3	2,771	31,936	19	28
Florida	30,555	95.3	1,332	31,887	20	26
Alaska	43,406	137.0	(11,723)	31,683	21	1
Georgia	28,950	92.0	2,527	31,477	22	31
Colorado	31,819	101.8	(576)	31,243	23	23
Vermont	29,714	95.3	1,473	31,187	24	27
Tennessee	28,248	90.8	2,849	31,097	25	33
Texas	28,100	90.5	2,940	31,040	26	36
Wyoming	28,996	93.5	2,032	31,028	27	30
Kansas	28,188	91.2	2,733	30,922	28	34
Arizona	30,773	100.1	(34)	30,739	29	25
District of Columbia	39,362	128.4	(8,706)	30,656	30	4
South Carolina	28,174	93.2	2,070	30,244	31	35
New Jersey	38,411	127.2	(8,208)	30,203	32	6
Iowa	27,636	92.5	2,252	30,201	33	37
Missouri	27,636	91.6	2,530	30,166	34	38
Maine	28,531	95.1	1,469	30,000	35	32
Alabama	26,846	90.0	2,969	29,815	36	39
New Hampshire	31,273	105.1	(1,505)	29,768	37	24
Nebraska	26,592	90.9	2,674	29,266	38	41
Massachusetts	36,090	124.0	(6,988)	29,102	39	10
West Virginia	25,966	89.4	3,067	29,033	40	43
Montana	26,696	92.2	2,256	28,952	41	40
Louisiana	26,170	91.0	2,604	26,774	42	42
New Mexico	25,800	92.4	2,125	27,925	43	44
Mississippi	24,609	88.3	3,276	27,885	44	47
Utah	25,415	92.3	2,123	27,538	45	46
Idaho	25,510	92.8	1,973	27,483	46	45
Oklahoma	24,378	89.2	2,955	27,333	47	48
Arkansas	23,735	88.7	3,034	26,769	48	49
North Dakota	23,574	90.4	2,517	26,091	49	50
South Dakota	22,363	89.5	2,632	24,995	50	51
Hawaii	33,548	135.0	(8,698)	24,850	51	51
U.S. Average	32,880	100.0		32,880		

\*AFT Research Dept. personal correspondence from the author, F. H. Nelson.

of the seven years examined, mean beginning teachers' salaries of contiguous districts entered first in each case . . . [I]n head-to-head statistical competition with the mean beginning salaries of contiguous districts, Florida PLIs lost seven times out of seven in predictions of local beginning teachers' salaries. In fact, once the mean beginning salaries of contiguous districts were entered, PLIs added nothing of statistical significance ( $p < .05$ ) . . . to the prediction of local teachers' salaries.

Apparently, great emphasis is not placed on the local cost of living when decisions are made regarding the salaries . . . However, a legitimate alternative explanation may be that local costs of living affect the supply of applicants willing to accept employment in a particular school district.<sup>15</sup>

When public school superintendents were questioned, the cost of living concept significantly trails the issues of moneys available as well as what salaries other districts pay by an

overwhelming margin.<sup>16</sup> Hence, an analysis of those who actually determine and bargain contracts for public schools indicates the CPI is of minor importance. An examination of these data reveals several explanations. The most plausible and reasonable explanation is that school superintendents make these decisions largely on the amount of moneys that will become available for salaries, with secondary thoughts toward salaries paid in other school districts.<sup>17</sup>

In summation, traditional supply and demand theory does little to explain variations in the cost of teacher inputs. In many school districts of the nation, particularly large urban school districts, school districts have engaged in non-hiring patterns including reductions in force, while at the very same time significantly increased teacher salaries due to a variety of reasons, including the collective bargaining process.<sup>18</sup> With declining enrollments throughout many portions of the country and with rising costs with reductions in corresponding state aid, it can be clearly demonstrated that supply and demand functions do not apply to public classroom teachers' salaries. If this overall theory were to apply, these school districts would not be raising teachers' salaries. An overall assessment of the research yields the clear conclusion that supply and demand functions are not applicable to teachers' salaries. Variations in the cost of living also have been shown to have little explanatory weight in assessing why teacher salaries vary among districts within a state.

#### Development of a Hypothetical Cost of Education Index

A hypothetical educational index would have to identify every variable within every school district in order to make every service identical. Anything less than this successful identification and quantification would mean failure by its own definition. Hence, an index would have to be created that would determine the cost of providing each and every discrete service to every applicable child in every school district in the state. Thus, by necessity the index would have to be applied to each child in each school building within a state and would be computed for every educational service across the state. Additionally, an index would have to be developed to cost out the differences in providing services to different identified pupil needs across the state. This would result in every service being indexed based on a "market basket" approach that would be applicable to every school district and ultimately every school and every child within the state. Every year these data would have to be adjusted up or down in order to ensure proper fiscal and educational allocations.

Several different approaches to ascertaining a cost of education index have been utilized in the past. These are essentially ones that involve: 1) a statistical approach, 2) a supply and demand approach, and 3) a behavioral approach.<sup>19</sup> It is interesting to note that no one methodology has yet to be accepted as the best methodology.

It is often assumed that the quantity and quality of teaching applicants are affected by local classroom salaries and/or the desire of local school officials to employ teachers of the highest quality. However, the variability is enormous among districts in terms of the salaries paid to teachers.<sup>20</sup> The use of average daily attendance, the cost of land and housing, the degree of urbanization, population density, the population of the county, and the distance of the county from the nearest city with a population over 100,000 in computing teacher cost indices has been widely questioned. In fact, this concept has been referred to as "shot gun empiricism."<sup>21</sup>

One of the major inherent weaknesses of an educational index is that in all such programs they essentially measure a wide variety of items. This concept has received significant criticism. Wentzler has written:

The single equation approach does not, however, enable one to empirically distinguish supply from demand variables; consequently, the researchers must rely

on an ad hoc designation of supply and demand variables when constructing the aggregate supply price index. This procedure leads to especially questionable indexing results if the researchers adopt crude proxies for the supply (demand) variables which are synonymous with demand (supply) variables.<sup>22</sup>

The simultaneous equation approach cannot be accurate or appropriate given the variables in question. For example, family income could easily serve as a proxy for socioeconomic characteristics of a given community (a district amenity) as it could serve as a cost of living proxy (a district disamenity). The same would be true of a host of other variables such as the cost of land and housing. Local housing costs would normally be highly correlated with the socioeconomic status of a given local population.<sup>23</sup> Even the use of average daily pupil attendance is a subject of great dispute. Such adjustments were shown to be inappropriate due to a number of systematic problems, since "absolute size of the coefficient on the enrollment variable effectively dampens the supply influence of the remaining variables in the equation when enrollment is included among the supply variables."<sup>24</sup>

Matthews and Holmes summarized the overall thoughts of Wentzler and Johnson in the following statement:

According to Johnson, [t]here is an 'absence of well grounded theory of the teacher market that contains maintained hypotheses that lead to specification of substantive, reliable and consistent relationships.' Although Wentzler based her work on existing thought, she also recognized that 'one problem that arises with the estimation of both the single and the simultaneous equations models is the lack of data corresponding to the theoretical variables.'<sup>25</sup>

In fact, the degree of elasticity concerning the supply of classroom teachers has not, as of yet, been determined. If changes were made in either individual school districts, or as a state as a whole, a supply function does not exist in order to determine the response of those who qualify for teaching positions. The only specific study on this question determined that the differences that existed among school districts in Georgia was almost exclusively a function of the salaries of beginning teachers for those teachers who were mobile. Relocation decisions of experienced classroom teachers have historically reflected very little, if any, evidence to suggest that salary was a function of their personal decisions.<sup>26</sup> In a Michigan study, average teacher salaries resulted in teacher price differentials from two to three times as large as when they used beginning teachers salaries as the dependent variable. As it has been observed, the choice of the dependent salary variable is critical to these studies. The study concluded in stating, "every single alternative assumption does not appear to produce a unique price index."<sup>27</sup>

In order to develop an educational index a methodology is presented for review. This is not to suggest that this is the only acceptable methodology. It does reflect the minimal elements of sound research protocol regarding the investigation of such an issue. In order for a state to properly develop a cost of education index, its agencies would have to engage, at a minimum, in the following analyses:<sup>28</sup>

- An education index would be developed for certified personnel including teachers, all school building level administrators, as well as all central office administrators,
- An education index would be developed for all noncertified personnel including instructional aides, clerical and secretarial personnel, custodial and maintenance personnel, and
- An education index for the nonpersonnel school consumables, e.g., utilities.

Generally, some form of multivariate regression analysis would be engaged in to determine and to explain the salaries as

discussed in items 1 and 2 and the nonconsumables. Overall analysis of variations to be examined would include such items as the following, at a minimum:

#### Personnel

- Age of every school district employee,
- Experience of every school district employee with the district as well as total experience,
- Educational attainment of each employee,
- Field of certification of every employee and status of the certification,
- Sex of every school district employee,
- Race of every school district employee,
- Job titles as well as the duties of every school district employee, and
- Days of work per year by every school district employee

#### Characteristics of individual classrooms

- Background characteristics of pupils, including demographic and scholastic data by classroom in every school in the state

#### School data

- Curriculum of every school in the state,
- Pupil characteristics from classrooms aggregated by school and district

#### School district data

- Pupil achievement data on every standardized test,
- Age of educational facilities and improvements therein,
- District size in terms of enrollment

#### Regional data

- Cost of housing within all school districts,
- Percent urban population within all school districts,
- Population density of all school districts,
- Access to urban areas from all school districts

It is of utmost importance to note that, while much of these data can be gathered from various state agencies, much of these data do not exist within a given data bank, or any variety of sources, within many states. Hence, scientific survey research must be engaged in to determine certain information. The surveys must be piloted and judged as to the level of statistical reliability and validity. For example, in California a survey was found necessary to receive certain data. A survey instrument was sent to over 9,000 individuals in order to ascertain certain information. As with all such surveys with less than 100 percent response rates, inference may be drawn but not a complete status report.

Once these data are gathered and analyzed, certain research explanatory variables must be divided into two overall categories: 1) those variables that are within the control of the local school district, and 2) those that are outside control of the local school board. Indices of these educational resources should reflect only variations in expenditures associated with factors outside local control. Factors which are reported as being within the control of local school districts include such characteristics of classroom teachers such as age, race, and sex.<sup>29</sup>

An index of this type attempts to essentially measure the cost of goods and services of those items within the control of the school district against the average cost of those same goods and services within the control of all other school districts. Hence, an index is developed which reflects higher than average costs or lower than average costs. Each index for each component is then combined into a single index for each school district within a state.<sup>30</sup> Generally, transportation will have a separate index developed for it due to the nature of the task.

Overall and specific data for each school district in the state would include at a minimum the mean, standard deviation, range for overall data, as well as each subset of data and each classification of school districts. The subsets would reflect such issues as size and metropolitan/nonmetropolitan locations. Overall data in such a study would include parameter estimates for the personnel and transportation regression equations.

Inasmuch that these data change constantly, all such studies must be reanalyzed periodically for state aid purposes. Relative changes can thus be noted. Additionally, the volatility of these data is quite apparent.

Based on an examination of the research to this point in time it should be noted that at least two states have conducted rather massive and complex studies of the differentiated costs of public education. A California study and a Georgia study revealed very similar cost differentials for public schools within the respective states. California reflected a cost differential of .892 to 1.132 while the Georgia study ranged from .944 to 1.179.<sup>31</sup> From a research perspective such differentials may tend to reflect similar such differentials throughout the nation.

Using a California study as a basis of illustration of how such a study would be conducted and assuming it could be modified for a given state, the mean, the standard deviation, and range would be reported for all school districts. Additionally, these data are broken down in relationship to school districts' proximity to their location to cities as divided into four groups varying from greater than 500,000 to those with less than 100,000 population as well as districts located in nonmetropolitan areas.<sup>32</sup> Rationales would have to be developed for an individual state for classification systems based on a state's population parameters. Overall eight indices would be developed for every school district as follows:

- Teachers' Cost Index,
- Principals' Cost Index,
- Administrators' Cost Index,
- Secretaries' Cost Index,
- Custodians' Cost Index,
- Instructional Aides' Cost Index,
- Natural Gas Cost Index, and
- Electricity Cost Index.

Personnel costs, the greatest sector of expenditures, would be held statistically constant for all school districts. Estimates must be obtained by simulating the variations in those school districts which employ similar kinds of personnel based on job classifications and job descriptions obtained from every school district. Descriptive data such as job titles, work days, classroom and school demographics, age and condition of school facilities and achievement test scores must be held statistically constant across school districts. The study would actually use the variables incorporated within the general state aid formula, the cost of land and housing, the degree of urbanization, population density, and the population of the county, and the distance of the county from the nearest standard metropolitan statistical area.

If, in certain school districts the cost of living, or for that matter, the cost of education is in fact high and thus classroom teachers should be paid more, then the converse should be true. That is to say, if the cost of living or education were to decrease, then state fiscal assistance should decline. However, given the nature of the conceptual model of correlating salary increases in other districts the likelihood of this occurring is extremely slim. No where does the research, or in common thinking, suggest that if the cost of living, or the cost of education, were to decline then such salaries should be reduced. This concept is simply not addressed.

It can be generally predicted that those districts that exhibit higher teacher costs per pupil would tend to dominate any state education index concept. The reason for this is rather

straightforward. As discussed herein, the cost of classroom teachers in terms of salaries and fringe benefits generally dominate the general fund budgets of most school districts regardless of geographical issues or other considerations. Thus, high expenditures are associated with higher costs for classroom instruction on a per pupil basis.

Generally, energy costs will be directly correlated with climatic conditions. That is, those districts in relatively colder regions of the state will spend more regardless of the energy efficiency of the school facilities located within these school districts. Advocates of a cost of education index have long argued that such an index should be reflective of an overall state aid to the school districts.<sup>33</sup> It should not be utilized to adjust teacher salary scales.

### Examples of States that Utilize a Cost of Education and Cost of Living Formula

Contemporary examples of states that utilize various forms of measuring the varying costs of providing educational services vary greatly. No two states appear to follow the same methodology. This is reasonable given the assumption that each state's true cost of providing education is distinctly different than others. Florida and Texas are discussed, in a limited manner in that each state represents the predominant methodologies engaged in by the various states in attempting to account for a cost of living/education concept. Florida illustrates a state that has chosen to concentrate its attempt at meeting a cost of living concept while Texas has chosen to measure a cost of education concept. Both states illustrate different methodologies if the costs of living/education were indeed higher for certain school districts. Such methodologies, for example, would be necessary before any moneys could be allocated for these purposes. This discussion is provided as illustration as to what complexities are involved in such cost of living/cost of education fiscal adjustments within state education finance formulas.

#### Florida

The state of Florida provides for what is essentially an adjustment for the cost of living in school districts.<sup>34</sup> The Florida Price Level Index (FPLI) was established by the Florida Legislature to determine what is referred to as the District Cost Differential in the state aid formula. The stated purpose of the FPLI is to measure the differences from county to county in the cost of purchasing a specific market basket of goods and services, at a particular point in time.<sup>35</sup> The FPLI measures either relative inflation or relative price levels. The FPLI measures relative price levels among all the state's counties as a cross-sectional index.

In 1991, seven counties had an index above the state average of 100.00. The highest levels were in the southern, more populous part of the state. Of the seven counties, two are over 1,000,000 population, four are between 100,000 and 1,000,000, and one is less than 100,000. The northern, least populated, portion of the state, had the lowest index values. Typically, Monroe County, i.e., the Florida Keys, has ranked as having the highest index meaning that the cost of living is highest within the state.

The FPLI places each selected item in either food, housing, transportation, apparel, and health, recreation and personal services. According to the FPLI, the costs of living for the typical consumer were distributed approximately as follows for every dollar spent:

- 22 cents were spent on food,
- 37 cents were spent on housing and related items,
- 7 cents were spent on clothing,
- 19 cents were spent on transportation, and
- 5 cents were spent on health, recreation and other personal services.

Each category index is grouped in order to calculate a population weight relative to the population weighted average of 100.00. Comparisons across counties is then possible within each category. It is noteworthy that the county rankings, and thus the school district's can vary from year to year. The overall rankings for the following selected years are shown for illustrative purposes in Table 3.

### Cost of Living Description

The state measures a theoretical 117 item marketbasket of goods. These goods and services are commonly utilized items. Housing prices for each county are computed with the help of the Department of Revenue's Ad Valorem Tax Division.

Rental prices are estimated by the state utilizing regression analysis. The resultant standardized apartment rents are then weighted according to the number of units available in order to determine the average rent price for each county.

Hospital costs and health professional costs are surveyed. Health and automobile insurance costs are determined by surveying private insurance companies. Utility rates are obtained from the Public Service Commission.

### Computation of Index Value

Once the retail prices are computed, they form an initial index for each county. This computation is by weighting the county average relative price for each item by the appropriate item weight. The final procedure consists of weighting the initial index by the population (see Table 4). A weighted average of the indices is thus determined by multiplying the index by the county population. The products of the count determinations is then summed and divided by the state's population. Thus, a statewide average index is determined. This final value is then divided into the initial index values and multiplied by 100 to produce the FPLI.

These indices are averaged for the last three years by each county. This lessens the positive or negative impact on individual school districts. Additionally, the state recognizes diseconomies of scale relative to smaller school districts via a different formula.

#### Texas

The state of Texas attempts to measure the cost of delivering educational services via a Cost-of-Education Index (CEI). The development of the CEI attempts to measure for uncontrollable regional price variations and for diseconomies of scale due to differences in the size of school districts.<sup>36</sup>

### Price Effects Component

The price component within the Texas formula is designed to adjust for geographic price variations that are beyond the control of local school districts. In that the primary operating expense of school districts is teacher salaries, the factors which affect variations in teacher payroll costs are examined. The monthly average salary was used as the dependent variable. The model identifies variations in teacher salary costs. The uncontrollable factors are as follows:

- contiguous county beginning teacher average salary,
- location in a rural county,
- percent low-income pupils,
- district type (suburban, independent town, and rural), and
- district size in terms of student population

Controllable factors at the local school district level were as follows:

- property wealth per teacher,
- total effective tax rate,
- teacher benefit level per pupil,
- graduation rate,
- number of secondary teachers,
- percent minority teaching staff, and
- nonsalary expenditures

Table 3. Florida Price Level Index—1988 to 1990 (Population weighted state average = 100.00)

County	1991	Rank	1990	Rank	1989	Rank	1988	Rank
Alachua	94.31	33	95.97	24	94.93	31	94.96	27
Baker	90.06	62	89.01	64	90.67	58	88.19	65
Bay	93.81	36	93.82	35	92.22	47	90.68	51
Bradford	92.04	50	90.61	58	94.19	35	92.52	41
Brevard	99.12	14	100.55	11	97.30	20	98.31	14
Broward	105.99	03	107.76	02	106.59	03	107.12	02
Calhoun	89.85	64	90.73	56	89.01	66	88.67	62
Charlotte	95.83	26	96.62	23	97.62	17	96.54	20
Citrus	91.76	51	91.03	54	91.61	51	91.37	45
Clay	96.07	24	94.60	32	96.20	24	95.16	25
Collier	100.11	07	103.16	04	100.69	08	101.37	06
Columbia	91.46	52	93.41	48	91.61	51	89.74	58
Dade	107.98	02	91.98	03	107.38	02	107.10	03
Desoto	96.30	22	97.42	36	96.01	26	94.56	31
Dixie	93.53	37	95.44	47	90.62	59	91.03	48
Duval	95.81	27	97.42	20	94.49	34	95.30	24
Escambia	94.67	32	92.75	42	93.27	41	93.22	39
Flagler	96.90	21	95.44	29	97.46	19	95.45	23
Franklin	95.00	30	93.07	38	93.44	38	93.43	37
Gadsden	91.00	55	92.91	39	90.10	62	90.60	52
Gilchrist	90.73	58	90.97	55	90.98	56	91.27	46
Glades	99.23	13	98.07	19	99.68	11	97.93	17
Gulf	92.29	47	91.57	49	91.02	55	89.24	59
Hamilton	90.82	57	91.40	50	93.34	40	88.88	61
Hardee	90.48	59	91.31	51	90.25	61	91.21	47
Hendry	96.23	23	96.84	22	95.66	27	97.01	19
Hernando	92.83	42	94.23	33	96.35	22	93.34	38
Highlands	93.33	39	95.51	28	94.11	37	94.13	32
Hillsborough	99.51	12	100.67	10	99.01	12	100.64	11
Holmes	89.74	65	90.55	59	92.87	43	90.22	54
Indian River	99.61	10	97.37	21	97.50	18	100.87	10
Jackson	88.24	67	89.82	61	90.40	60	88.97	60
Jefferson	93.40	38	90.64	57	92.19	48	90.52	53
Lafayette	90.40	60	89.73	62	91.32	54	88.65	63
Lake	95.88	25	95.71	30	94.73	32	93.44	36
Lee	99.68	09	100.09	12	100.08	10	99.19	12
Leon	98.10	18	98.17	17	96.11	25	95.52	22
Levy	90.90	56	89.43	63	89.08	65	92.35	42
Liberty	92.37	45	92.14	46	92.73	45	89.89	56
Madison	89.93	63	87.26	67	88.38	67	87.86	66
Manatee	100.25	06	101.20	09	101.79	06	101.51	07
Marion	92.36	46	92.43	44	92.14	49	92.21	43
Martin	100.51	05	102.48	06	102.03	05	101.12	09
Monroe	116.79	01	112.79	01	115.03	01	113.98	01
Nassau	94.73	31	95.69	25	94.13	36	93.96	33
Okaloosa	93.23	41	94.16	34	93.11	42	92.54	40
Okeechobee	95.47	29	92.90	41	96.90	21	93.79	34
Orange	98.90	15	98.58	14	98.30	15	97.78	18
Osceola	94.20	34	98.33	15	96.24	23	98.02	15
Palm Beach	103.84	04	102.35	07	105.09	04	104.18	04
Pasco	93.90	35	94.79	31	94.58	33	94.78	23
Pinellas	92.39	17	101.84	08	100.67	09	101.63	06
Polk	98.89	40	92.63	43	95.38	29	94.98	26
Putnam	92.39	43	93.28	37	93.35	39	92.07	44
Saint Jonas	98.89	16	98.08	18	98.35	14	96.05	21
Saint Lucie	99.55	11	98.67	13	98.15	16	97.99	16
Santa Rosa	91.11	54	91.07	53	91.94	50	89.79	57
Sarasota	99.93	08	102.60	05	101.66	07	101.78	05
Seminole	97.63	20	98.20	16	98.79	13	98.69	13
Sumter	92.39	43	92.36	45	91.60	53	93.63	35
Suwannee	89.07	66	87.57	66	89.19	64	88.49	64
Taylor	92.07	49	90.25	60	92.84	44	89.94	55
Union	91.30	53	91.18	52	92.67	46	90.91	50
Volusia	97.90	19	95.52	27	95.63	28	94.71	29
Wakulla	95.75	28	95.55	26	95.00	30	94.65	30
Walton	92.14	48	92.91	39	90.95	57	91.01	49
Washington	90.23	61	87.97	63	89.74	63	87.76	67

Table 4. Population Weighted Category Indices

County	Rank	Total	Food	Housing	Clothing	Transportation	Health
Alachua	33	94.31	99.21	89.33	96.45	97.19	93.54
Baker	62	90.06	94.25	81.84	93.99	98.88	89.27
Bay	36	93.81	98.36	86.21	97.41	98.86	96.14
Bradford	50	92.04	95.94	85.13	86.73	97.10	98.33
Brevard	14	99.12	104.41	95.35	102.10	98.65	98.90
Broward	03	105.99	101.27	113.65	97.68	100.92	106.24
Calhoun	64	89.85	99.90	77.82	94.34	97.42	90.33
Charlotte	26	95.83	97.72	89.78	100.71	99.33	99.95
Citrus	51	91.76	96.01	87.49	93.69	96.46	88.12
Clay	24	96.07	101.06	92.72	94.12	98.53	94.08
Collier	07	100.11	98.48	99.66	108.97	98.52	101.19
Columbia	52	91.46	93.19	83.32	92.73	100.46	95.36
Dade	02	107.98	101.66	115.83	102.11	103.70	107.94
Desoto	22	96.30	103.28	87.71	114.28	98.29	93.88
Dixie	37	93.53	98.14	86.78	93.85	97.92	96.27
Duval	27	95.81	100.40	90.62	98.87	97.65	96.94
Escambia	32	94.67	96.40	87.47	105.61	100.48	95.64
Flagler	21	96.90	100.89	96.40	91.60	97.95	93.30
Franklin	30	95.00	98.33	90.79	95.36	95.58	98.77
Gadsden	55	91.00	96.85	83.80	76.46	98.67	96.23
Gilchrist	58	90.73	99.14	81.19	92.61	96.73	91.30
Glades	13	99.23	101.14	98.88	94.33	99.54	99.24
Gulf	47	92.29	99.61	81.68	104.04	98.92	91.18
Hamilton	57	90.82	99.82	81.05	92.84	95.69	92.43
Hardee	59	90.48	92.75	87.48	88.15	94.33	90.18
Hendry	23	96.23	100.89	89.46	93.30	98.53	103.40
Hernando	42	92.83	96.00	90.44	80.00	98.37	92.89
Highlands	39	93.33	96.18	88.83	93.17	97.45	94.17
Hillsborough	12	99.51	103.43	96.40	104.37	100.13	97.47
Holmes	65	89.74	95.01	81.46	95.68	97.07	88.37
Indian River	10	99.61	101.97	95.77	100.92	103.69	98.94
Jackson	67	88.24	96.43	77.37	84.01	97.45	91.18
Jefferson	38	93.40	99.56	79.98	104.73	99.62	101.33
Lafayette	60	90.40	99.42	81.32	84.59	96.97	92.19
Lake	25	95.88	99.15	91.44	91.77	100.65	97.14
Lee	09	99.68	98.84	99.10	105.53	99.30	99.79
Leon	18	98.10	101.29	93.20	101.89	99.38	101.01
Levy	56	90.90	92.68	82.97	89.32	102.17	92.80
Liberty	45	92.37	101.50	80.71	96.63	98.60	95.25
Madison	63	89.93	95.85	82.09	91.77	99.19	86.16
Manatee	06	100.25	97.43	105.59	97.16	99.24	102.02
Marion	46	92.36	100.41	83.40	98.52	96.43	92.47
Martin	05	100.51	96.16	102.46	105.55	101.97	98.17
Monroe	01	116.79	111.80	138.81	99.21	102.26	101.11
Nassau	31	94.73	94.45	92.15	92.30	99.37	96.36
Okaloosa	41	93.23	97.01	85.99	102.19	97.05	94.77
Okeechobee	29	93.23	98.46	93.16	84.80	98.79	97.42
Orange	15	95.47	104.35	94.42	100.07	99.32	99.87
Osceola	34	98.90	92.96	95.57	82.49	98.57	93.20
Palm Beach	04	94.20	100.99	105.76	114.52	98.81	104.78
Pasco	35	103.84	96.71	90.88	86.78	99.83	92.57
Pinellas	17	93.90	97.22	100.38	95.81	100.34	97.32
Polk	40	98.84	94.75	88.55	92.41	98.98	95.20
Putnam	43	93.30	97.35	89.07	93.82	95.77	92.54
Saint Johns	16	92.39	100.48	100.00	94.09	99.67	95.35
Saint Lucie	11	98.90	101.14	95.20	107.48	102.26	99.69
Santa Rosa	54	99.55	94.12	81.12	98.50	98.56	96.31
Sarasota	08	91.11	92.12	103.14	110.19	99.83	99.25
Seminole	20	99.93	102.10	94.04	98.28	100.28	95.35
Sumter	43	97.63	98.51	86.21	86.93	97.14	94.01
Suwannee	66	92.39	97.46	81.78	77.47	97.70	87.93
Taylor	49	89.07	98.10	83.76	92.48	98.60	93.50
Union	53	92.07	97.53	82.31	95.87	96.08	94.12
Volusia	19	97.90	99.28	97.69	97.94	97.65	96.62
Wakulla	28	95.75	103.44	87.22	102.20	98.99	96.30
Walton	48	92.14	90.87	87.15	102.24	97.54	93.52
Washington	61	90.23	97.05	80.40	94.24	97.67	90.93



Controllable factors at the teacher level were determined to be:

- whether the teacher has an advanced degree,
- whether the teacher has no college degree, and
- total years of teaching experience.

**Scale Effects Component**

The scale effects component adjusts for the perceived diseconomies of scale due to differences in district size. The Texas methodology for the development of the scale component is as follows:

- School districts were grouped according to grade span,
- Districts were ranked by size,
- Classes taught within each district were classified,
- Information determined average class size,
- The number of students in each class level was divided by the appropriate class average size. The result equated to the number of classes required according to school district size grouping.
- The number of classes needed was converted to a required number of teachers.
- The number of teachers was converted to a dollar cost for a standardized teacher salary. Total dollars are then divided by the district pupil count yielding an average cost per pupil related to size differences.
- These steps were repeated, using administrator costs.
- Total salary costs were examined in terms of district size.

These data determined that there were five steps. These steps corresponded to different cost patterns relative to district size—for ADA of 130, 300, 700, and 1,000. Four equations were constructed. These equations are shown in the following table.

ADA of the District	Calculation of Scale Factor
More than 2,000 ADA	1.0
1,000 to 2,000 ADA	$1.0 + [(2,000 - ADA) \cdot .00014]$
700 to 999 ADA	$1.14 + [(1,000 - ADA) \cdot .00023]$
300 to 699 ADA	$1.209 + [(700 - ADA) \cdot .0008]$
Less than 300 ADA	$1.529 + [(300 - ADA) \cdot .00485]$ except that 130 is used for ADA if ADA is less than 130

**Final Cost-of-Education Index**

The scale component is calculated from a series of formulas, while the price component is arrived at from a table derived from the results of regression analysis.

1. The final cost of education index is a combination of its two components. It is calculated as follows:

$$\text{price component} \times \text{scale component} = \text{final cost-of-education index}$$

2. The final index is applied to 71 percent of the basic allotment. The 71 percent corresponds to the percent of statewide total operating expenditures (excluding transportation, career ladder payments, debt service and capital outlay), accounted for by professional salaries and their proportionate share of benefits. The result is the adjusted basic allotment.

$$(\text{basic allotment} \times .71 \times \text{cost-of-education index}) + (\text{basic allotment} \times .29) = \text{adjusted basic allotment}$$

According to the Texas Education Code, the CEI must be applied in a formula "in a manner that appropriately reflects the relative significance of the costs adjusted by the index to the overall cost of a minimum accredited regular program represented by the basic allotment." Of the 85 percent of general fund operating expenses spent for salaries and benefits, 71 percent is paid to professional employees.

**Impact of the Cost-of-Education Index**

The index is described by a curve; the prior adjustment is reflected as two linear functions, one for districts greater than 300 square miles and the other, for districts which are smaller in area. Districts below 300 ADA receive a higher adjustment than they would have under the SDA from prior statute, as do districts that range in size from 1,600 to 2,000 ADA. Districts from about 500 to 1,500 ADA receive a smaller adjustment. A district between 300 and 500 ADA would fare better if its area is less than 300 square miles; its adjustment would decrease if its area is greater.

**Scale Index Calculation**

The cost-of education index has two parts. One part reflects diseconomies of scale and is analogous to the small district adjustment. The following text describes the development of the formulas for the scale portion.

1. Once total salary costs per pupil (for teachers and administrators combined) were determined, a graphic representation was constructed which plotted the number of pupils on the x-axis, and the salary cost per pupil on the y-axis. There were several "break points" in the "curve," at 130, 300, 700, 1,000, and 2,000 students in ADA.
2. Four equations were constructed to describe the slope of the line segment between each break point. The basic equation to describe the slope of a line is the result of the change in the x-value divided by the change in the y-value. This equation was adjusted to take into account the proportional change in each segment from the base cost of \$1,616.

$$\text{Slope of Line Segment A-B: } (234/1616)/1000 = .0014$$

$$\text{Slope of Line Segment B-C: } (344/1616) - [(1850 - 1616)/1616]/300$$

$$\text{Which reduces to: } (1950 - 1850)/(1616 \cdot 300) \text{ or } (110)/(1616 \cdot 300) = .0023$$

The reduced form of the last two segments is as follows:

$$\text{Slope of Line Segment C-D: } 518/(1616 \cdot 400) = .0008$$

$$\text{Slope of Line Segment D-E: } 1333/(1616 \cdot 170) = .00485$$

Details for these calculations are as follows:

Break Point Label	Value on the x-Axis (ADA)	Value of the y-axis Salary Cost Per Student
A	2,000	\$1,616
B	1,000	\$1,850
C	700	\$1,960
D	300	\$2,478
E	130	\$3,811

Line segment values that generate the scale component formulas are shown as follows:

Line Segment	Differences in the x-Axis Values	Differences in y-Axis Values
A-B	$2,000 - 1,000 = 1,000$	$1,850 - 1,616 = 234$
B-C	$1,000 - 700 = 300$	$1,960 - 1,850 = 110$
C-D	$700 - 300 = 400$	$2,478 - 1,960 = 518$
D-E	$300 - 130 = 170$	$3,811 - 2,478 = 1,333$

3. Four more equations were constructed to produce the final scale index values. Index values are calculated in reference to the base salary cost per student of \$1,616 and each is added to the index value at the beginning break point. The results are as follows:

ADA of the District	Calculation of Scale Factor
More than 2,000 ADA	1.0
1,000 to 2,000 ADA	$1.0 + [(2,000 - ADA) * .00014]$
700 to 999 ADA	$1.14 + [(1,000 - ADA) * .00023]$
300 to 699 ADA	$1.209 + [(700 - ADA) * .0008]$
Less than 300 ADA	$1.529 + [(300 - ADA) * .00485]$ except that 130 is used for ADA if ADA is less than 130

### Adjustment for Price Effects

The adjustment for price variations is based on the regression analysis that was completed to explain the variation in beginning teacher salaries. The appropriate number of points from the "Index Contribution" column are added or subtracted from a base value of 1.00.

### Conversion of the Regression Results to the Price Component Table

Regression analysis produces an equation which predicts the value of the dependent variable (in this case, the salary of an individual teacher) based on the values of one or more independent variables (in this case, characteristics of the teacher and the district in which the teacher teaches).

The base equation is as follows:

$$\begin{aligned} \text{Log of} & 7.82729186 \text{ (intercept term) +} \\ \text{teacher} & (0.03678998 * 1 \text{ if teacher Has No Degree) +} \\ \text{salary} = & (0.01707559 * 1 \text{ if teacher is Assigned Secondary} \\ & \text{Teaching Duties} \\ & (0.02898405 * \text{Number of Years of Experience} \\ & \text{for Teachers) +} \\ & (-0.000412168 * \text{Square of Experience of Teacher) +} \\ & (-0.02527647 * \text{Total Effective Tax Rate for} \\ & \text{State Aid Purposes) +} \\ & (.0000000906152 * \text{Taxable Property Value} \\ & \text{Per Teacher) +} \\ & (.000045564 * \text{Percentage of Minority Teachers) +} \\ & (-0.02858745 * \text{Graduation Rate) +} \\ & (0.000071112 * \text{Non-Salary Benefits Expenditure} \\ & \text{per Student) +} \\ & (0.000022884 * \text{Competing Average Beginning} \\ & \text{Teacher Salaries) +} \\ & (-0.000969745 * \text{Percentage of Low-Income} \\ & \text{Students) +} \\ & (0.000013348 * \text{Square of Percentage of} \\ & \text{Low-Income Students) +} \\ & (0.004578901 * 1 \text{ if District is Classified} \\ & \text{Major Suburban) +} \\ & (-0.01200070 * 1 \text{ if District is Classified} \\ & \text{Independent Town) +} \\ & (0.01213998 * 1 \text{ if District is Classified Rural) +} \\ & (0.01137511 * 1 \text{ if County Population Less} \\ & \text{than 40,000) +} \\ & (-0.31896171 * \text{Log of Average Daily Attendance) +} \\ & (0.04335643 * \text{Square of Log of Average} \\ & \text{Daily Attendance) +} \\ & (-.001817481 * \text{Cube of Log of Average} \\ & \text{Daily Attendance}) \end{aligned}$$

Each of the factors in the equation contributes to the expected value of a specific teacher's salary through the coefficients identified. The variables listed account for approximately 85 percent of the variation in teacher salaries.

Indices are generally created to represent the relationship between a specific observation and the minimum value of the distribution of all values, or the relationship between a specific observation and the mean of all values. The cost component of the CEI seeks to represent an index to form the relationship between an individual district and a base level of cost.

The objective of the regression analysis is to identify the impact of certain uncontrollable factors on teacher salaries, then allow variation in those factors to alter the prediction of the salary of a teacher if all other characteristics are held constant.

By assessing the impact on the predicted salary of a teacher of a change in value for an uncontrollable characteristic on which an index is to be based, a revised predicted teacher salary can be obtained. For every unit of change in an uncontrollable characteristic, a change in expected teacher salary would occur, and each new expected teacher salary can be related to the base value in order to determine an index.

There were five uncontrollable characteristics of school districts found to have an impact on teacher salaries: average salary of beginning teachers in the surrounding area, the percentage of low income students, location of the district in a county with fewer than 40,000 residents, classification of the district as either rural or independent town, and the average daily attendance of the district.

The process for determining the impact of a change in the value of an uncontrollable characteristic is set forth in the following steps:

1. The mean or average value of all characteristics is used to determine a base predicted teacher salary by substituting the mean values in the equation.
2. For a single uncontrollable characteristic, the minimum value is substituted in the equation, holding all other characteristics at their respective mean values.
3. The resulting predicted value for the dependent variable, teacher salary, is then compared to the value determined in step 1. (This process actually involves taking the exponent of the logarithmic value used in the regression so that a meaningful comparison can be made.)
4. Steps 2 and 3 are repeated for the full range of values of the single uncontrollable characteristic until the maximum is reached. This gives a range of predicted values, generated by values for the uncontrollable characteristic, extending from a minimum prediction based on a minimum value for the uncontrollable factor to the maximum based on the maximum value of the uncontrollable factor. When compared to the base value in step 1, a range of percentage variations can be determined, and these variations can be translated into index contributions.

A specific range in an uncontrollable characteristic can be defined so that it corresponds to a specific contribution toward the index value.

### Summary

The authors, by design, have discussed the issues of the cost of living in funding public elementary and secondary education. Further, they have replicated state documents to reflect the complexities of two selected state methodologies. The determination of the cost of providing public educational services is complex and costly for any state. It should be noted that there are essentially two different methodologies in attempting to measure the cost of education. The first methodology, as illustrated by the Florida example is essentially one of measuring the cost of living within school districts. The proponents of this methodology argue that the vast majority of expenses of a school district are in fact labor. The school district must in fact purchase labor and it cannot do so without accounting for its labor costs. Thus, in a circuitous manner the district is purchasing services who must live in the community. On the other hand, opponents state that such measures do indicate the cost of living, but the cost of living has very little, if anything, to do with the cost of providing educational services in that the school district is not purchasing the same items that individuals purchase. Hence, such models are a cause of inflation in a given state in that labor costs will always tend to rise while productivity remains the same.

The Texas methodology attempts to measure the controlled and uncontrolled costs associated with providing educational services by school districts. The size, location, and nature of professional staff indicate the costs of providing such services. This latter model is conceptually different than the former. While both purport to measure the same thing, it is a reasonable observation to make that the methodologies measure different attributes affecting school districts. Which methodology is superior and worthy of greater research is a continual debate by education finance researchers. Further investigation of running both models within the same state would yield interesting observations as to the effects on public education and the equity and adequacy issues inherent within education finance discussions. The vast majority of education finance researchers would concede that cost of living issues are legitimate variables for any education finance distribution program. Equally important is that the cost of living variables be properly measured and accounted for within a state distribution formula.

## References

1. A discussion of what constitutes the concept of the cost of living is beyond the scope of this discussion. Such detailed and academic discussions can be found in R. A. Pollack, *The Theory of the Cost-of-Living Index*, (Oxford: Oxford University Press) 1989.
2. See the discussion in K. M. Matthews and C. T. Holmes, "Implications of Regional Cost Adjustments to School Finance Plans," *Educational Administration Quarterly*, vol. 20, no. 1 (Winter, 1984) 69.
3. Matthews and Holmes, "Implications of Regional Cost Adjustments," *Educational Administration Quarterly*, 69.
4. Research regarding this observation can be found in D. Gerwin, "An Information Processing Model of Salary Determination in a Contour of Suburban School Districts," *American Educational Research Journal*, vol. 10, no. 1, (1973) 5-20.
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7. F. H. Nelson, "An Interstate Cost-of-Living Index," *Educational Evaluation and Policy Analysis*, Spring 1991, vol 13, no. 1, 110.
8. Nelson, "An Interstate Cost-of-Living Index," *Educational Evaluation and Policy Analysis*, 110.
9. J. G. Chambers, "The Development of a Cost of Education Index: Some Empirical Estimates and Policy Issues," *Journal of Education Finance*, 5 (Winter, 1980), 262-281.
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14. K. M. Matthews and C. T. Holmes, "Implications of Regional Cost Adjustments," *Educational Administration Quarterly*, 85.
15. Matthews and Holmes, "Implications of Regional Cost Adjustments," *Educational Administration Quarterly*, 76-77.
16. Matthews and Brown, "Determinants of Metropolitan Teachers' Salaries," *Journal of Education Finance*, 286-287.
17. Matthews and Holmes, "Implications of Regional Cost Adjustments," *Educational Administration Quarterly*, 81.
18. See R. Craig Wood, "Reduction in Force," in R. C. Wood, (ed), *Principles of School Business Management*, (Reston, VA: Association of School Business Officials, Inter., 1987), 537-557; J. G. Ward, "Fiscal Trends in Urban School Districts," (Paper presented the American Education Finance Association, Annual Meeting, March 1983), 5.
19. J. G. Chambers, "Cost and Price Level Adjustments to State Aid for Education," in *Perspectives in State School Support Programs*, K. F. Jordan and N. H. Cambron-McCabe, eds. (Cambridge MA: Ballinger Pub. Co., 1981), 45.
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21. G. P. Johnson, *Cost of Education Indices: The State of the Art and Implications for Indiana School Finance Reform*, (Indianapolis, IN: Indiana School Finance Study, 1978), 162.
22. N. Wentzler, "Adjusting for Input Price Differences Across School Districts: A Comparison of Alternative Techniques," *Journal of Education Finance* 6 (Winter 1978), 313.
23. Wentzler, "Adjusting for Input Price Differences Across School Districts," *Journal of Education Finance* 313 and Matthews and Holmes, "Implications of Regional Cost Adjustments," *Educational Administration Quarterly*, 78. Specifically regarding the latter point, Fox found a Pearson Correlation Coefficient of .857 between the Florida Price Level Indices, which was based largely on housing costs and mean family income, see J. N. Fox, "Cost of Living Adjustments: Right Intent, Wrong Technique," *Phi Delta Kappan* 56 (April 1975) 549.
24. Wentzler, "Adjusting for Input Price Differences Across School Districts," *Journal of Education Finance* 326.
25. Matthews and Holmes, "Implications of Regional Cost Adjustments to School Finance Plans," *Educational Administration Quarterly*, at 79 citing Johnson, *Cost of Education Indices*: 162 and Wentzler, "Adjusting for Input Price Differences Across School Districts," *Journal of Education Finance* 327.
26. Matthews and Holmes, "District Revenue Potential and Teacher Salaries in Florida Implication," *Journal of Education Finance*, 351.
27. L. Stiefel and R. Berne, "Price Indexes for Teachers in Michigan," in *Selected Papers in School Finance* 1981 (Washington, DC: National Institute of Education), 184.
28. Similar methodologies may be found in a number of studies, this particular methodology is based upon Chambers, "The Development of a Cost of Education Index," *Journal of Education Finance*, 262-281.
29. The researchers are reporting the methodology and questions how a school district can control for race, age, and sex in the absence of a specific court order regarding such areas as racial integration.

30. It should be noted that school districts, dependent upon type and classification, will have a different market basket of goods and services from which an index is developed.
31. See Chambers, "The Development of a Cost of Education Index:," *Journal of Education Finance*, 270, and K. M. Matthews, *A Study of the Impact of Resource Cost Variations on Equality of Educational Opportunity in Georgia*, (Athens GA: The Georgia School Finance Study, 1978) 92.
32. Matthews and Brown criticized this variable, in particular, as being highly questionable as to even remotely related as to any relationship that could be causal in nature. See Matthews and Brown, "The Development of a Cost of Education Index:," *Journal of Education Finance*, 236.
33. It is of the utmost importance to note that the advocates of such cost of education indices have acknowledged in the research literature that such programs are only intended to compensate school districts for costs outside their control. Further, and more specifically, the researchers have acknowledged that such plans do not take into account the differences in pupil needs among school districts.
34. For a detailed explanation of the Florida methodology see *The Florida Price Level Index 1991*, (Tallahassee, FL: Office of Planning and Budgeting, Revenue and Economic Analysis Unit) 1–12. The explanation of the Florida methodology as contained herein is taken almost verbatim from this document.
35. It should be noted that in the state of Florida school districts are organized on a county basis.
36. For a detailed explanation of the Texas methodology see *Cost of Education Index 1992–92 Biennium*, (Austin, TX: Legislative Education Board, State of Texas) March, 1991, 17–26. The explanation of the Texas methodology as contained herein is taken almost verbatim from this document.