# EFFICIENCY AND INEFFICIENCY IN THE TEXAS PUBLIC SCHOOLS

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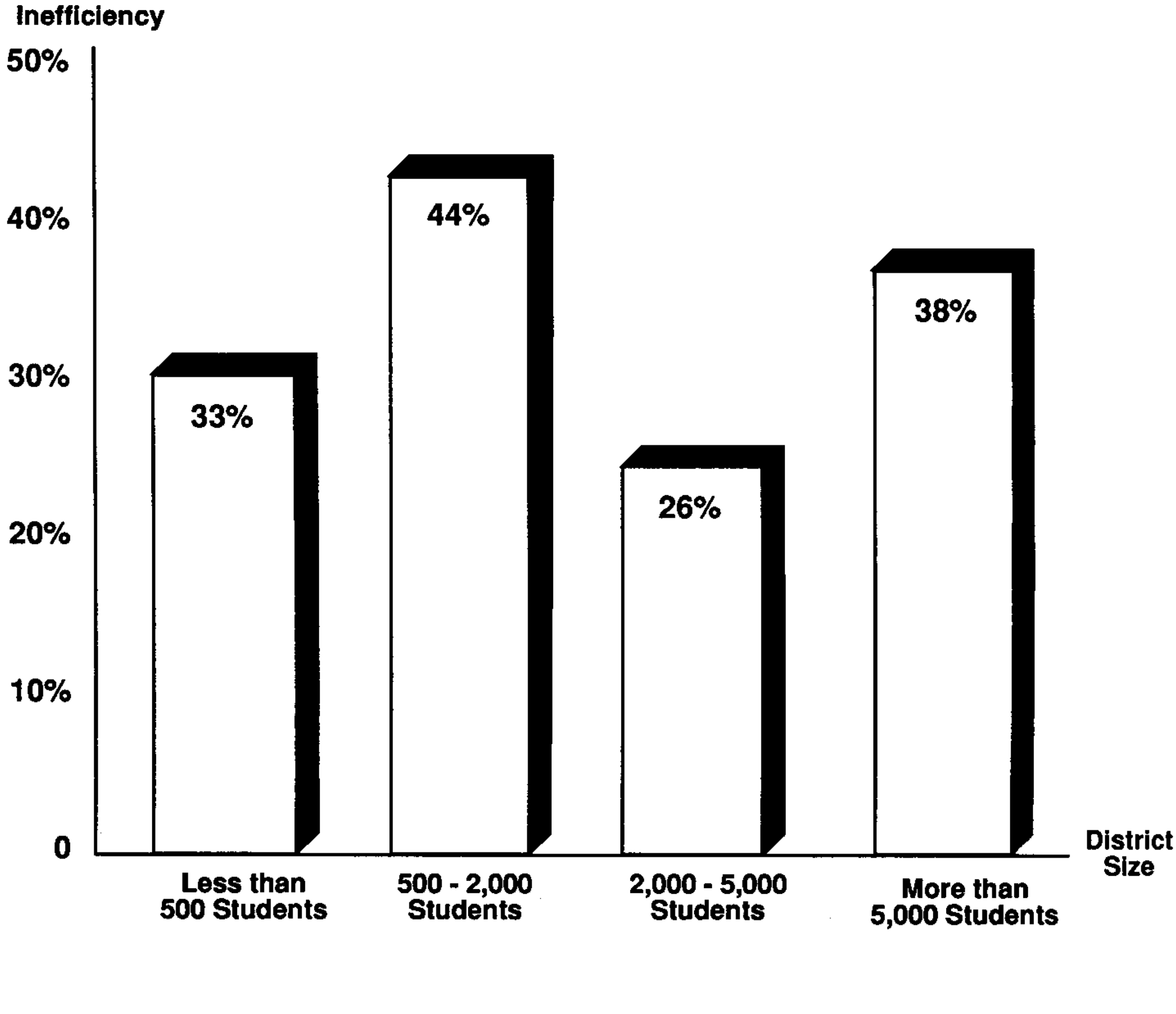
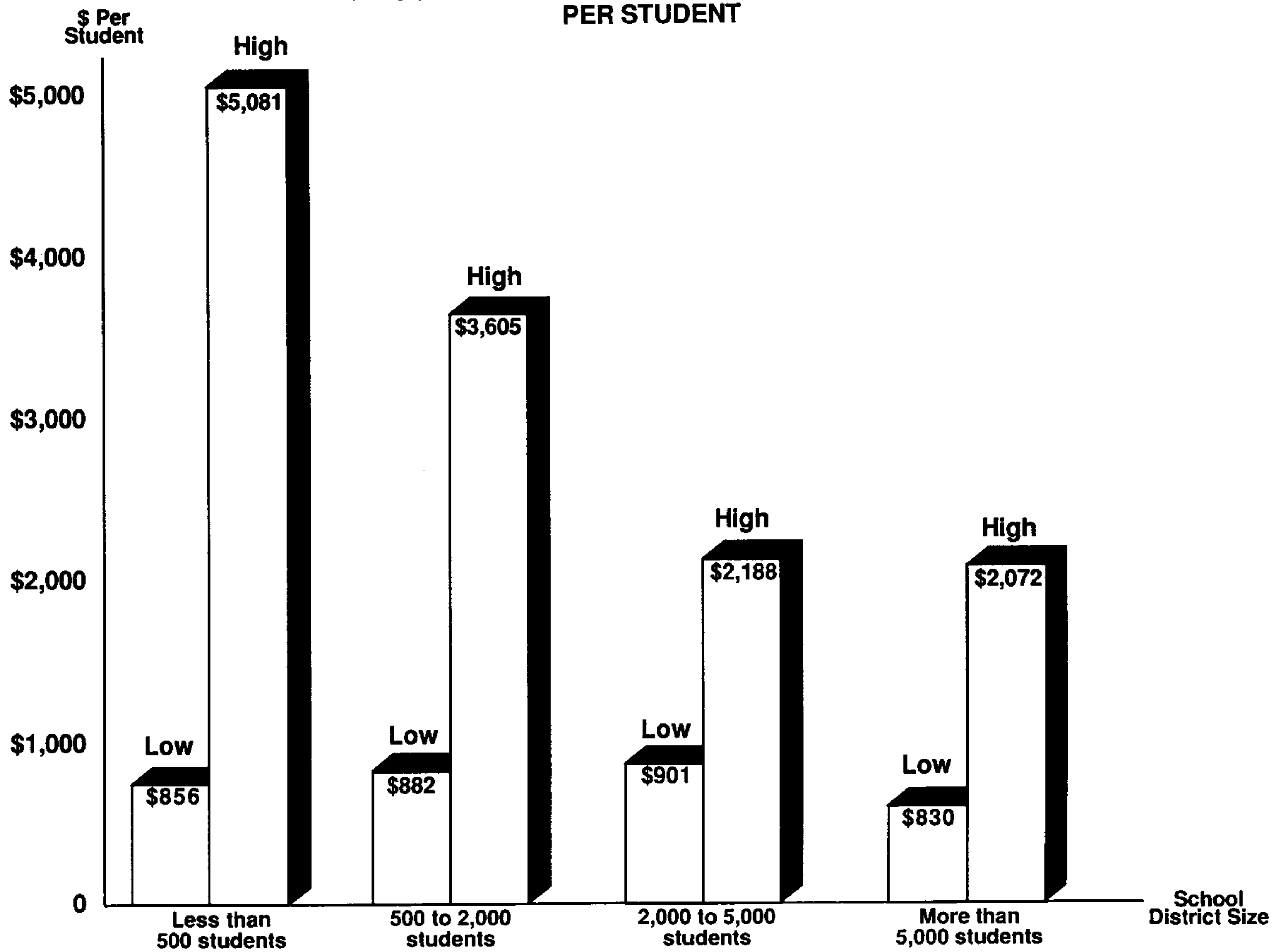
AVERAGE INEFFICIENCY OF TEXAS SCHOOL DISTRICTS



## AMOUNT SPENT ON NON-TEACHING ACTIVITIES PER STUDENT



## EXECUTIVE SUMMARY

On the whole, Texas public schools are very inefficient. If we compare student achievement scores with the amount of money spent to produce those scores, we conclude that about one out of every three dollars spent on public education is being wasted. On the average, if a school district is randomly chosen from among the more than 1,000 school districts in Texas, odds are that some other school district performs just as well on standardized tests for about two-thirds as much money.

One apparent source of inefficiency is the large amount of money spent on nonclassroom activities and administrative personnel.

- The Texas public schools employ more nonteachers than teachers, and spending on nonteaching activities is more than $5,000 per student in some school districts.

- The amount spent on administrative costs varies from a low of $29 per student in the leanest school district to $2,208 in the highest-spending district.

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- Extracurricular spending varies from less than $30 per student in some districts to more than $600 per student in others - not counting spending on facilities such as football stadiums and swimming pools.

Another source of inefficiency is our fragmented school system, in which we have too many districts for the number of students.

- On the average, full economies of scale require a student population of about 2,000.

- Yet 73.6 percent of Texas school districts have fewer than 2,000 students, and many of these districts are within close proximity and easily could be merged.

Another source of inefficiency is regulation by state government. Texas teachers probably are subjected to more state government regulations than teachers in any other state. Many teachers spend more time filling out forms and complying with red tape than they spend preparing for class. We were unable to measure the effects of most of these regulations. We did find that more years of classroom experience by teachers improves efficiency, whereas the pupil-teacher ratio appears not to matter.

Texas currently spends about $4,600 per student (including spending on debt, facilities and teachers' retirement). Yet it appears we are not getting our money's worth. In general, the more we spend on education, the more inefficient Texas public schools become. On the average:

- A 10 percent increase in state spending would lead to an additional $270,000 of waste in an average-size school district.

- Although districts which are more dependent on state aid (poorer districts) tend to be more efficient, each additional dollar of state aid in these districts would lead to 25 cents of waste under the current system.

# INTRODUCTION

Article Vll, Section 1 of the Texas Constitution mandates that "it shall be the duty of the Legislature of the State to establish and make suitable provision for the support and maintenance of an *efficient* system of public-free schools."[1] Yet in modem times little attention has been paid to whether our schools are efficient and what measures need to be taken to make them more efficient.

That changed with the Texas Supreme Court decision in *Edgewood* v. *Kirby,* in which the court declared the current system of educational finance unconstitutional on the grounds of "efficiency" because of its reliance on local property taxes. Because of wide disparities in the value of property among school districts, the same tax rate produces very different revenues per student. The court ruled that we must move to a system in which school districts have the opportunity to obtain comparable revenues for comparable tax effort.[2]

The Texas Supreme Court decision focused on the rights of bureaucracies and their ability to obtain money rather than on the rights of children and parents, however. The court addressed the "efficiency" with which school administrators can obtain funds. It ignored the "efficiency" with which those funds are spent to educate children. Indeed, only once in the court's opinion was there a reference to how school district spending affects children:

> The differences in the quality of educational programs offered are dramatic. For example, San Elizario I.S.D. offers no foreign language, no pre-kindergarten program, no chemistry, no physics, no calculus and no college preparatory or honors program. It also offers virtually no extracurricular activities such as band, debate or football. [3]

The implication is that Texas should make it possible for San Elizario school district to have a calculus teacher, a physics teacher, a debate coach, a band, a football team and so forth. But would these actions constitute an *efficient* use of state funds?

As it turns out, San Elizario is one of the least efficient school districts in the state ─ with student achievement scores far below those of other school districts spending a similar amount of money per student. Although 67 percent of San Elizario first graders pass the Texas Educational Assessment of Minimum Skills (TEAMS) tests, at the third grade level only 12 percent of the students are passing. The passing rate also is only 12 percent among San Elizario ninth graders - the lowest in the state.

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[1]Emphasis added.

[2]For an analysis of the ruling and what it means for Texas school districts, see Kathy Hayes and Daniel Slottje, "Equality and Inequality Among Texas Schools," NCPA Policy Report No. 147, National Center for Policy Analysis, March 1990.

[3]*Edgewood Independent School District* v. *William Kirby* (33 Tx. Sys. Ct. JrI. 12). Decision by Justice Oscar Mauzy.

Should we hire a calculus teacher and a physics teacher in a school district when the majority of students have not mastered basic arithmetic? Should we hire a debate coach for students who have not mastered the basic elements of expression? Should we have college preparatory classes in a district where the vast majority of students are not performing at the level required to earn a high school diploma?[4] Should we invest funds in a football team and band when the sentiment of the entire state is summarized in the slogan "no-pass, no-play"?

Unlike the Supreme Court decision, this study addresses how our education dollars are spent by school districts. Our basic conclusion: We taxpayers are not getting our money's worth for the dollars we now spend on public education in Texas. Moreover, we find that efficiency with which dollars are used to produce student achievement is in general unrelated to the concerns addressed by the court and the remedy it imposed. Specifically, we find that

- There is very little relationship between school district efficiency and the value of property.[5]

- There is also no relationship between school district efficiency and local property tax rates.

## MEASURING EFFICIENCY

Although Texas spends more than $14 billion on our public school system - about $4,600 per student - Texas parents and taxpayers know surprisingly little about what we get in return for our money.[6] Despite the constitutional requirement of "efficiency," Texas makes no systematic effort to measure the efficiency of public schools, and most of the information that would help us judge efficiency either is not collected or is purposely suppressed by the educational establishment.

Although numerous national tests[7] are administered to Texas school children each year and paid for with Texas dollars - parents, taxpayers and researchers are denied the opportunity to learn how individual schools perform relative to other schools in the state. Texas makes little effort to determine what school dropout rates are for individual school districts, and the statistics we have are too unreliable to be of value. The only statewide test results that are publicly available are the TEAMS tests - measuring achievement in reading, mathematics and writing.[8] But these tests measure only minimum basic skills, not higher-level skills or skills in other subjects (e.g., geography and economics).

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[4]Passing the eleventh grade TEAMS tests is a requirement for receiving a high school diploma in Texas.

[5]The one exception to this generalization is shown in Table A-10 in the Appendix.

[6]The Texas Education Agency estimates that total spending from all sources for all purposes was about $14.3 billion in the 1988-89 academic school year.

[7]These include the Scholastic Aptitude Tests (SAT), the American College Testing (ACT) tests and the Iowa achievement tests.

[8]The TEAMS tests results are reported in Texas Education Agency, *Texas Educational Assessment of Minimum Skills: Student Performance Results.* 1988-1989, Vol. I, II and III (Austin: TEA, 1989).

Because the *only* currently available measures of the output of Texas public schools are the TEAMS test results, and because all other measures are inadequately recorded or intentionally suppressed, the TEAMS tests form the basis for this efficiency study.[9]

Efficiency refers to a relationship between inputs and outputs. A school district is efficient if it produces a level of achievement at the minimum possible cost. In this study, we identify those school districts which achieve the highest TEAMS scores for the least amount of money, after adjusting for considerations such as differences in the cost of living, school district size and racial composition of the student body.[10] The school districts so identified are the most efficient. All other school districts are less efficient and the degree of inefficiency is measured relative to the most efficient schools.

Efficiency Results for Texas School Districts. The results for school districts of different sizes are depicted in Table 1. As the table shows:

- On the average, school districts in Texas are only two-thirds as efficient as they could be.
- This means that if a school district is selected randomly from among the 1,055 districts[11] in Texas, odds are that some other district which has the same student achievement level is spending only two-thirds as much.

Inefficiency implies waste. To the degree that a school district is inefficient, it is spending more than is necessary to achieve its results. Conversely, an inefficient school district could achieve the same results for less money if it developed efficient methods of schooling.

[9]Put another way, in this study the public school system is judged by the *only* measure which the school system provides us with.

[10]The method of estimation is described in Appendix A.

[11] There are 1,055 local school districts that elect a board of trustees and levy local property taxes. In addition, there are six other special districts.

**TABLE I**

**AVERAGE INEFFICIENCY OF TEXAS SCHOOL DISTRICTS**

| District Size | Average Inefficiency |
|---|---|
| Less than 500 students | 33% |
| 500 to 2,000 students | 44% |
| 2,000 to 5,000 students | 26% |
| More than 5,000 students | 38% |

**Honor Roll Schools.** Most Texas schools are *not only* inefficient, they also produce mediocre results on student tests of minimum basic skills. Some schools, however, excel. Table II shows those school districts which have high efficiency ratings *and* high test scores.[12] We have chosen to designate these school districts as "honor roll" school districts. They are presented in Table II in order to draw attention to the fact that some Texas school districts achieve a lot with a very modest amount of money.

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[12]In general, high test scores and efficiency are not related. Some "efficient" school districts have mediocre 1EAMS tests results. Conversely, many school districts with high 1EAMS tests scores receive low efficiency rating. Only a handful of schools score high on both measures of performance.

**TABLE II**
**HONOR ROLL SCHOOLS**

| District (County), | Efficiency Rating | Percent of Students Passing all TEAMS Tests[2] |
|---|---|---|
| **Stephenville (Erath)** | 100% | 86% |
| **Lindsay (Cooke)** | 92% | 95% |
| **Round Rock (Williamson)** | 93% | 86% |
| **Oglesby (Coryell)** | 93% | 86% |

**HONORABLE MENTION**

| District (County) | Efficiency Rating[1] | Percent of Students Passing all TEAMS Tests[2] |
|---|---|---|
| **Mansfield (Tarrant)** | **100%** | **81%** |
| Chapel Hill (Titus) | **90%** | **82%** |
| Gregory Portland (San Patricio) | **90%** | **81%** |
| Alvarado (Johnson) | 86% | 81% |
| Duncanville (Dallas) | 84% | 82% |
| North East (Bexar) | 82% | 82% |
| Alamo Heights (Bexar) | 81% | 83% |
| Denison (Grayson) | 81% | 81% |
| Rockwall (Rockwall) | 81% | 80% |
| New Braunfels (Comal) | 80% | 81% |
| Pine Tree (Gregg) | 80% | 84% |

[1]Measured on a scale of 0 to 100.

[2]Results for 1988 1EAMS tests of minimum skills.

**How Efficiency Measures Can be Misleading.** As a word of caution, it is important to note that the measure of efficiency used in this study (and in all other efficiency studies) can be misleading for several reasons. First, our method of measuring efficiency applies the same standard to all districts within a range of student population. For example, all districts with less than 500 students are subjected to the same measure. But some rural school districts in Texas have less than 30 students.[13] When overhead costs (building and administrative costs) are spread over 30 students, the cost per student will be much higher than if those same costs could be spread over 60 or 90 students. Thus some small districts (which cannot reasonably be merged with other districts) may receive a low efficiency rating, even though they might actually be very efficient considering the constraints they face.

Second, since the TEAMS test results measure minimum basic skills, these scores may be a misleading measure of the output of high-performing school districts. For example, a district with a 95 percent passing rate on the TEAMS tests may be devoting considerable resources to higherlevel mathematics and college preparatory courses - outputs not measured in this study. Thus some high-performing districts may receive a low efficiency rating in this study even though they actually are very efficient in achieving other academic goals. The TEAMS tests results are a much better measure of efficiency among low-performing school districts. The State of Texas has said, in about every way it can be said, that the achievement of minimum basic skills is the highest priority for Texas schools. Taxpayers have been asked to pay more to help schools achieve these goals. If a low-performing district intentionally sacrifices minimum basic skills to the achievement of other goals, it seems appropriate to label these actions "inefficient."

Third, some school districts may divert funds from teaching to extracurricular activities (such as football) not because the school administration prefers this result but because the local community insists on it. Such schools may receive a low efficiency rating in this study. But the inefficiency will be due to community preference, not to lack of diligence on the part of school administrators.

## NINE SOURCES OF INEFFICIENCY

Bearing in mind the qualifications above, we can examine the reasons why there is so much inefficiency among Texas schools.

### 1. Total Spending

One of the most important sources of inefficiency is money itself. School districts which have more money to spend do not achieve substantially better results when they spend it. Other things equal, school districts with less money are more efficient, and those with more money are less efficient. As a result, when school revenues increase so does inefficiency. On the average:

> A 10 percent increase in total revenue for school districts with less than 500 students would create about $40,000 of additional waste in each district - about $720 per student.
>
> A 10 percent increase in total revenue for school districts with between 2,000 and 5,000 students would lead to about $270,000 of additional waste in each district about $80 per student.

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[13]The smallest school district, Allamore CSD, has only three students.

This result is consistent with most educational research conducted over the last 25 years. In the mid-1960s, James Coleman conducted a study for the Civil Rights U.S. Office of Education in response to a requirement of the Act of 1964. The "Coleman Repon" concluded that there was no relationship between educational spending and student achievement.[14] Since that time, academic studies have overwhelmingly confirmed Coleman's conclusion.[15]

## 2. Spending by State Government

Just as there is a negative relationship between total district spending and efficiency, there is a negative relationship between the amount of money school districts receive from state government and efficiency. In fact, increases in state spending lead to even more waste (per dollar of spending) than increases in spending generally. On the average:

- A 10 percent increase in state spending for the smallest school districts would lead to about $30,000 of additional waste in each district - about $70 per student.

- A 10 percent increase in state spending in districts with 500 to 2,000 students would lead to about $130,000 of additional waste in each district - about $140 per student.

- A 10 percent increase in state spending in districts with 2,000 to 5,000 students would lead to about $500,000 in additional waste in each district - about $160 per student.

## 3. Spending by the Federal Government

We also find that spending by the federal government lowers the efficiency of school districts, although this conclusion seems to apply only to smaller districts. For example, among districts with less than 500 students, about 30 cents of each additional dollar of federal aid is wasted.

In addition to the explanation given above, federal spending may contribute to inefficiency for a different reason. Federal funds used to subsidize school lunches or busing may accomplish other social goals, but this type of spending does nothing to increase student test scores.

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[14]J.S. Coleman, E.Q. Campbell, D. J. Hobson, J. McPartland, A.M. Mood, F.D. Weinfeld, and R.L. York, *Equality of Educational Opportunity* (Washington, D.C.: U.S. Government Printing Office, 1966).

[15]Eric Hanushek, "The Impact of Differential Expenditures on School Performance," *Educational Researcher*. May 1989.

## 4. State Spending as a Percent of District Revenues

Even though more state spending leads to less efficiency overall, we nonetheless find that those districts which receive more state aid are more efficient than those districts which receive less. Small districts which are more heavily reliant on state aid are considerably more efficient - saving hundreds of thousands of dollars - relative to those districts which are less reliant on state aid and more reliant on local property tax revenue. The differences are even more dramatic among larger school districts.

In the light of the Texas Supreme Court decision in *Edgewood v. Kirby*, it is interesting to note that districts which are more reliant on state aid tend to be poorer districts with lower property values. However, when the total amount spent (from all sources) is compared to student achievement, *in most cases we found no relationship between the value of property and school district efficiency*.

## 5. Spending on Nonclassroom Activities

Another major source of inefficiency among school districts is the amount of money spent on nonclassroom activities, including administrative personnel.

- The Texas public schools now employ more nonteachers than teachers.
- Administrative costs per student vary from $29 in the leanest school districts to as much as $2,208 in others.
- Extracurricular spending varies from $6.70 per student in one district to more than $600 per student in others - not counting spending on facilities such as football stadiums and swimming pools.

There is clear evidence that this type of spending lowers the efficiency of school districts. On the average:

- The total amount spent on nonteaching activities ranges from $830 per student to more than $5,000 per student.
- If small districts reduced their administrative budget by 10 percent, they would increase efficiency by more than 1.0 percent- saving more than $12,000 in each district.
- For medium-sized districts, reducing the administrative staff by one person would increase efficiency by 1.0 percent - leading to a more than $20,000 reduction in total costs.
- If medium-sized school districts lowered their extracurricular budgets by 10 percent, they would save about $6,000 in each district.

**TBALE III**

**AMOUNT SPENT ON NONTEACHING ACTIVITIES PER STUDENT**

| **District Size** | **Low** | **High** |
|---|---|---|
| **Less than 500 Students** | $856 | $5,081 |
| **500 to 2,000 Students** | 882 | 3,605 |
| **2,000 to 5,000 Students** | 901 | 2,188 |
| **More than 5,000 Students** | 830 | 2,072 |

Source: Appendix A, Tables A-I through A-4

**TABLE IV**

**AMOUNT SPENT ON ADMINISTRATION PER STUDENT**

| **District Size** | **Low** | **High** |
|---|---|---|
| **Less than 500 Students** | $391 | $2,208 |
| **500 to 2,000 Students** | 248 | 1,232 |
| **2,000 to 5,000 Students** | 248 | 907 |
| **More than 5,000 Students** | 29 | 322 |

Source: Appendix A, Tables A-I through A-4

**TAVLE V**

**AMOUNT SPENT ON COCURRICULAR ACTIVITIES PER STUDENT**

| District Size | Low | High |
|---|---|---|
| **Less than 500 Students** | $6.70 | $602.68 |
| **500 to 2,000 Students** | 5.93 | 551.00 |
| **2,000 to 5,000 Students** | 30.67 | 209.70 |
| **More than 5,000 Students** | 29.30 | 322.00 |

**Source: Appendix A, Tables A-I through A-4**

**TABLE VI**

**NONTEACHING PERSONNEL PER 1,000 STUDENTS**

| | Administrative Staff | | Support Staff | |
|---|---|---|---|---|
| District Size | Low | High | Low | High |
| **Less than 500 Students** | 0 | 26.5 | 0 | 18.1 |
| **500 to 2,000 Students** | 0 | 16.7 | 0 | 16.1 |
| **2,000 to 5,000 Students** | 0 | 9.0 | 0 | 11.3 |
| **More than 5,000 Students** | 2.9 | 7.0 | 2.0 | 11.0 |

**Source: Appendix A, Tables A-I through A-4**

## 6. State Regulations

Texas probably has more state regulation of public schools than any other state in the nation. Among other regulations, the state of Texas mandates a minimum pupil-teacher ratio, minimum teacher salary increases, a career ladder program and school bus fuel requirements. The state even mandates how long a teacher's lunch period must be. These mandates are popular with legislators because they can create benefits for special-interest constituencies without the pain of funding. The mandates are not popular with school officials. The State School Board has formed "Mandate Watch," a lobbying group dedicated to opposing all new mandates for which the state fails to provide the necessary revenue to pay for implementing the mandate.

The Texas Education Code now has reached 2,631 pages and the Texas Administrative Code on education is 998 pages. These rules and regulations are partly the result of pressures from 154 special interest groups which actively lobby in Austin in a continuing political struggle over a $14 billion (total) education budget.[16]

Texas teachers are subjected to a myriad of specific regulations - telling them what to teach and when to teach it. Our teachers are enduring more harassment from the educational bureaucracy than at any time in our past. Many teachers spend more time filling out forms and complying with red tape than they spend preparing for class. As an example of state government interference, viewers of *60 Minutes* recently watched a north Dallas school teacher break: down in tears before the camera when Mike Wallace informed him that the state would forbid him from using a highly successful mathematics textbook. The Texas Education Agency (TEA) defended the decision. But, TEA officials, in a city miles away from students, teachers and classroom almost never accept blame for the failure of students to leam.[17]

In this study we were unable to measure the effects of these state regulations, although we suspect they are not trivial. We did find that there is no relationship between the pupil-teacher ratio and school district efficiency, however.[18]

### 7. Minority and Nonminority Students

During the decade of the 1980s, much of the discussion about public policy toward education was dominated by the idea that minority students are more difficult or more costly to educate. The new racism in public education has been used as an excuse to weight the state's funding formula so that minority students receive higher weights (and thus more funds for their school districts) than nonminority students. The new racism is invariably used as an excuse to explain low test scores. We find little evidence to support these attitudes. In fact, over the last 15 years minority students have registered the biggest gains on standardized tests:[19]

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[16]Task Force Report, "Choice in Education: Opportunities for Texas," National Center for Policy Analysis and Texas Public Policy Foundation, March 1990, p. 12.

[17]See Joseph Garcia, "State Board Hears Pros, Cons of Controversial Math Texts," *Dallas Morning News.* March 10, 1990.

[18]This implies that there are neither too few or too many teachers.

[19]Source: the College Board.

- The average SAT score for white students in Texas fell from 12 points below the scores of white students in other states in 1979 to a 21 point deficit in 1989.

- Over the same period, Texas black students gained 56 points, almost reaching the average score of black students in all states last year.

- Texas Hispanic students gained 37 points and are now within 14 points of the national average for Hispanic students.

Texas minority students also have progressed faster than white students on the TEAMS tests. On the 1989 ninth grade TEAMS tests, Petersburg ISD (near Lubbock) out-scored all other school districts in Texas with a 100 percent passing rate. Petersburg is 65 percent Hispanic.

While it is undoubtedly true that minority students are the worst victims of the failure of the Texas public schools,[20] we find no evidence that minority students are more costly to teach. On the average, a school district with a 10 percent higher-than-average share of minority students wastes $7,000 less than other districts among small districts and $20,000 less among larger school districts. This means that school districts with more minority students achieve higher test scores for the money they spend.

## 8. The Size of School Districts

Our study confIrn1S what other studies have found: that very small school districts fail to achieve economics of scale in schooling. Specifically:

- Full economics of scale in education are reached with a student population of about 2,000.[21]

- Yet 73.6 percent of the school districts in Texas have fewer than 2,000 students.[22]

Some school districts are unavoidably small because of the sparsity of population. But in other cases, smallness is a matter of politics and bureaucratic preference. For example:[23]

- Upshur County (at the top of the Texas panhandle) has seven independent school districts plus two districts headquartered in adjacent counties serving an area of only 46 square miles.

- All nine districts operate a high school through the 12th grade, yet only one has more than 100 twelfth grade students.

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[20]See Staff Report, "Report Card on Texas Schools," NCPA Policy Report No. 144, National Center for Policy Analysis, January, 1990.
[21] William Niskanen, "Economies of Scale in the Provision of Public Schooling," 6th Annual Critical Issues Symposium, The James Madison Institute, Tallahassee, FL, March 8-10,1989.
[22]For the distribution of school districts and a discussion of the issue, see Texas Research League, "The Quest for an Efficient System of Schools," *Analysis.* Vol. II, No.2, February 1990, p. 3
[23]Ibid., p. 6.

Evidence indicates that smaller districts are more costly (per student) and that student achievement is lower. For example:

- Total current operating expenses were $3,550 per student in 1988-89 for districts with more than 50,000 students compared to $6,579 for districts with fewer than 100 students.[24]

- In 1988, average SAT verbal scores were 28 points higher and math scores were 44 points higher in schools with more than 1,000 graduating seniors than in schools with fewer than 100 graduating seniors.[25]

Our results not only indicate economies of scale in schooling, we also find that inefficiency is related to size.[26] Specifically:

- A doubling of enrollment among small school districts would lead to savings of about $200,000 in each district.
- Among medium-sized school districts (2,000 to 5,000 students), a 10 percent increase in enrollment would save about $260,000 in each district.

## 9. Teaching Experience

Although most studies have found no relationship between teaching experience and student performance, we do find such a relationship among Texas school districts. Specifically, if school districts managed to retain teachers longer, there would be some gains in efficiency which translates into dollars of savings.[27] On the average:

- Increasing the average of teachers' experience by one year would lead to a cost saving of $14,000 in each small district.

- Increasing the average of teacher experience by one year would lead to a cost saving of $54,000 in each school district with 2,000 to 5,000 students.

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[24]Ibid., p. 4.

[25]Ibid., p. 7.

[26]The existence of economies of scale means that school districts can produce higher test scores per dollar of spending if they can increase their size. *As a separate issue.* we find that smaller districts use funds less efficiently than larger districts after adjusting for potential economies of scale.

[27] On the average, teachers in Texas have been teaching about 11 years.

**TABLE II**

**POLICY OPTIONS THAT AFFECT EFFICIENCY**

| Option | Percent Change in Efficiency | | | |
|---|---|---|---|---|
| | Less than 500 Students | 500 to 2,000 Students | 2,000 to 5,000 Students | More than 5,000 Students |
| **1. Total Spending (Increase by 10 percent)** | -4% | -2% | -3% | * |
| **2. State Spending (Increase by 10 percent)** | -2.2% | -5.7% | -4.3% | * |
| **3. Nonteaching Expenses (Decrease by 5 percent)** | +16% | +1.5% | * | * |
| **4. Consolidation (Increase students per district by 100 percent)** | +14% | +14% | +30% | * |
| **5. Teacher Experience (Increase by 10 percent)[1]** | +1.2% | +1.3% | +.6% | * |

*Indicates the relationship is not significant.
[1]Number of years of classroom experience.
Source: Appendix A

## TABLE III

## GAIN OR LOSS IN DOLLARS PER SCHOOL DISTRICT

| Option | Less than 500 Students | 500 to 2,000 Studnets | 2,000 to 5,000 Students | More than 5,000 Students |
|---|---|---|---|---|
| **1. Total Spending (Increase by 10 percent)** | -$4,000 | -$45,000 | -$270,000 | * |
| **2. State Spending (Increase by 10 percent)** | -$30,000 | -$130,000 | -$500,000 | * |
| **3. Nonteaching Expenses (Decrease by 5 percent)[1]** | +$70,000 | +$50,000 | * | * |
| **4. Consolidation (Increase students per district by 100 percent)** | +$140,000 | +$300,000 | +$2,600,000 | * |
| **5. Teacher Experience (Increase by 10 percent)[2]** | +$14,000 | +$30,000 | +$54,000 | * |

*Indicates the relationship is not significant.
[1]Gain includes efficiency gains plus cost savings from the reduced expenditure
[2]Number of years of classroom experience.
Source: Appendix A

## IMPLICATIONS FOR PUBLIC POLICY

Tables II and III contain a summary of the effects of some major policy options faced by the legislature and by local school administrators. Table II presents the effects of these policy options in terms of our measure of efficiency. The same information is presented in Table III in terms of dollars. As the tables show, major savings are possible in Texas by merging small school districts and by reducing spending on nonteaching activities and personnel in small and mediumsized districts.

Efficiency gains are also possible through a reduction in spending. Although we do not recommend that option, this result has important implications for the opposite policy option: increasing spending. Proposals currently before the state legislature would increase state spending on education and encourage local districts to increase local spending. Tables II and III show that these policies would increase inefficiency and lead to additional waste. *Even if additional state spending is concentrated on those districts which are currently more dependent on state aid (property-poor school districts), about* 25 *cents of each additional dollar of state spending would be wasted.*

## WHAT OTHER STUDIES SHOW

Among efficient organizations, there will always be a positive relationship between inputs and outputs. In other words, the more inputs that are used, the greater the output will be. Inefficiency, however, severs the direct relationship between inputs and outputs. If inefficiency is pervasive enough, there will be no relationship between inputs and outputs. Interestingly, this is precisely the case with public schools around the nation. Table VII summarizes the results of educational research conducted over the past 25 years. As the table shows:[28]

- Of 65 studies that examined whether increasing pupil expenditures improved student performance, three-fourths found no improvement, and about 5 percent found that expenditures reduced performance.

- Of 74 studies that examined whether better school facilities improved education, 84 percent found no improvement, and almost 7 percent found a negative impact.

- Of 152 studies that examined whether lower student-teacher ratios affected performance, 82 percent found no impact, and over 8 percent found a negative impact.

- Of 140 studies that examined whether more experienced teachers made a difference, 64 percent found no difference, and 7 percent found lower student achievement.

[28]Hanushek, "The Impact of Differential Expenditures."

These results have been reconfirmed by the Brookings Institution - in the largest and most comprehensive study of education ever conducted in the United States. In studying 9,000 students, 11,000 teachers, 400 public and private high schools and the principals in each school, Brookings researchers found that only four factors consistently made a difference in achievement gains: student aptitude, school autonomy, family background and peer group influence.[29]

The Brookings researchers expressed the impact of these variables in terms of the number of months of additional classroom instruction that would enable students in the bottom 25 percent to achieve at the same levels as students in the top 25 percent. For example, other things equal, student aptitude is worth 18 months of classroom instruction. Continuing with this method of measurement, family background makes a 12-month difference, peer influence a five-month difference and school autonomy a 13-month difference.[30] These results are shown in Table VIII. In general, schools have little control over the aptitudes or family backgrounds of their students, or peer group pressure. However, school systems have a great deal of control over the amount of autonomy given to schools.

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[29]John E. Chubb and Terry M. Mae, *Educational Choice* (San Antonio: Texas Public Policy Foundation, March 1990).

[30]Ibid.

**TABLE VII**
**INPUTS AND OUTPUTS IN EDUCATION:**
**WHAT OTHER STUDIES SHOW**

| **Input** | **Increases Student Achievement (No. of Studies)** | **Reduces Student Achievement (No. of Studies)** | **Makes No Difference (No. of Studeis)** |
|---|---|---|---|
| **Teacher/Pupil Ratio** | 14 | 13 | 125 |
| **Teacher Education** | 8 | 5 | 100 |
| **Teacher Experience** | 40 | 10 | 90 |
| **Teacher Salary** | 11 | 4 | 54 |
| **Spending Per Student** | 13 | 3 | 49 |
| **Administrative Inputs** | 7 | 1 | 53 |
| **Facilities** | 7 | 5 | 62 |

Source: Eric Hanuskek, "The Impact of Differential Expenditures on School Performance," *Educational Researcher,* May 1989.

## TABLE VIII

## WHAT ACCOUNTS FOR DIFFERENCES IN STUDENT ACHIEVEMENT?

| Variable | Difference in Achievement (Measured in Months of Classroom Instruction) |
|---|---|
| **Student Aptitude** | 18 months |
| **School Autonomy** | 13 months |
| **Family Background** | 12 months |
| **Peer Group Influence** | 5 months |
| Source: Brooking Institution | |

The Brookings researchers found that successful schools have distinctive organizations. They are characterized by dear and ambitious goals; strong, teacher-oriented leadership; an orderly environment; teacher participation in decisions; and collegial relationships among leaders and staff. Private schools were found to be superior to public schools and were "free from excessive central controls by administrators, boards and unions. The main reason appears to be market competition. In a process much the reverse of the one in government schools, where political pressure leads to an increase in central control, competitive pressures lead to an increase in autonomy in private schools." Public schools can also be successfu1. But Brookings researchers found that in order for a public school to achieve autonomy, the school generally must be: (1) located outside a large city in a suburban school district, (2) currently performing well, (3) actively monitored by parents and (4) independent of a large administrative system.

School districts have little control over the aptitudes of their students, student family backgrounds or peer group influences. Nor can inner-city schools relocate to the suburbs. We can, however, give local schools more autonomy and transfer the function of school monitoring from the educational bureaucracy to parents through a system of school choice.[31]

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[31]See Task Force Report, "Choice in Education: Opportunities for Texas," National Center for Policy Analysis and Texas Public Policy Foundation, March 1990.

# CONCLUSION

As we enter the decade of the 1990s, a new educational reform movement is underway in cities and states around the country. Unlike the reform movement of the early 1980s, the new reform movement rejects the idea that we can achieve higher quality education by pouring more money into failing school systems or by attempting to change the operation of those school systems by more state government regulation and control.

Instead, the new reform movement attempts to draw on the strengths of competitive markets, which have served us well in other areas of economic life. Power over resources is being shifted from large bureaucracies to individuals, as parents and children increasingly exercise choice in an educational market place. Decision-making is being decentralized, as schools are obtaining more autonomy - giving them the freedom and the flexibility to compete for students.

So far, Texas has not been part of this new reform movement. Education policy in the state continues to be shaped and molded by old ideas - ideas that have been discredited and repeatedly shown not to work. Our state is well behind most other states on measures of student achievement. We are seventh from last in our ability to keep students in school. We are third from last in the literacy of our adult population. Unfortunately, it appears that we also may be near the last in adopting genuine reform.

Because of the Texas Supreme Court ruling in *Edgewood* v. *Kirby,* Texas is forced to make substantial and radical changes in the way we are financing the public schools. In the very process of meeting the mandate of the court, Texas has an opportunity to be a leader rather than a follower in the new school reform movement.

Spending more money will not eliminate public school inefficiency in Texas. Nor will it give Texas taxpayers our money's worth in terms of increased student achievement. Instead, student performance and more efficient schooling require decentralization and parental choice.

# APPENDIX A

In this study we do not rely on the notions of efficiency developed in modern welfare economics, such as Pareto optimality or Hicks-Kaldor wealth maximization. Rather, we focus on the narrow question of productive efficiency, since productive efficiency is clearly a necessary condition for most other definitions of efficiency and can, at least in principle, be modeled and measured. In other words, we do not ask whether a school is producing too much or too little output, but only whether a school could lower the costs of producing that output.

Because of the importance of the issue, there is a large body of literature that purports to estimate the educational production function.[1] Early research from the late 1960s and early 1970s typically defined output as a single measure, often test scores, and took as inputs such factors as the number and quality of teachers and various measures of facilities.[2] More recent research allows greater flexibility in functional form, and in particular regards schools as producing multiple output (e.g., a vector of test scores and graduation rates).[3]

There is still much controversy in the management science and econometrics literature about how efficiency ought to be measured.[4] Essentially, the line is drawn between those who prefer "data envelopment analysis" (DEA) and those who advocate a statistical approach. The methods are similar in that both attempt to use the data to identify a best practice or "frontier" cost function, and then to measure the inefficiency of those organizations not on the frontier by the distance from the ideal.[5]

DEA identifies the frontier by using programming methods to envelop the data. Since DEA is a nonparametric approach, it does not require the researcher to specify any functional fonD and hence is not vulnerable to specification error. The disadvantages of DEA include the fact that it does not incorporate a priori information, that it may be very sensitive to outliers and that it yields estimates of efficiency which may have unknown statistical properties.

The statistical approach, which is more familiar to most economists, specifies a cost function in a recognizable form, imposes the usual restrictions such as homogeneity in factor prices, then tries to model the inefficiency in the error structure. The pros and cons are nearly the mirror of DEA: statistical methods are prone to specification error (a more serious problem since

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[1] An extensive review can be found in E. Hanushek, "Conceptual and Empirical Issues in the Estimation of Educational Production Functions," Journal of Human Resources, 14, no. 3, (1979): 351-88; and E. Hanushek, "The Economics of Schooling," Journal of Economic Literature, 24, no. 3 (September 1986), pp. 1141-77.

[2]An example of this approach can be found in A. Summers and B. Wolfe, "Do Schools Make a Difference?", American Economic Review, 67, no. 4 (September 1977), pp. 639-52.

[3]Examples of this approach include RS. Fare, Grosskopf, and W. Weber, "Measuring School District Performance," Public Finance Quarterly (forthcoming); and C.A.K. Lovell, L. C. Walters and L. L. Wood, "Exploring the Distribution of DEA Scores," mimeD, September 1989.

[4]For a survey, see C.A.K. Lovell and Peter Schmidt, "A Comparison of Alternative Approaches to the Measurement of Productive Efficiency," in Applications of Modern Production Theory: Efficiency and Productivity, A. Dogramaci and R Fare, eds., Boston: Kluwer-Nijhoff Publishing. [Date?]

[5]The measure of efficiency is based on the work of MJ. Farrell, "The Measurement of Productive Efficiency," Journal of the Royal Statistical Society, General Series A, 120 Part 3 (1957), pp. 253-81.

economic theory says nothing about how inefficiency ought to be reflected in the error structure), but they incorporate a priori information in a systematic way, are less driven by outliers and yield estimates of efficiency that follow an obvious distribution. Much of the work measuring the efficiency of schools uses DEA methods.[6] The most obvious difference between our work and the existing literature is the use of a statistical method for modeling the frontier. We use the technique first proposed by Afriat[7] and extended by Richmond,[8] Greene[9] and Gyiman-Brempong.[10]

## Measuring Efficiency

To measure relative efficiency, we use the frontier estimation technique suggested by Greene (1980a) and Gyiman-Brempong (1980b). We begin by defining observed cost as

$$C = A + C(Y,w;\beta) + e \tag{1}$$

where A can be interpreted as a measure of fixed costs if statistically different from zero, Y is output, w is a vector of input prices, b is a vector of parameters. A + C(.) represents the costs of production if all inputs are used optimally and e represents increases in cost due to nonoptimal resource usage.

In this approach the data are "enveloped" by the frontier. Equation (1) is estimated using corrected ordinary least squares (COLS). Letting u be the mean of e, (1) can be rewritten

$$C = (A+u) + C(Y,w;\beta) + e - u \tag{2}$$

where the new error term (e-u) has zero mean. COLS can be used to estimate (2). Parameter estimates will be best linear unbiased and consistent. However, to determine relative efficiency, A + U must be decomposed into separate estimates of A and u. We follow Gabrielson's[11] (1975) methodology and decrease the cost function until the production function just envelops the data. We define û by

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[6]Examples include A.M. Bessent, J. Kennington and B. Reagan, "An Application of Mathematical Programming to Assess Productivity in the Houston Independent School District," Management Science, 28, No. 12 (December 1982): pp. 1355-67; A.M. Bessent, A. Charnes, W. Cooper, and N.C. Thorogood, "Evaluation of Educational Program Proposals by Means of DEA," Educational Administration Quarterly, 19, No.6, (Spring 1983): pp. 82107; R.S. Fare, Grosskopf, and W. Weber, "Measuring School District Performance," Public Finance Quarterly, (forthcoming); and C.A.K. Lovell, L.C. Walters and LL. Wood, "Exploring the Distribution of DEA Scores," mimeo, September 1989.

[7]S.N. Afriat, "Efficiency in Estimation of Production," International Economic Review 13:3 (1972): pp. 568-98.

[8]J. Richmond, "Estimating the Efficiency of Production," International Economic Review 15 (1974): pp.515-21.

[9]W.H. Greene, "Maximum Likelihood Estimation of Econometric Frontier Functions," Journal of Econometrics 13:1 (1980a): pp.27-56.

[10]K. Gyiman-Brempong, "On the Estimation of a Flexible Fronier Production Model," Journal of Econometrics 13:1 (1980b): pp.27-56.

[11] A. Gabrielson, "On Estimating Efficient Production Functions," Working Paper No. A-85 (Chr. Michelson Institute, Department of Humanities and Social Science, Bergen, Norway), 1975.

$$\hat{U} = \text{Max } \{I\ u\ I : u \geq o, (A + u) - u + C(\cdot) \geq O\} \tag{3}$$

This ensures that no observations will be below the frontier. In addition, $\hat{u}$ is consistent and $\hat{A}$ is consistent for anyone-sided distribution of e with a positive density in a neighborhood of zero. Point estimates of Jhe efficiency measures can be calculated by comparing observed cost with efficient cost, $\hat{A} + \hat{C}(\cdot)$:

$$EFF = \frac{C}{\hat{A} + \hat{C}(\cdot)} \tag{4}$$

## Estimating Model and Data Description

To estimate costs, a specific functional form must be chosen. In this analysis we use a translog cost function, and so we estimate

$$\ln C = \Sigma_i \alpha_i \ln w_i + {}^1\!/\!_2 \Sigma_i \Sigma_j \beta_{ij} \ln w_1 + \Sigma \gamma_k \ln Y_k + {}^1\!/\!_2 \Sigma_k \Sigma_1 \gamma_{k1} \ln Y_k \ln Y_1 + \Sigma_1 \Sigma_j \rho_{ij} \ln w_i \ln Y_j + \Sigma_i \delta_i z_i + e \tag{5}$$

where the subscript i = 1, . . . , n for each observation is omitted for ease of exposition and the following restrictions are imposed to insure homogeneity in prices: $\Sigma\alpha_1 = 1$, $\Sigma\beta ij = 0$, $\Sigma\rho ij = O$. The z vector denotes fixed inputs to the production process.[12]

To estimate the system, we need data from school districts on output, Y; input prices, Wj; fixed inputs, Zj; and expenditures, C. To that end, we have selected a sample of Texas School Districts from the 1988-89 school year.

We take as our measure of educational output the percent of students passing the Texas Educational Assessment of Minimum Skills (TEAMS) test. Other measures of output such as a weighted average of the component scores (writing, reading and analytical) for eleventh graders and a weighted average of all students' scores were also tested. These measures yielded almost identical results. We include five input prices in our analysis: capital costs and average salaries for school administrators, teachers, support staff and teachers' aides. To proxy a price of capital, we use debt service per student divided by total debt. Costs for each district are measured by the sum of own source revenues (both taxes and bond sales), state aid and federal aid.

In addition to these variables, we include the school district's enrollment, enrollment squared, average teacher experience and percentage of nonwhite students as conditioning variables in the z vector. We recognize, of course, that enrollment can be treated as an output and that teacher experience is an input. However, enrollment is something that cannot be controlled by the school district, and teacher experience is an input for which we have no reliable price data. Thus we have elected not to place these as direct elements of cost. For those who disagree with our decision, we point out that a different choice would have made relatively little difference in our estimating equation (we would have included some extra cross-product terms) and so should not radically alter our analysis. By including the squared term for enrollment, we can examine the

[12]See K. Gyiman-Brempong,"Production of Public Safety: Are Socioeconomic Characteristics of Local Communities Important Factors?," *Journal of Applied Econometrics* 4 (1989): pp. 57-72.

coefficients for the enrollment variables for indications as to optimal school size.

Implicit in this analysis is the assumption that all school districts have access to the same technology and thus have similar production functions. Attempting to insure that similar products were being produced using similar technologies, the sample was divided into four groups according to enrollment. We hypothesize that larger school districts use a different technology than smaller school districts. A Chow test supports this hypothesis. We now turn to the empirical analysis.

**Efficiency Estimates**

Based on parameter estimates of (2), we use (4) to calculate efficiency measures for each school district. The reader should note that these numbers measure efficiency relative to those districts within the same sample. Thus small schools are compared only to small schools. An efficiency measure of .80, for example, is interpreted as indicating a 25 percent overuse of inputs, or that output could be increased by 20 percent with the same input usage within the appropriate group.

Descriptive statistics for the relative efficiency measures and other school district characteristics are given in Tables Al through A4. We find that among the smaller school districts the average efficiency is almost 67 percent. The larger school districts (those with enrollments greater than 5,000) show an average efficiency of 62 percent. Note that these are relative measures and should not be interpreted as showing that smaller districts are more efficient than larger districts. These results do show that there is a larger variation in efficiency within the set of small districts than within the set of large districts.

Given the extent of measured inefficiency within each of these size groups, it is especially important that we analyze the source of the inefficiency, both to get a better feel for what our model is measuring and to suggest policy alternatives. To that end, we have estimated two regression equations for each group in which the dependent variable was our measure of efficiency.

In the first regression the independent variables were total costs, state aid per pupil, state aid as a percent of total expenditures, federal aid per pupil, normalized average assessed market value of property, college-bound seniors as a percent of enrollment, teacher experience, enrollment, the pupil-teacher ratio, percentage of nonwhite students, nonteaching staff budget per student and nonteaching staff per student. The results are reported in Tables A-5 through A-8.

The second regression differs from the first in that specific components of the nonteaching staff budget and the number of non teachers are included. Specifically, we examine the relationship between the efficiency index and the per-student budget for administration, the per-student budget for co curricular activities, the per-student support staff and the per-student administrative staff. These regression results are reported in Tables A-9 through A-12.
The direct relationship between outcomes and costs can be derived from the parameter estimates in the cost function. We include costs in this regression model in order to see whether inefficiency is related to expenditures. The significant and negative relationship that we observe in all four groups indicates that, other things equal, increased expenditures result in less efficiency. This result is consistent with the claim made by Hanushek[13] that most previous research supports the hypothesis that outcomes are not systematically improved by increased expenditures.

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[13]E. Hanushek, "The Economics of Schooling."

The coefficient on the enrollment variable is positive and significant in nearly all regressions. This indicates rather clearly that, when measured by the size of the student body, smaller schools tend to be less efficient. We do not know exactly why this is true, but it may suggest that our model is not picking up some scale effects.

The percent of students who are college-bound is intended to proxy average family socioeconomic status in the school district as well as to allow for the possibility that some school districts may use discretionary funds for such programs as Advanced Placement courses which would otherwise make them appear inefficient. Recall that the efficiency index measures how much costs could be reduced to produce a school district's current TEAMS score. Any additional money directed at producing other outputs is considered in this model to be "waste." Since some schools can do more than just produce high TEAMS scores, we control for that by including the percentage of seniors planning to attend college. [In both sets of regressions, we find little statistical support for our hypothesis.] Only for schools with enrollment between 2,000 and 5,000 do we find any relationship, and that is a direct one. Schools with more college-bound seniors tend to produce at lower relative costs. This would suggest that, for school districts of this size, factors which are highly correlated with the decision to go to college, such as family income and parental participation in the education process, are important.

The other conditioning variable in the cost function, teacher experience, is positive and significant in all of the size groups for the fIrst regression and all but the largest school districts in the second regression. However, the parameter estimates suggest that increasing the average experience from 11 years to, say, 14 years would on average increase efficiency less than one percent. There is an intriguing interpretation here that, although we would not push it too far, is worth mentioning. This result may show that teacher experience is properly priced in the market. In other words, as school districts hire and retain more experienced teachers, the benefits to the schools of the teachers' experience is reflected in the premium paid for experience and hence in the costs of the district. Had we found negative coefficients in all cases, we might have concluded that more experienced teachers were being overcompensated, in that if they were replaced by less experienced teachers, the districts' costs would have fallen (due to the reduction in inefficiency) without affecting output. Similarly, had we found larger positive coefficients, we would have claimed that experienced teachers were underpaid.

The coefficient on the pupil-teacher ratio is not significantly different from zero in any of the regressions. This does not mean that smaller classes are of no value, but it does show that districts which, other things equal, have relatively larger classes cannot expect a significant lowering of costs and/or improvement in outcomes by reallocating resources to reduce class size. Perhaps more interestingly, we think this shows that the root causes of inefficiency are not to be found in the classroom - if districts are wasting money, they are not wasting it by hiring too many teachers.

The coefficient for the percentage of nonwhite students is significant and positive in all but the largest school district regression. This suggests that minority students are not necessarily more difficult or more costly to educate. In fact, insofar as we can read anything into this result, it shows that relatively more efficient schools can be characterized by large minority student populations.

The state-aid and the state-aid percent of total funds variables have the greatest implication for statewide funding policies. Here, we see decidedly mixed results. State aid as a percent of district revenues is significant and positive in all of the groups. Total state aid is significantly negative in all but the large school district regression. In one of the groups, federal aid per student is negative and significant.

To test whether certain types of inputs were being wasted, that is, whether specific input usage could be reduced without lowering TEAMS scores, we included several measures of nonteaching inputs. In the first regression these inputs were aggregated and proxied by staff per student and expenditure per student. We find strong support for the hypothesis that higher spending on nonteaching activities leads to less efficiency for smaller school districts. For slightly larger districts, those with enrollments between 500 and 2,000, we find that nonteaching staffs are too large and co-curricular budgets too extensive.

We would expect that these kinds of over-utilization problems would be more prevalent in larger schools. Our results are not consistent with that conjecture. That is, there is not a systematic relationship between over-utilizing nonteaching inputs and the efficiency measure. Inefficiency in the larger school districts cannot be said to be due to typically wasting one particular resource.

## TABLE A-1

## DESCRIPTIVE STATISTICS
## ENROLLMENT LESS THAN 500 STUDENTS
## (n=128)

| VARIABLE | MEAN | STANDARD DEVIATION | MINIMUM VALUE | MAXIMUM VALUE |
|---|---|---|---|---|
| EFFICIENCY INDEX | 0.674 | 0.127 | 0.298 | 1.00 |
| 88 TEAMS: % PASS-ALL TESTS | 73.047 | 11.231 | 29.400 | 95.00 |
| WAVE SCORE | 800.209 | 26.633 | 693.600 | 868.70 |
| 88 TEAMS: % PASS-READING | 39.775 | 15.837 | 0.000 | 75.00 |
| 88 TEAMS: % PASS-WRITING | 55.062 | 21.052 | 0.000 | 90.00 |
| 88 TEAMS: % PASS-MATH | 62.147 | 23.278 | 0.000 | 97.00 |
| TOTAL REVENUE | 1499465.972 | 523745.045 | 530497.280 | 3279296.00 |
| 88-89 STATE AID TO DISTRICT | 1977.225 | 762.019 | 247.000 | 3477.00 |
| PERCENT STATE AID | 0.452 | 0.200 | 0.020 | 0.80 |
| 88-89 FED. AID TO DISTRICT | 96454.736 | 80806.056 | 0.000 | 405035.00 |
| COLLEGE-BOUND STUDENTS | 0.038 | 0.018 | 0.000 | 0.08 |
| 87-88 AVEYRS. TEACHING EXPERIENCE | 11.275 | 3.611 | 3.600 | 28.20 |

| VARIABLE | MEAN | STANDARD DEVIATION | MINIMUM VALUE | MAXIMUM VALUE |
|---|---|---|---|---|
| FALL 1988 ENROLLMENT | 320.984 | 107.103 | 95.000 | 632.00 |
| 87-88 PUPIL-TEACHER RATIO | 12.471 | 2.634 | 0.000 | 17.80 |
| PERCENT NONWHITE | 26.230 | 24.608 | 0.300 | 100.00 |
| GRADUATES/ENROLLMENT | 0.060 | 0.023 | 0.000 | 0.12 |
| NONTEACHING BUDGET PER STUDENT | 1884.202 | 781.849 | 855.450 | 5080.60 |
| NONTEACHING STAFF PER STUDENT | 52.253 | 20.051 | 0.000 | 133.80 |
| 88-89 BUDGET/STUDENT-ADMINISTRATION | 785.167 | 319.723 | 390.680 | 2207.86 |
| 88-89 BUDGET/STUDENT- COCURRICULAR ACTIVITY | 154.683 | 106.557 | 6.700 | 602.68 |
| 87-88 ADMIN. STAFF/1000 PUPILS | 9.881 | 4.210 | 0.000 | 26.50 |
| 87-88 SUPPORT STAFF/1000 PUPILS | 4.912 | 3.439 | 0.000 | 18.10 |

**TABLE A-2**

**DESCRIPTIVE STATISTICS**
**ENROLLMENT BETWEEN 500 AND 2000 STUDENTS**

**(n=316)**

| VARIABLE | MEAN | STANDARD DEVIATION | MINIMUM VALUE | MAXIMUM VALUE |
|---|---|---|---|---|
| EFFICIENCY INDEX | 0.558 | 0.08 | 0.27 | 1.0 |
| 88 TEAMS: % PASS-ALL TESTS | 74.531 | 9.56 | 22.60 | 94.9 |
| WAVE SCORE | 803.155 | 22.82 | 669.60 | 862.2 |
| 88 TEAMS: % PASS-READING | 42.310 | 9.03 | 0.00 | 67.0 |
| 88 TEAMS: % PASS-WRITING | 58.250 | 12.25 | 0.00 | 89.0 |
| 88 TEAMS: % PASS-MATH | 66.237 | 13.35 | 0.00 | 93.0 |
| TOTAL REVENUE | 4153928.521 | 1753987.75 | 1410456.60 | 12008913.8 |
| 88-89 STATE AID TO DISTRICT | 1858.563 | 599.02 | 233.00 | 3220.0 |
| PERCENT STATE AID | 0.498 | 0.18 | 0.03 | 1.1 |
| 88-89 FED. AID TO DISTRICT | 280438.136 | 242608.23 | 0.00 | 1501576.0 |
| COLLEGE-BOUND STUDENTS | 0.035 | 0.01 | 0.00 | 0.1 |
| 87-88 AVE.YRS. TEACHING EXPERIENCE | 11 .754 | 2.29 | 2.20 | 19.1 |
| FALL 1988 ENROLLMENT | 1063.563 | 417.63 | 503.00 | 1965.0 |

| VARIABLE | MEAN | STANDARD DEVIATION | MINIMUM VALUE | MAXIMUM VALUE |
|---|---|---|---|---|
| 87-88 PUPIL-TEACHER RATIO | 15.172 | 2.02 | 0.00 | 20.7 |
| PERCENT NONWHITE | 30.107 | 23.91 | 0.20 | 100.0 |
| GRADUATE&ENROLLMENT | 0.058 | 0.01 | 0.00 | 0.1 |
| NONTEACHING BUDGET PER STUDENT | 1429.666 | 350.76 | 882.44 | 3605.3 |
| NONTEACHING STAFF PER STUDENT | 43.705 | 11.55 | 0.00 | 84.2 |
| 88-89 BUDGET/STUDENT-ADMINISTRATION | 513.174 | 134.83 | 248.33 | 1231.5 |
| 88-89 BUDGET/STUDENT- COCURRICULAR ACTIVITY | 139.131 | 58.66 | 5.93 | 551.0 |
| 87-88 ADMIN. STAFF/1000 PUPILS | 6.277 | 1.77 | 0.00 | 16.7 |
| 87-88 SUPPORT STAFF/1000 PUPILS | 4.825 | 2.26 | 0.00 | 16.1 |

## TABLE A-3

## DESCRIPTIVE STATISTICS
## ENROLLMENT BETWEEN 2000 AND 5000 STUDENTS
## (n=155)

| VARIABLE | MEAN | STANDARD DEVIATION | MINIMUM VALUE | MAXIMUM VALUE |
|---|---|---|---|---|
| EFFICIENCY INDEX | 0.74 | 0.08 | 0.51 | 1.0 |
| 88 TEAMS: % PASS-ALL TESTS | 72.85 | 9.38 | 38.70 | 93.6 |
| WAVE SCORE | 801.32 | 23.22 | 722.50 | 867.2 |
| 88 TEAMS: % PASS-READING | 42.28 | 6.87 | 24.00 | 62.0 |
| 88 TEAMS: % PASS-WRITING | 58.09 | 8.15 | 27.00 | 78.0 |
| 88 TEAMS: % PASS-MATH | 66.83 | 9.67 | 32.00 | 88.0 |
| TOTAL REVENUE | 12084799.02 | 3976514.77 | 6090657.10 | 31234459.5 |
| 88-89 STATE AID TO DISTRICT | 1526.76 | 527.95 | 199.00 | 2715.0 |
| PERCENT STATE AID | 0.44 | 0.17 | 0.03 | 0.7 |
| 88-89 FED. AID TO DISTRICT | 869916.23 | 630865.75 | 0.00 | 3933353.0 |
| COLLEGE-BOUND STUDENTS | 0.03 | 0.01 | 0.01 | 0.1 |
| 87-88 AVEYRS. TEACHING EXPERIENCE | 11.36 | 1.86 | 6.80 | 16.6 |
| FALL 1988 ENROLLMENT | 3320.88 | 925.35 | 2006.00 | 4995.0 |

| VARIABLE | MEAN | STANDARD DEVIATION | MINIMUM VALUE | MAXIMUM VALUE |
|---|---|---|---|---|
| 87-88 PUPIL-TEACHER RATIO | 16.44 | 2.98 | 0.00 | 21.8 |
| PERCENT NONWHITE | 36.00 | 26.86 | 1.00 | 99.5 |
| G RADUA TES/EN ROLLM ENT | 0.06 | 0.01 | 0.04 | 0.1 |
| NONTEACHING BUDGET PER STUDENT | 1329.46 | 254.28 | 900.79 | 2188.3 |
| NONTEACHING STAFF PER STUDENT | 43.25 | 11.01 | 0.00 | 70.4 |
| 88-89 BUDGET/STUDENT-ADMINISTRATION | 436.79 | 97.10 | 247.62 | 906.6 |
| 88-89 BUDGET/STUDENT- COCURRICULAR ACTIVITY | 108.04 | 36.25 | 30.67 | 209.7 |
| 87-88 ADMIN. STAFF/1000 PUPILS | 4.95 | 1.35 | 0.00 | 9.0 |
| 87-88 SUPPORT STAFF/1000 PUPILS | 5.72 | 1.96 | 0.00 | 11.3 |

## TABLE A-4

## DESCRIPTIVE STATISTICS
## ENROLLMENT GREATER THAN 5000 STUDENTS
## (n=1 01)

| VARIABLE | MEAN | STANDARD DEVIATION | MINIMUM VALUE | MAXIMUM VALUE |
|---|---|---|---|---|
| EFFICIENCY INDEX | 0.62 | 0.1 | 0.2 | 1 |
| 88 TEAMS: % PASS-ALL TESTS | 72.82 | 9.6 | 38.2 | 92 |
| WAVE SCORE | 801 .15 | 24.7 | 714.5 | 862 |
| 88 TEAMS: % PASS-READING | 42.45 | 8.1 | 20.0 | 59 |
| 88 TEAMS: % PASS-WRITING | 56.36 | 9.0 | 31.0 | 74 |
| 88 TEAMS: % PASS-MATH | 68.30 | 10.5 | 41.0 | 89 |
| TOTAL REVENUE | 59949748.84 | 46956123.8 | 15838528.0 | 235335623 |
| 88-89 STATE AID TO DISTRICT | 1549.84 | 541.9 | 244.0 | 2739 |
| PERCENT STATE AID | 0.43 | 0.2 | 0.0 | 1 |
| 88-89 FED. AID TO DISTRICT | 4098616.62 | 4724773.9 | 153080.0 | 31485255 |
| COLLEGE-BOUND STUDENTS | 0.03 | 0.0 | 0.0 | 0 |
| 87-88 AVEYRS. TEACHING EXPERIENCE | 10.74 | 1.8 | 6.6 | 15 |
| FALL 1988 ENROLLMENT | 15831.02 | 11854.2 | 5018.0 | 61507 |
| 87-88 PUPIL-TEACHER RATIO | 17.67 | 1.2 | 15.5 | 22 |

| VARIABLE | MEAN | STANDARD DEVIATION | MINIMUM VALUE | MAXIMUM VALUE |
|---|---|---|---|---|
| PERCENT NONWHITE | 45.44 | 29.9 | 2.9 | 99 |
| GRADUATES/ENROLLMENT | 0.05 | 0.0 | 0.0 | 0 |
| NONTEACHING BUDGET PER STUDENT | 1294.62 | 193.8 | 830.3 | 2072 |
| NONTEACHING STAFF PER STUDENT | 45.70 | 7.9 | 18.5 | 65 |
| 88-89 BUDGET/STUDENT-ADMINISTRATION | 41 0.31 | 79.4 | 279.9 | 624 |
| 88-89 BUDGET/STUDENT- COCURRICULAR ACTIVITY | 76.93 | 36.3 | 29.3 | 322 |
| 87-88 ADMIN. STAFF/1000 PUPILS | 4.65 | 0.8 | 2.9 | 7 |
| 87-88 SUPPORT STAFF/1000 PUPILS | 6.20 | 1.3 | 2.0 | 11 |

## TABLE A-5

## PARAMETER ESTIMATES
## ENROLLMENT LESS THAN 500 STUDENTS
## (n = 128)

| VARIABLE | PARAMETER ESTIMATE | STANDARD ERROR | T FOR HO: PARAMETER=O | PROB >\|T\| |
|---|---|---|---|---|
| INTERCEPT | 0.81195987 | 0.07614049 | 10.664 | 0.0001 |
| TOTAL REVENUE | -1.68457E-07 | 3.76372E-08 | -4.476 | 0.0001 |
| 88-89 STATE AID TO DISTRICT | -0.000064771 | 0.000038366 | -1.688 | 0.0941 |
| PERCENT STATE AID | 0.32927332 | 0.14478543 | 2.274 | 0.0248 |
| 88-89 FED. AID TO DISTRICT | -1.36330E-07 | 1.11601 E-07 | -1.222 | 0.2244 |
| 88 PAR VALUE | 0.000131382 | 0.000096538 | 1.361 | 0.1762 |
| COLLEGE BOUND-STUDENTS | 0.13022378 | 0.36423634 | 0.358 | 0.7214 |
| 87-88 AVE.YRS. TEACHING EXPERIENCE | 0.007028615 | 0.001783831 | 3.940 | 0.0001 |
| FALL 1988 ENROLLMENT | 0.000278434 | 0.000169375 | 1.644 | 0.1029 |
| 87-88 PUPIL-TEACHER RATIO | -0.000450962 | 0.003892275 | -0.116 | 0.9080 |
| PERCENT NONWHITE | 0.001640129 | 0.000321773 | 5.097 | 0.0001 |
| NON-TEACHING BUDGET | -0.000056896 | 0.000019465 | -2.923 | 0.0042 |
| NON-TEACHING STAFF | -0.000272277 | 0.000381649 | -0.713 | 0.4770 |

R-SQUARE = 0.7172

# TABLE A-6

## PARAMETER ESTIMATES
## ENROLLMENT BETWEEN 500 AND 2000 STUDENTS
## (n = 316)

| VARIABLE | PARAMETER ESTIMATE | STANDARD ERROR | T FOR HO: PARAMETER=O | PROS > \|T\| |
|---|---|---|---|---|
| INTERCEPT | 0.56007532 | 0.03864232 | 14.494 | 0.0001 |
| TOTAL REVENUE | -2.61672E-08 | 4.49621 E-09 | -5.820 | 0.0001 |
| 88-89 STATE AID TO DISTRICT | -0.000171810 | 0.000012579 | -13.659 | 0.0001 |
| PERCENT STATE AID | 0.62433294 | 0.04440899 | 14.059 | 0.0001 |
| 88-89 FED. AID TO DISTRICT | -1.29040E-08 | 1.64195E-08 | -0.786 | 0.4325 |
| 88 PAR VALUE | -0.000066434 | 0.000022107 | -3.005 | 0.0029 |
| COLLEGE BOUND-STUDENTS | -0.01534435 | 0.19680085 | -0.078 | 0.9379 |
| 87-88 AVEVRS. TEACHING EXPERIENCE | 0.005937900 | 0.001100342 | 5.396 | 0.0001 |
| FALL 1988 ENROLLMENT | 0.000070113 | 0.000018962 | 3.698 | 0.0003 |
| 87-88 PUPIL-TEACHER RATIO | -0.000124944 | 0.001376214 | -0.091 | 0.9277 |
| PERCENT NONWHITE | 0.000711654 | 0.000130206 | 5.466 | 0.0001 |
| NON-TEACHING BUDGET | -0.000012801 | 0.000012624 | -1.014 | 0.3114 |
| NON-TEACHING STAFF | -0.000450127 | 0.000234374 | -1.921 | 0.0557 |

R SQUARE = 0.7695

# TABLE A-7

## PARAMETER ESTIMATES
## ENROLLMENT BETWEEN 2000 AND 5000 STUDENTS
## (n = 155)

| VARIABLE | PARAMETER ESTIMATE | STANDARD ERROR | T FOR HO: PARAMETER=O | PROB >\|T\| |
|---|---|---|---|---|
| INTERCEPT | 0.69698376 | 0.06649087 | 10.482 | 0.0001 |
| TOTAL REVENUE | -1.77789E-08 | 3.77840E-09 | -4.705 | 0.0001 |
| 88-89 STATE AID TO DISTRICT | -0.000218082 | 0.000039785 | -5.481 | 0.0001 |
| PERCENT STATE AID | 0.70175410 | 0.12434358 | 5.644 | 0.0001 |
| 88-89 FED. AID TO DISTRICT | -6.05852E-09 | 1.31014E-08 | -0.462 | 0.6445 |
| 88 PAR VALUE | -0.000058725 | 0.000085605 | -0.686 | 0.4938 |
| COLLEGE BOUND-STUDENTS | 1.11982795 | 0.48396481 | 2.314 | 0.0221 |
| 87-88 AVEVRS. TEACHING EXPERIENCE | 0.003889776 | 0.002388623 | 1.628 | 0.1056 |
| FALL 1988 ENROLLMENT | 0.000065493 | 0.000014844 | 4.412 | 0.0001 |
| 87-88 PUPIL-TEACHER RATIO | -0.001334740 | 0.001877877 | -0.711 | 0.4784 |
| PERCENT NONWHITE | 0.000585022 | 0.000249702 | 2.343 | 0.025 |
| NON-TEACHING BUDGET | -0000059327 | 0.000030251 | -0.196 | 0.8448 |
| NON-TEACHING STAFF | -0.000018927 | 0.000562068 | -0.034 | 0.9732 |

R SQUARE = 0.6162

## TABLE A-a

## PARAMETER ESTIMATES
## ENROLLMENT GREATER THAN 5000 STUDENTS
## (n = 101)

| VARIABLE | PARAMETER ESTIMATE | STANDARD ERROR | T FOR HO: PARAMETER=O | PROS >\|T\| |
|---|---|---|---|---|
| INTERCEPT | 0.45170319 | 0.27472340 | 1.644 | 0.1037 |
| TOTAL REVENUE | -1.22838E-09 | 7.90267E-10 | -1.554 | 0.1237 |
| 88-89 STATE AID TO DISTRICT | -0.000154538 | 0.000109178 | -1.415 | 0.1605 |
| PERCENT STATE AID | 0.56787542 | 0.27674631 | 2.052 | 0.0431 |
| 88-89 FED. AID TO DISTRICT | 2.78785E-09 | 3.84224E-09 | 0.726 | 0.4700 |
| 88 PAR VALUE | 0.000549085 | 0.000720786 | 0.762 | 0.4482 |
| COLLEGE BOUND-STUDENTS | -0.10044582 | 1.01873969 | -0.099 | 0.9217 |
| 87-88 AVEVRS. TEACHING EXPERIENCE | -0.001084953 | 0.006356453 | -0.171 | 0.8649 |
| FALL 1988 ENROLLMENT | .00000288421 | 0.0000031097 | 0.927 | 0.3562 |
| 87-88 PUPIL-TEACHER RATIO | 0.01054189 | 0.009884571 | 1.066 | 0.2891 |
| PERCENT NONWHITE | 0.000150563 | 0.000600958 | 0.251 | 0.8028 |
| NON-TEACHING BUDGET | 0.000010432 | 0.000078344 | 0.133 | 0.8944 |
| NON-TEACHING STAFF | -0.001240101 | 0.001570020 | -0.790 | 0.4317 |

R SQUARE = 0.3418

## TABLE A-9
## PARAMETER ESTIMATES
## ENROLLMENT LESS THAN 500 STUDENTS
## (n = 128)

| VARIABLE | PARAMETER ESTIMATE | STANDARD ERROR | T FOR HO: PARAMETER=O | PROB >\|T\| |
|---|---|---|---|---|
| INTERCEPT | 0.76363750 | 0.07383162 | 1 0.343 | 0.0001 |
| TOTAL REVENUE | -1.63669E-07 | 3.85512E-08 | -4.245 | 0.0001 |
| 88-89 STATE AID TO DISTRICT | -0.000075604 | 0.000038358 | -1.971 | 0.0512 |
| PERCENT STATE AID | 0.35759282 | 0.14323065 | 2.497 | 0.0140 |
| 88-89 FED. AID TO DISTRICT | -1.98985E-07 | 1.18786E-07 | -1.675 | 0.0967 |
| 88 PAR VALUE | 0.000088041 | 0.000092451 | 0.952 | 0.3430 |
| COLLEGE BOUND-STUDENTS | 0.39132831 | 0.40434182 | 0.968 | 0.3352 |
| 87-88 AVE.VRS. TEACHING EXPERIENCE | 0.007719199 | 0.001861738 | 4.146 | 0.0001 |
| FALL 1988 ENROLLMENT | 0.00024541 0 | 0.000175619 | 1.397 | 0.1650 |
| 87-88 PUPIL-TEACHER RATIO | 0.001686062 | 0.003618732 | 0.466 | 0.6422 |
| PERCENT NONWHITE | 0.001692590 | 0.000334291 | 5.063 | 0.0001 |
| 88-89 BUDGET/STUDENT-ADMINISTRATION | -0.000102266 | 0.000041619 | -2.457 | 0.0155 |

| VARIABLE | PARAMETER ESTIMATE | STANDARD ERROR | T FOR HO: PARAMETER=O | PROS >\|T\| |
|---|---|---|---|---|
| 88-89 BUDGET/STUDENT COCURRICULAR ACTIVITY | -0.000149625 | 0.000101814 | -1.470 | 0.1445 |
| 87-88 SUPPORT STAFF/1000 PUPILS | 0.000688060 | 0.002076797 | 0.331 | 0.7410 |
| 87-88 ADMIN. STAFF/1000 PUPILS | 0.000554655 | 0.001884468 | 0.294 | 0.7690 |

R SQUARE = 0.7177

# TABLE A-10
# PARAMETER ESTIMATES
# ENROLLMENT BETWEEN 500 AND 2000 STUDENTS
# (n = 316)

| VARIABLE | PARAMETER ESTIMATE | STANDARD ERROR | T FOR HO: PARAMETER=O | PROS > \|T\| |
|---|---|---|---|---|
| INTERCEPT | 0.55019946 | 0.03662077 | 15.024 | 0.0001 |
| TOTAL REVENUE | -2.58186E-08 | 4.37840E-09 | -5.897 | 0.0001 |
| 88-89 STATE AID TO DISTRICT | -0.000172719 | 0.000012541 | -13.772 | 0.0001 |
| PERCENT STATE AID | 0.63402586 | 0.04425802 | 14.326 | 0.0001 |
| 88-89 FED. AID TO DISTRICT | -2.47540E-08 | 1.63069E-08 | -1.518 | 0.1301 |
| 88 PAR VALUE | -0.000064434 | 0.000021135 | -3.049 | 0.0025 |
| COLLEGE BOUND-STUDENTS | 0.07040849 | 0.19811802 | 0.355 | 0.7225 |
| 87-88 AVE.VRS. TEACHING EXPERIENCE | 0.006095044 | 0.001115512 | 5.464 | 0.0001 |
| FALL 1988 ENROLLMENT | 0.000066376 | 0.000018701 | 3.549 | 0.0004 |
| 87-88 PUPIL-TEACHER RATIO | 0.000116446 | 0.001393768 | 0.084 | 0.9335 |
| PERCENT NONWHITE | 0.000760415 | 0.000130471 | 5.828 | 0.0001 |
| 88-89 BUDGET/STUDENT-ADMINISTRATION | .00000157079 | 0.000026919 | 0.058 | 0.9535 |

| VARIABLE | PARAMETER ESTIMATE | STANDARD ERROR | T FOR HO: PARAMETER=O | PROS > \|T\| |
|---|---|---|---|---|
| 88-89 BUDGET/STUDENT COCURRICULAR ACTIVITY | -0.000102156 | 0.000047811 | -2.137 | 0.0334 |
| 87-88 SUPPORT STAFF/1000 PUPILS | 0.000154059 | 0.001157913 | 0.133 | 0.8942 |
| 87-88 ADMIN. STAFF/1000 PUPILS | -0.003654186 | 0.001593209 | -2.294 | 0.0225 |

R SQUARE = 0.7177

**TABLE A-11**

## PARAMETER ESTIMATES
## ENROLLMENT BETWEEN 2000 AND 5000 STUDENTS
## (n = 155)

| VARIABLE | PARAMETER ESTIMATE | STANDARD ERROR | T FOR HO: PARAMETER=O | PROS > \|T\| |
|---|---|---|---|---|
| INTERCEPT | 0.74080873 | 0.06341818 | 11 .681 | 0.0001 |
| TOTAL REVENUE | -1.69154E-08 | 3.66157E-09 | -4.620 | 0.0001 |
| 88-89 STATE AID TO DISTRICT | -0.000204158 | 0.000041382 | -4.933 | 0.0001 |
| PERCENT STATE AID | 0.63537785 | 0.12839646 | 4.949 | 0.0001 |
| 88-89 FED. AID TO DISTRICT | -3.40263E-09 | 1.29089E-08 | -0.264 | 0.7925 |
| 88 PAR VALUE | -0.000044652 | 0.000084741 | -0.527 | 0.5991 |
| COLLEGE BOUND-STUDENTS | 1.11631712 | 0.46747274 | 2.388 | 0.0183 |
| 87-88 AVEVRS. TEACHING EXPERIENCE | 0.003362255 | 0.002503383 | 1.343 | 0.1814 |
| FALL 1988 ENROLLMENT | 0.000059047 | 0.000014254 | 4.142 | 0.0001 |
| 87-88 PUPIL-TEACHER RATIO | 0.000381804 | 0.001934064 | 0.197 | 0.8438 |
| PERCENT NONWHITE | 0.000611781 | 0.000256615 | 2.384 | 0.0185 |
| 88-89 BUDGET/STUDENT-ADMINISTRATION | -0.000046690 | 0.000057569 | -0.811 | 0.4187 |

| VARIABLE | PARAMETER ESTIMATE | STANDARD ERROR | T FOR HO: PARAMETER=O | PROS > \|T\| |
|---|---|---|---|---|
| 88-89 BUDGET/STUDENT COCURRICULAR ACTIVITY | -0.000067582 | 0.000137259 | -0.492 | 0.6232 |
| 87-88 SUPPORT STAFF/1000 PUPILS | -0.000277804 | 0.002882363 | . -0.096 | 0.9234 |
| 87-88 ADMIN. STAFF/1000 PUPILS | -0.006265200 | 0.004285269 | -1.462 | 0.1460 |

R SQUARE = 0.6274

# TABLE A-12

## PARAMETER ESTIMATES
## ENROLLMENT GREATER THAN 5000 STUDENTS
## (n = 101)

| VARIABLE | PARAMETER ESTIMATE | STANDARD ERROR | T FOR HO: PARAMETER=O | PROB > \|T\| |
|---|---|---|---|---|
| INTERCEPT | 0.31668722 | 0.28819813 | 1.099 | 0.2749 |
| TOTAL REVENUE | -1.26118E-09 | 7.791 03E-1 0 | -1.619 | 0.1092 |
| 88-89 STATE AID TO DISTRICT | -0.000134334 | 0.000108479 | -1.238 | 0.2190 |
| PERCENT STATE AID | 0.54567199 | 0.27012174 | 2.020 | 0.0465 |
| 88-89 FED. AID TO DISTRICT | 4.10003E-09 | 3.88626E-09 | 1.055 | 0.2944 |
| 88 PAR VALUE | 0.000801261 | 0.000693869 | 1.155 | 0.2514 |
| COLLEGE BOUND-STUDENTS | -0.35782508 | 1.04566636 | -0.342 | 0.7330 |
| 87-88 AVEYRS. TEACHING EXPERIENCE | -0.003402345 | 0.006897314 | -0.493 | 0.6231 |
| FALL 1988 ENROLLMENT | .00000266672 | .00000305352 | 0.873 | 0.3849 |
| 87-88 PUPIL-TEACHER RATIO | 0.01533216 | 0.01081754 | 1.417 | 0.1600 |
| PERCENT NONWHITE | -0.000062510 | 0.000598627 | -0.104 | 0.9171 |
| 88-89 BUDGET/STUDENT-ADMINISTRATION | -0.000112416 | 0.000173022 | -0.650 | 0.5176 |

| VARIABLE | PARAMETER ESTIMATE | STANDARD ERROR | T FOR HO: PARAMETER=O | PROS > \|T\| |
|---|---|---|---|---|
| 88-89 BUDGET/STUDENT COCURRICULAR ACTIVITY | 0.000047180 | 0.000294333 | 0.160 | 0.8730 |
| 87-88 SUPPORT STAFF/1000 PUPILS | 0.009265500 | 0.009239315 | 1.003 | 0.3188 |
| 87-88 ADMIN. STAFF/1000 PUPILS | -0.001806188 | 0.01553130 | -0.116 | 0.9077 |

R SQUARE = 0.6274