DOES NO CHILD LEFT BEHIND PLACE A FISCAL BURDEN ON STATES? EVIDENCE FROM TEXAS

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Abstract
The No Child Left Behind Act of 2001 (NCLB) requires states to establish goals for all students and for groups of students characterized by race, ethnicity, poverty, disability, and limited English proficiency and requires schools to make annual progress in meeting these goals.

In a number of states, officials have argued that increased federal education funding is not sufficient to cover the costs imposed by the new legislation. In this article, we use data from Texas to estimate the additional costs of meeting the new student performance standards. We find that these costs substantially exceed the additional federal funding. The article concludes with a discussion of whether NCLB should be considered an underfunded federal mandate and a brief discussion of the appropriate federal role in the financing of K-12 education.
1. INTRODUCTION
The No Child Left Behind Act of 2001 (NCLB) requires that states establish academic performance goals for all students and for separate groups of students characterized by race, ethnicity, poverty, disability, and limited English proficiency. The legislation mandates annual testing of all students in grades 3-8 and testing at least once in grades 10-12. The legislation also requires that schools make annual progress in meeting state-determined student performance goals. By 2013-14, the NCLB law mandates that 100 percent of students in each subgroup perform at a proficient level as determined by test standards established by each state. Those schools that fail to meet their adequate yearly progress (AYP) goals will be subject to sanctions. To help states meet the requirements imposed by NCLB, over the past two years Congress increased federal funding for elementary and secondary education by nearly 40 percent.

No Child Left Behind has been extremely controversial. Although some of the criticism is based on philosophical objections to frequent student testing, much of the criticism, especially from some local officials, has focused on the high costs of implementing the law and meeting the accountability standards. In some states that have not previously conducted frequent and uniform standardized testing, the financial burden of establishing a student accountability system is seen as burdensome. In other states, concern has been voiced about the high costs of ensuring that all students are able to satisfy the new academic performance standards.

According to a recent survey, about thirty states have concluded that increased federal funding is not sufficient to cover the costs imposed by NCLB (Willen 2004). In a number of states, legislation is pending that would limit state participation or seek greater flexibility in the implementation of the federal law (Olson 2004). Individual school districts in several states have actually decided to forgo federal Title I funds rather than comply with the provisions of NCLB. In mid-May 2004, the attorney general of Wisconsin issued a written opinion that asserted that Wisconsin may have no obligation to implement the provisions of NCLB if the costs of implementation exceed the amount of money provided by the federal government (Laufenschlager 2004). In effect, the attorney general suggested that it would be appropriate for the state’s Department of Public Instruction or local school districts to sue the federal government in order to get out of the responsibility for implementing the law.

Over the past year, a number of studies have appeared that address the question of whether NCLB is an unfunded or underfunded federal mandate. Not surprisingly, these studies come to very different conclusions about the costs of funding NCLB. As pointed out by Willara Mathis (2004), one of the reasons that the studies differ is that the authors use quite different definitions.
of what is currently fully funding NCLB. One approach is to focus primarily on the actual costs of implementing the accountability standards mandated by NCLB. An example of this approach is a study prepared by Accountability Works for the Education Leaders Council (2004). The core of that study is an assessment of the “hard” costs of implementing NCLB. These hard costs include the additional costs of expanding student accountability systems, implementing testing, and of operationalizing various reporting requirements mandated by NCLB. The authors of the report conclude that increased federal government funding for education exceeds in every year the “hard” costs of implementing the legislation. An underlying premise of this study, and a similar one by Peyer and Costrell (2004), is that the improved student performance mandated by NCLB can in large part be achieved by implementing various education reforms, most of which can be financed by reallocating existing school district spending.

Another approach that has been taken in several national studies is to assume that the cost of fully funding NCLB is the amount of money authorized by Congress. For example, the National Conference of State Legislatures (2004) published a report called Mandates Monitor, in which they point out that the gap between the amount the president proposed to spend for Title I grants to local school districts in fiscal year 2005 and the amount authorized by NCLB is in excess of $5.8 billion. Also, in a discussion of unfunded mandates, Law and Brehet (2004) point out that in the four years since the passage of NCLB, the amount of money appropriated by Congress was more than $5 billion less than the amount that Congress had authorized. As these authors recognize, however, there is no evidence that Congress in authorizing a funding level for NCLB made any attempt to determine the “true” costs of implementing the requirements of NCLB.

A similar methodology-based approach is to use “cost factors” specified in the NCLB legislation as guidelines for the amount of money needed to fully fund the new law. Specifically, the formula used to allocate “targeted” Title I-A grants stipulates that local school districts in each state are eligible for grants equal to 40 percent of average per pupil spending for each school-age child living in poverty. According to calculations made by the Congressional Research Service, the 40 percent formula implies fiscal year 2004 funding of more than $30 billion, an amount that is nearly two and a half times the actual amount of funding for Title I-A in 2004 (National Education Association 2004). Although the Title I allocation formula may reflect congressional intent, there is again

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1. In 1990 where average per pupil spending is below 80 percent of the U.S. average, the 40 percent level is used, and in states where average per pupil spending is above 120 percent of the U.S. average, the 100 percent level is used.
no reason to believe that the extra costs of closing the academic achievement gap for poor children is the same in each state, or that the 40 percent number is reflective of the actual costs.

A serious shortcoming of all of the studies mentioned above is that they don’t address what may well be the largest cost associated with achieving the goals of NCLB, namely, the additional costs of improving the educational performance of children so that they can meet the academic performance standards mandated by NCLB. Although NCLB specifies both the frequency and subject area of student testing, each state is responsible for developing its own set of examinations, determining the scores that are required to pass each exam, and determining the percentage of students required to pass each exam, each year. The cost of meeting the "adequate yearly progress" requirements of NCLB will thus depend not only on the detailed academic standards and testing regime utilized, but also on the size of the academic achievement gap in each state between current student performance and the student achievement levels needed to meet these standards. For this reason, estimates of the costs of achieving the standards mandated by NCLB must be done on a state-by-state basis.

A number of studies have been conducted in individual states designed to measure the costs of achieving "educational adequacy." The most common approach is to use "professional judgment" or, more recently, "evidence-based" studies to construct education programs designed to produce an adequate education. These studies determine the costs of achieving their stated adequacy goals by costing out the inputs required to operate the educational programs they have identified. The "successful schools" approach starts by identifying a set of high-performing schools and then bases estimates of providing an adequate education on the lowest level of per pupil spending among the set of successful schools. These studies have generally not been designed to explicitly estimate the costs associated with ensuring that all students meet a precise set of standards, such as those mandated by NCLB. The one exception that we are aware of is a recent study of the additional costs of meeting the student achievement requirements of NCLB in Ohio, conducted by William Driscoll and Howard Fleeter (2003). Their study is based on the assumption that extra educational programs will be required to increase the test scores of students who are currently performing substantially below state academic standards. They estimate these "intervention" costs by "costing out" a set of specific educational programs targeted to students who currently have the lowest scores

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3. For an assessment of the advantages and disadvantages of various types of adequacy studies that have been conducted throughout the country over the past decade, see Shrier, Tinto, and Weill; 2004 and Dornbusch, Lankmeier, and Yinger 2004.
on the standardized tests administered in Ohio. Although the authors warn that the numbers are not directly comparable, they estimate that NCLB will generate additional annual costs of about $1.4 billion, while federal funding in Ohio associated with NCLB increased by less than $50 million.

In this article, we directly address the question of whether the additional costs of meeting the student performance standards mandated by NCLB exceed the recent increases in federal education funding. The cost estimates in this article are for Texas, a state that educates about one-tenth of all public school students in the United States. We employ a statistical approach to estimate the minimum amount of money Texas school districts need to achieve state and federally mandated student performance goals. Specifically, we estimate a cost function for K-12 education in Texas. A cost function allows us to quantify the relationship between per-pupil spending for education, student performance, various student characteristics, and the economic and spatial characteristics of school districts. Thus, by estimating a cost function, we are able to determine how much a school district with, for example, a large number of children from poor families must spend in order to meet the state-determined student performance standards.

Texas is a good state in which to study the costs of NCLB. Since the early 1990s Texas has been collecting annual measures of student academic performance and developing a system that holds schools directly accountable for the educational performance of their students. In fact, the basic elements of the Texas accountability system provided the foundation for the act. This head start suggests that the costs of meeting the NCLB requirements will be lower in Texas than in many other states. Thus, if we find that NCLB creates an unfunded mandate in Texas, this would suggest that NCLB is probably creating fiscal hardships in a large number of other states.

Although the Texas accountability system is well established, there is very little connection between how well school districts and their students perform, and the allocation of state financial resources to school districts through the state's Foundation School Program (FSP). Until recently the core of the Texas accountability system was student performance on a series of standardized reading, writing, and mathematics tests known as the Texas Assessment of Academic Skills (TAAS). Starting in the 2002-3 school year, the state adopted a new set of tests called the Texas Assessment of Knowledge and Skills (TAKS). These tests, which now include a science test, will be linked with tougher standards for promotion from grades 3, 5, and 8, and a new eleventh-grade exam will be required for graduation. Although meeting these new, more rigorous academic standards will require the expenditure of additional money in some school districts, the school funding system in Texas has not been changed to reflect the fiscal implications of the changing accountability system.
In the next section of this article, we describe the procedure we followed in estimating an educational cost function for K–12 public education in Texas. We detail the data used and discuss briefly some important statistical and estimation issues. In the following section, we report on the results of our cost function estimates. We then provide estimates of the additional amount of money that would be required by school districts in Texas to satisfy various state and federal NCLB accountability standards. We also discuss a number of costs that we were unable to include in our analysis. We then compare our estimates of the additional costs of fulfilling the requirements of NCLB with the increases in federal Title I funding since the passage of NCLB. We compare not only the state totals, but also data on changes in Title I allocations and on additional costs associated with NCLB at the individual school district level. We conclude with a brief discussion of whether the finding that additional costs exceed increases in federal funding justifies a conclusion that NCLB has imposed an unfunded federal mandate on the state of Texas.

2. ESTIMATING A COST FUNCTION FOR K–12 EDUCATION IN TEXAS

Estimating cost functions provides a practical way to identify and quantify the factors that influence the costs of education, where the output of school districts can be measured using multiple measures of student performance. By estimating a cost function based on data on K–12 school districts, we can characterize the relationship between spending per pupil by school districts and various measures of student performance, while also taking account of the characteristics of each school district's student body, other characteristics of the school district, such as size, and the prices the school district must pay for inputs into the education process. For a much more detailed discussion of the assumptions required to estimate a cost function for education and the consequences of alternative assumptions, see Imazeki and Reschovsky 2005.

We follow the approach found frequently in the literature of estimating a log-linear cost function using data for K–12 districts in Texas. For reasons to be explained below, our measures of student performance are for the 2001–2 school year. Our dependent variable is thus per pupil expenditures in that year. Because spending on transportation and food services is not directly related to

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5. In pragmatic terms, a cost function can be represented by the following equation: \( C = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n + \epsilon \), where \( C \) is per pupil expenditures, \( X_i \) are specified as a function of public school inputs, \( \beta_i \) are the characteristics of the student body, \( \beta_o \) other characteristics of the school district such as its size, \( \beta_n \) a vector of unexplained characteristics of the school district, and \( \epsilon \) a random error term.

4. In this article, we estimate a cost function very similar to the one presented here and discuss the methodological similarities and differences between our cost function and one estimated by Groeber et al. (2001).
student academic performance, these two categories of spending are excluded from our measure of per pupil spending.

**Student Performance Measures**

Although student performance can, in principle, be measured in various ways, most states measure how effectively school districts are improving the academic performance of their students by relying on standardized exams. Furthermore, the federal No Child Left Behind Act of 2001 explicitly requires that all states develop accountability systems based on assessment tests. Texas has long run a well-developed testing system for the majority of students. Until 2002-3, all students in grades 3-8 and in grade 10 were tested in the spring of each year as part of the Texas Assessment of Academic Skills (TAAS). In 2002-3, the TAAS was replaced with the Texas Assessment of Knowledge and Skills (TAKS), a more rigorous test, and testing was extended to students in grades 3 and 11. Passing rates on the TAKS are the primary basis for ratings within the Texas accountability system.

For this article, one-fourth measures of student achievement is passing rates on these standardized exams. In estimating our cost function, we focus on annual changes in passing rates: that is, we utilize a value-added approach. We believe that it is appropriate to use a value-added measure of student academic performance in estimating a cost function because a primary objective of schools is to improve, on an annual basis, the knowledge and skills of students. An additional reason for using a value-added measure of student performance is that both NCLB and Texas accountability standards call for students to make adequate yearly progress toward the achievement of the accountability standards.

Ideally, we would like to estimate a cost function using two years of data from the tests that are currently in use, the TAKS. Unfortunately, because the accountability standards did not apply to the first-year TAKS results, to calculate a value added measure using the TAKS, it will be necessary to wait until the results from the 2004-5 tests are available. As we can only measure student improvement by comparing test scores in one year with the test scores for the same students in the next year on a comparable set of exams, we have no choice but to base our cost function estimates on test score results from the last two years in which the TAAS exams were administered. The cost function we estimate thus includes for each school district the average of the passing rates on the TAAS reading and mathematics exams administered to students in grades 5 through 8 and in grade 10 in 2002-3. To create a

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5 This table was adapted from individual student data by Gordon et al. (2004). The passing rate on each exam is calculated as the number of students in grades 5-8 and 10 who passed the exam, divided by the total number of students in those grades who took the exam. The authors then use the ordinary average of these passing rates on the math and reading tests.
value-added measure, these results are compared to the average of the TAAS math and reading passing rates administered to students in grades 4 through 7 in 2000-2001 and grade 8 in 1999-2000.6

Although we estimate our cost function using TAAS scores, an important objective of this article is to predict the costs of achieving a number of different student performance standards that are measured in terms of passing rates on the new TAKS exam. As the TAKS exams are more difficult than the TAAS, and the passing standard for the TAKS is different than the passing standard for the TAAS, using the results from a cost function estimated with TAAS passing rates would seriously underpredict the costs associated with achieving a given passing rate on the TAKS.7 To deal with this problem, we estimate the cost function with passing rates that have been converted from the TAAS passing rates to TAKS rates using a methodology to be described later in the article. In effect, we base our cost estimates on the passing rates that a school district would have achieved if the TAKS had been in place in 2001-2.

Not all students take the TAKS exams. Some students in special education programs take the State-Developed Alternative Assessment (SDAA) instead. We therefore include the passing rate on the SDAA exams as an additional outcome measure. As a final school output variable we use the percentage of graduating seniors who achieve a score of 1100 or above on the SAT or a score of 24 or above on the ACT.8

The statistical estimation of a cost function should take special account of the fact that while decisions by local school boards to raise the level of student performance presumably will require additional spending, decisions concerning per student spending are likely to directly influence student performance; that is, per pupil expenditures and student performance are simultaneously determined. To deal with this simultaneity, we estimate our cost function using two-stage least squares.9

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6. Testing was not done in the ninth grade during these years. Our lagged score is generated from aggregate data from the Texas Education Agency (TEA) and is thus only a simplified match to the zero–one cohort. The TEA reports passing scores for each grade but does not report participation rates for each grade. Therefore, our lagged passing rates are calculated as the number of students in grades 4–7 who passed the exam, divided by the total number of students in those grades who took the exam, assuming that all students enrolled took the exam (i.e., 100 percent participation).

7. The raw score that a student needs to achieve in order to be considered passing is different for the TAKS than for the TAAS.

8. The score criteria for the SAT and the ACT were established by the Texas Education Agency. This variable is calculated as the number of students who achieve the criteria score, divided by the total number of graduating students.

9. As instruments for the endogenous school input variables, we draw upon a set of variables that are related to the demand for public education. Following a long literature on the determinants of local government spending, we model the demand for public education as a function of school district demographic preferences for education, their incomes, the tax prices they face for education spending, and the intergovernmental aid their school districts receive. To the extent that the median voter model provides a reasonable explanation for school district spending decisions, it is appropriate to use the tax price faced by the median voter as instruments (however, median income was also included).
Teacher Cost Index

Teachers are the single most important factor in the production of education, and, not surprisingly, teacher salaries account for the largest share of school expenditures. In our estimation of education cost functions, we include only teacher salaries, excluding explicit treatment of other public school employees. It is important to recognize that teacher salaries are determined both by factors under the control of local school boards, and factors that are largely outside of their control. In setting hiring policies, districts make decisions about the quality of teachers that they recruit and these decisions have obvious fiscal implications. For example, a district can limit its search for new teachers to those with advanced degrees, those with high grade-point averages, or those with a certain number of courses in their teaching specialty. Teacher salary levels are generally determined through a process of negotiation with teacher unions, and school boards have a substantial impact on the outcome of these negotiations. At the same time, the composition of the student body, working conditions within schools, and area cost of living play a potentially large role in determining the salary a school district must offer in order to attract teachers of any given quality. These factors will be reflected in student and district cost variables, to be described below.

Our goal is to relate factors that contribute to higher levels of education spending but are outside the control of local school districts. To accomplish this goal we use an index of teacher costs developed by Taube (2004). Her index separates variations in compensation arising from uncontrollable district characteristics such as area cost of living, from variations arising from factors that district can influence (such as teacher experience and educational background).

Student Characteristics

There exists a quite large literature that has demonstrated that it costs more to educate students from economically disadvantaged families, students with various mental and physical disabilities, and students with limited proficiency in English, than students without these disadvantages. In fact, these higher

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1. An energetic instrument. We also include the instrument as a measure of the economic success of schools that may or may be related to the performance on public education. These include the percentage of household with a problem, the percentage of household below the poverty line, and the percentage of school that have earned a four-year college degree.

2. It is likely that the differences in costs associated with non-teacher educational professionals are negligible compared with differences in teacher costs. On the other hand, we suspect that the salary differences between school districts for non-educational employees, for example, janitors, are quite small.

3. We refer the reader to Taube’s article for a full discussion of the estimation, construction, and analysis of the salary index.

4. Cost function studies that have found that higher-than-average costs will be faced by school districts with high concentrations of students who have these characteristics include Cawthorn and
costs have been recognized in the design of the state’s Foundation School Program (FSP), which allocates additional funds to school districts with students who are from economically disadvantaged families, who qualify for “special education,” or who enter the schools with limited proficiency in English. To measure the number of children from economically disadvantaged families, we use the percentage of students who qualify for the federal government-financed free and reduced-price lunch program or other public assistance. It should be noted that NCLB includes a requirement that students classified as economically disadvantaged must show adequate yearly progress toward meeting the state’s accountability standards. For purposes of meeting this requirement, Texas identifies students as economically disadvantaged if they are eligible for free or reduced-price meals under the National School Lunch Program (U.S. Department of Education 2003).

We also include in our cost function a measure of the percentage of students in each district who have been identified as limited English proficient (LEP), and two measures of disabilities—the percentage of students who are classified as having a learning or speech disability, and the percentage of students who are classified as having any other kind of disability.

Both NCLB and the Texas accountability system explicitly require districts to meet student performance standards not only for all students, but separately for subgroups of white, African American, Hispanic, and economically disadvantaged students. Although separate outcome (student performance) measures for these subgroups are available, the fact that they are quite highly correlated means that we are not able to explicitly include these separate student performance measures in the cost function we estimate.13 Higher scores for any given subgroup will, of course, contribute to higher overall district scores, all else equal, so that the impact of each subgroup is implicitly part of the average passing rate that we include in the cost function. However, passing rates for the subgroups of African American, Hispanic, and economically disadvantaged students are generally lower than the overall district passing rate and it seems reasonable to assume that the costs of assuring that every subgroup’s academic performance meets the accountability standard will vary with the proportion of students in the district that belong to each subgroup.

We therefore attempt to capture some of the additional costs associated with standards for these subgroups by including measures of the relative size of

13 For example, among the 256 districts for which passing rates are reported for African American students, the correlation between the overall passing rate and the African American passing rate is 0.805 for the math TAKS exam and 0.758 for the reading exam.
each subgroup within each school district. The percentage of students who qualify for the free and reduced-price lunch program already captures the importance of the economically disadvantaged subgroup. We also include the percentage of students who are African American and the percentage of students who are Hispanic as variables in the cost function to account explicitly for the importance of these two groups.

School Characteristics

Finally, to account for the possibility that different levels of resources may be needed to provide a high school education as compared to an elementary school education, we include the proportion of each school district's student body that is enrolled in high school. Previous research on the question of whether higher proportions of students enrolled in high school leads to higher average costs has been inconclusive, with some studies finding higher costs and other studies finding lower than average costs. It is important to point out that this variable can be difficult to interpret because the percentage of a district's total student body enrolled in high school may reflect higher-than-average dropout rates in some districts or higher rates of student transfers to other public or private schools.

There exists a long history of research on economies of scale in public education. In a recent review of this literature, Andrews, Duncombe, and Yi (2006) present strong evidence that small school districts have higher costs per student than larger school districts. Although the results are not conclusive, they also provide some evidence that per student costs are higher for large districts. Following standard practice to reflect potential diseconomies of scale associated with both small and large school districts, we include each district's enrollment and enrollment squared in the cost function.14

Efficiency

Some school districts may have higher per pupil expenditures not because of higher costs but because they are not using their resources efficiently. Although on a conceptual level, it is easy to discuss enhancing efficiency by minimizing costs, the actual measurement of efficiency in the context of elementary and secondary education is exceedingly complex. In order to accurately measure school district efficiency, it is necessary to accurately identify and quantify both the educational goals of each school district and the factors that contribute to

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14 We also estimated a specification that included a cubic enrollment term. In that specification, the sign on the cubic term is negative, but none of the enrollment variables are statistically significant. Furthermore, the distribution of costs and the implications for Title I funding, discussed in the next section, are quite similar if our specification of the cost function is used to predict costs. Results are available from the authors upon request.
the achievement of these goals and to school district expenditures. A number of authors have used complex statistical techniques to attempt to identify spending that is high relative to spending in districts with similar performance and inputs. The measurement of school district efficiency using these statistical methods is, however, highly sensitive to the way that school district goals are measured. For example, in school districts that emphasize vocational education, or arts and music—subjects not directly measured by standardized tests—money spent on these alternative educational objectives will be counted as inefficient spending.

Rather than attempting to measure efficiency directly, in this article we address the issue of efficiency by assuming that school districts will operate more efficiently if they face a competitive local educational market. Tyler (2000), after reviewing the literature on government competition, concludes, "Almost across the board, researchers have found that school spending is lower, academic outcomes are better, and school district efficiency is higher where parents have more choice in their children's education provider" (p. 7).

To measure public school competition, we use a Herfindahl index. This index, which has also been used by Hoxby (2000), is constructed on the assumption that the metropolitan statistical areas (MSAs) can be used to define local "markets" for education. The index increases with the amount of competition, so if district efficiency is correlated with the amount of competition that the district faces, then we would expect spending to be lower in districts with higher values of the Herfindahl index. In Texas, competition is highest for districts in and around large urban cities and lowest for districts in nonurban towns outside MSAs. It is also reassuring to note that our Herfindahl index is relatively well correlated with median income (correlation coefficient of 0.407), which has been related to district efficiency in other studies (Duncombe and Yinger 2001). While the use of the Herfindahl index may provide an underestimate of school district inefficiency, in our opinion all other methods are quite unreliable and almost certainly overestimate school district inefficiency.

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15. See, for example, Duncombe, Ruggieri, and Yinger 1996; McCloy and Yasunari 1999; and Eller and Ruhm 1999. Glauber et al. (1998) address the measurement of efficiency by estimating these cost functions with a stochastic frontier.

16. A Herfindahl index for school districts in market k can be calculated using the following formula:

\[ H_{k} = \sum \frac{d_{i,k}^2}{d_{i,k}} \]

For a market with just one district and no competition, the index will equal zero. For a market with a large number of equal-sized districts, the index will equal 1.0. Thus, the index approaches 0 as the number of districts, and presumably competition, increases. For districts that are located outside of metropolitan statistical areas, the market is defined by the county.

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EDUCATION FINANCE AND POLICY
Table 1. Descriptive Statistics. 827 K-12 School Districts

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum Value</th>
<th>Maximum Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per pupil expenditures, 2003-4</td>
<td>35,806</td>
<td>31,432</td>
<td>14,172</td>
<td>129,553</td>
</tr>
<tr>
<td>2003-2 TAKS passing rate, converted to TAKS 2005 standard</td>
<td>53.3</td>
<td>10.9</td>
<td>19.5</td>
<td>88.2</td>
</tr>
<tr>
<td>Composite lagged TAKS 400th grad. 2006-2007</td>
<td>31.9</td>
<td>4.0</td>
<td>29.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Percent of graduates who performed above criteria on SAT or ACT</td>
<td>12.6%</td>
<td>8.5%</td>
<td>0.0%</td>
<td>37.4%</td>
</tr>
<tr>
<td>Passing rate in state-defined alternate assessment</td>
<td>79.8</td>
<td>15.8</td>
<td>5.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Augmented wage index (monthly wage)</td>
<td>82,400</td>
<td>9,055</td>
<td>82,217</td>
<td>82,777</td>
</tr>
<tr>
<td>Percent of students eligible for free or reduced price lunch</td>
<td>47.7%</td>
<td>16.9%</td>
<td>2.5%</td>
<td>98.1%</td>
</tr>
<tr>
<td>Percent of students with learning or speech disabilities</td>
<td>15.8%</td>
<td>3.6%</td>
<td>23.9%</td>
<td>24.5%</td>
</tr>
<tr>
<td>Percent of students with other disabilities</td>
<td>3.1%</td>
<td>1.0%</td>
<td>0.2%</td>
<td>24.5%</td>
</tr>
<tr>
<td>Percent of students who are black</td>
<td>8.8%</td>
<td>12.5%</td>
<td>0.0%</td>
<td>84.4%</td>
</tr>
<tr>
<td>Percent of students who are Hispanic</td>
<td>30.1%</td>
<td>27.2%</td>
<td>0.2%</td>
<td>69.8%</td>
</tr>
<tr>
<td>Percent of students with limited English proficiency</td>
<td>10.8%</td>
<td>9.2%</td>
<td>0.0%</td>
<td>55.8%</td>
</tr>
<tr>
<td>Percent of students employed in high school</td>
<td>19.0%</td>
<td>3.4%</td>
<td>12.4%</td>
<td>98.5%</td>
</tr>
<tr>
<td>Student enrollment</td>
<td>4,074</td>
<td>13,648</td>
<td>188</td>
<td>283,670</td>
</tr>
<tr>
<td>Herfindahl (efficiency) index</td>
<td>0.61</td>
<td>0.240</td>
<td>0.000</td>
<td>0.998</td>
</tr>
</tbody>
</table>

3. COST FUNCTION RESULTS

We estimate the cost function for K-12 education using data for academic year 2001-2.17 We restrict our estimation to K-12 school districts, of which there are 379 in Texas.18 Because of missing data, we were forced to drop 143 K-12 districts from our estimation sample. The 827 districts that remain in our sample, however, educate 98.3 percent of all students in Texas. Table 1 presents descriptive statistics for the 827 districts that are used to estimate the cost function. For each variable, the table displays the average (mean) value of the variable, the standard deviation, and the minimum and maximum values.

The results of the cost function estimation are shown in table 2.19 In general, all coefficients have the expected signs. Each of the outcome measures

17 The data for the lagged test scores are for 2000-2001.
18 In addition to the 379 K-12 districts, there are also 65 elementary and high school districts for a total of 444 districts.
19 The fact that all variables are measured at the district level and that districts vary greatly in size introduce the possibility that the error terms are not standard but are correlated with district size. We therefore weight the regression by district enrollment and report Huber/White robust standard errors.
Table 2. Reduced-Form Cost Function: 2001-02, K-12 School Districts, Based on Log of Expenditures per Pupil

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Coefficient</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>4.07</td>
<td>2.04</td>
</tr>
<tr>
<td>2001-02 TAM passing rate, converted to TABS 2005 standard</td>
<td>2.29*</td>
<td>1.69</td>
</tr>
<tr>
<td>Corporate bidders TABS rate, 2000-2001</td>
<td>-0.029*</td>
<td>-2.6</td>
</tr>
<tr>
<td>Percent of graduates who performed above criteria on SAT or ACT</td>
<td>0.024</td>
<td>0.66</td>
</tr>
<tr>
<td>Passing rate on state defined alternative assessment</td>
<td>0.103</td>
<td>1.15</td>
</tr>
<tr>
<td>Teacher wage (in log)</td>
<td>0.859*</td>
<td>3.08</td>
</tr>
<tr>
<td>Percent of students eligible for free and reduced-price lunch</td>
<td>0.331*</td>
<td>2.71</td>
</tr>
<tr>
<td>Percent of students who are black</td>
<td>0.259*</td>
<td>3.88</td>
</tr>
<tr>
<td>Percent of students with learning or speech disabilities</td>
<td>1.50*</td>
<td>2.35</td>
</tr>
<tr>
<td>Percent of students with other disabilities</td>
<td>0.38</td>
<td>1.77</td>
</tr>
<tr>
<td>Percent of students who passed English proficiency</td>
<td>-0.36*</td>
<td>-3.00</td>
</tr>
<tr>
<td>Percent of students enrolled in high school</td>
<td>-0.48</td>
<td>-1.34</td>
</tr>
<tr>
<td>Log of student enrollment</td>
<td>-0.29*</td>
<td>-6.95</td>
</tr>
<tr>
<td>Square of log of student enrollment</td>
<td>0.013*</td>
<td>5.51</td>
</tr>
<tr>
<td>Herfindahl-Hirschman index (in log)</td>
<td>-0.0002</td>
<td>-0.03</td>
</tr>
</tbody>
</table>

* indicates statistically significant at the 5% level
** indicates statistically significant at the 1% level

has a positive sign, indicating that it costs more to achieve higher levels of performance.\(^{20}\) Since lagged scores are a proxy for past levels of student achievement, high scores mean that districts can spend less to achieve any given level of educational progress. The cost variables generally have the expected signs, and most of them are statistically significant. In particular, the percentages of minority students, of students eligible for free and reduced-price lunch, and of students with learning or speech disabilities all have coefficients that are positive and statistically significant. Consistent with previous studies, we find a U-shaped relationship between per pupil spending and school district size: with our estimates, average costs are lowest in a district with 5,744 students.\(^{21}\) At that point, costs begin to rise again. We find an unexpected negative relationship between per pupil spending and the percentage of EEP students;

\(^{20}\) Recall that we treat the outcome variables as endogenous. A Hausman test of our instruments rejected the use of ordinary least squares at the 1 percent level (chi-square statistic of 9.95 with 7 degrees of freedom). An overidentification test cannot reject that our instruments are exogenous (chi-square statistic of 9.81 with 2 degrees of freedom).

\(^{21}\) The form of the U is calculated as exp(a + b*Y) where b > 0 is the coefficient on enrollment and a is the coefficient on enrollment squared. This expression comes from the first derivative of the cost function with respect to enrollment, and is equal to zero.
however, these results may reflect economies of scale in the specialized programs provided for these students. In Texas, any district with even one LEP student is required to provide extra services for that student, thus, when there are few such students, the per pupil costs could be quite high. For LEP students, these services can range from tutoring to a full bilingual curriculum. If there are more than twenty LEP students in an elementary grade, the district must offer a bilingual program. Given these requirements, it is perhaps not surprising to find that economies of scale can be found for at least lower levels of LEP students.

In contrast to some other studies, we find that costs are inversely related to the percentage of high school students in the district. There is no compelling reason why we would expect costs to be higher in school districts with a larger share of high school students, especially since class sizes tend to be substantially lower in elementary school grades. The higher costs associated with high schools, for example, for science laboratories and for extensive computer facilities, are likely to be reflected in higher capital, rather than operating costs. One additional explanation for the negative relationship between the percent of high school students and costs may reflect the possibility that highly motivated students leave schools with heavy concentrations of "high-cost" students. Although we cannot observe student motivation, the departure of those "low-cost" students would reduce the percent of high school students in a district and also tend to raise the average cost of educating the remaining students.

Finally, the negative sign on the Herfindahl index provides a measure of school district inefficiency. The result indicates that, as expected, school districts located in areas of the state where there is more competition among schools tend to operate more efficiently. It should be noted, however, that this variable is not statistically significant.

4. THE CONSTRUCTION OF A COST INDEX FOR TEXAS SCHOOL DISTRICTS

Estimating a cost function provides information about the contributions of various characteristics of school districts to the costs of education. The calculation of a cost index allows for the summarization of all the information about costs into a single number for each district. For any given accountability standard, a cost index can be constructed that will indicate, for each school district, how much money that district must spend, relative to the district with average costs, for its students to meet the accountability standards.

Actual school district spending will vary not only because of differences in student and district characteristics that influence costs, but also because school boards in some districts, presumably reflecting the preferences of the
district's residents, will choose to provide a quality of education that exceeds the state's accountability standards, or to provide courses in areas not covered by the state's accountability standards. Actual spending can also differ from the costs of education if districts are operating inefficiently.

Thus, our objective in constructing a cost index involves not a consideration of the current spending level of school districts but, rather, the calculation for each district of the minimum amount of money it will need to achieve any given TAKS accountability standard, given the district's student and district characteristics. In this section of the article we present the results of calculating a cost index using two alternative accountability standards. The use of different standards will not affect the relative ranking of districts in terms of their costs but will change the cost index values.

To calculate the cost index value for any given district, we use our estimated cost function coefficients to calculate how much the district would have to spend given the amount of student performance gain it must provide in order to fulfill the chosen accountability standards, the actual values of its student and district characteristics, and with the exception of the Herfindahl index, the statewide average values of the other variables in the cost function. For the Herfindahl index our measure of efficiency, we use the 90th percentile value. This means that the cost index values for each school district are calculated on the assumption that the school district operates with a high degree of efficiency. The calculations described above result in what might be called a hypothetical level of spending for each district. To determine the cost index value for any particular district, we divide the hypothetical spending number for that district with hypothetical spending in a district with average characteristics. If we assume that the per pupil cost of education to meet some given accountability standard is $7,500, then a school district with a cost index value of 1.1 will need to spend $8,250 ($7,500 times 1.1) to reach the accountability standards. Another district with a cost index value of 0.9 will be able to meet the standards at a cost of $6,750 (0.9 times $7,500).

A prerequisite to calculating a cost index is determining an accountability standard. The current NCLB accountability standards, which are established by the State Board of Education with the approval of the U.S. Department of Education, are based primarily on results of TAKS exams. There are several elements involved in determining these standards. First, the state must decide what grade on any examination will be considered passing (which we refer to as the passing standard); and second, decisions must be made about what passing rates, or increases in passing rates, will satisfy or defer the standard.

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22. That is, we use the cost function equation to predict spending in each district by multiplying each coefficient by the value of that variable and summing up. The outcome variables and Herfindahl index are held constant for all districts.
(which we refer to as the passing rate standard.) As explained previously, our
cost function is estimated using TASS test score results. In order to predict
the costs of meeting a given passing rate standard on the TAKS, we must first
convert performance on the TASS to the higher passing standard associated
with the TAKS. As the TAKS is phased in over the next few years, the passing
standard will increase each year until it reaches the stated recommendation
level in 2005. We use data for TASS passing rates that have been converted
to passing rates defined in terms of the 2005 TAKS panel recommendation
passing standard. The conversion is based on a conversion schedule developed
by the Texas Education Agency that indicates how a given score on the TASS
correlates to expected performance on the TAKS (e.g., a student would need
a particular TASS score in order to have passed the TAKS at the 2005 panel
recommendation). See Gremillion et al. (2004) for a full description of this
conversion.

The Texas Consolidated State Application Accountability Workbook (U.S.
Department of Education 2003) lists passing rate targets for each year that will
meet the requirements of NCLB. For school year 2003–6, all students in all
grades and in all subgroups (economically disadvantaged, African American,
white, and Hispanic) need to achieve a TAKS passing rate of 55 percent
on the reading/language arts examination and 42.7 percent passing rate on
the mathematics exam, or make “acceptable progress” toward those goals. In
calculating a cost index value for each school district, we started with a TAKS
passing rate standard of 55 percent.

Although the target is 55 percent, the Texas accountability system also al-
loows for the fact that some districts may be so far below the standard that
expecting them to reach the standard in such a short time period is unreal-
istic. According to the state’s commissioner of education, districts that do
not meet the absolute performance standard can still be characterized by the
commissioner as “academically acceptable” if they demonstrate sufficient test
score improvement (Texas Commissioner of Education 2004). This improve-
ment is measured as the gain necessary to reach the accountability standard
in a set number of years. The NCLB legislation refers to this requirement for
annual improvement as adequate yearly progress. We incorporate this into our
calculations of cost in the following way: in calculating the cost of meeting the
accountability standard, all school districts that had a TASS converted passing
rate of less than 52 percent were assigned a required gain of one-third of the
difference between the 55 percent standard and their current passing rate.14

13. In addition to the test scores, the Texas accountability standards also include graduation rate and
attendance rate standards.
14. The U.S. Department of Education has approved a definition of adequate yearly progress (AYP) that
requires at least a 6 percent annual reduction in the percentage of students not passing each test.
School districts with passing rates between 52 and 55 percent were assigned a required gain of the full difference between their current passing rate and 55 percent. Descriptive statistics of the resulting cost index are displayed in the first column of table 3.25

The average cost per student assuming the 55 percent passing rate accountability standard is $6,966, measured in 2002 dollars. If we add to that number average per pupil spending for transportation and food services of $559 (amounts that were excluded from the spending data used to calculate the cost function), the average per pupil cost of achieving the 55 percent standard is $7,525. In order to put this number in 2004 dollars, we use the percentage change in the Bureau of Labor Statistics' (2004) Employment Cost Index for all civilian workers between the first quarter of 2002 and the first quarter of 2004. According to that index, over this two-year period, costs rose by 7.0 percent. Thus, in 2004 dollars, the average cost per pupil of meeting the 55 percent standard would be $8,119.

Because NCLB requires that the passing rate standard used to define adequate yearly progress increase each year until it reaches 100 percent by 2013-14, we have also calculated a second set of cost index values based on a TAKS passing rate standard of 70 percent. Although Texas school districts will not have to meet this standard for several more years, the 70 percent is the 2005-6 standard for a school district to be considered a “recognized” district by the commissioner of education (Texas Commissioner of Education 2004). In calculating the cost index, the required gain in passing rate was set equal to

25. We calculate our cost index for 767 school districts. These districts educate 99.6 percent of all public school students in Texas. We are able to calculate cost index values for more districts than we use in estimating our cost function because we include districts that are missing one of the outcome values. For the alternative assessment test used the SAT/ACT measure, we substitute the average values—something we do anyway in calculating the cost index. For districts scoring the TAKS 2005, we set it equal to the sample average (TAKS converted) rate of 55.5.

EDUCATION FINANCE AND POLICY
Table 4: Cost Index Values by Poverty Quintiles

<table>
<thead>
<tr>
<th>Student Weighted Quintile</th>
<th>Number of School Districts</th>
<th>Cost Index Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
<td>Minimum</td>
</tr>
<tr>
<td>1 (lowest)</td>
<td>131</td>
<td>0.71</td>
</tr>
<tr>
<td>2</td>
<td>255</td>
<td>0.91</td>
</tr>
<tr>
<td>3</td>
<td>281</td>
<td>0.99</td>
</tr>
<tr>
<td>4</td>
<td>264</td>
<td>1.15</td>
</tr>
<tr>
<td>5 (highest)</td>
<td>92</td>
<td>1.30</td>
</tr>
<tr>
<td>75th percentile</td>
<td>119</td>
<td>0.67</td>
</tr>
<tr>
<td>50th percentile</td>
<td>69</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>957</td>
<td>1.00</td>
</tr>
</tbody>
</table>

one-third of the difference between 70 percent and the actual passing rate for all districts except those with current rates between 67 and 70 percent. The required gain for these districts was the entire gap between their current passing rate and 70 percent. The results of these calculations are shown in the second column of Table 3. Following the same procedure outlined above, the average cost per pupil of achieving the 70 percent standard would be $10.35.

Table 3 demonstrates that there is a wide range of costs across school districts in Texas at both the 55 and 70 percent passing rate standard. At the 55 percent passing rate, the lowest cost school district could meet the standard at a cost of almost half of the districts with average costs. On the other hand, the district with the highest cost would need to spend over four times more than the district with average costs to meet the accountability standards. This wide range of costs, however, reflects the impact of a few districts. If we rank school districts by their cost index values, the district at the 10th percentile level has costs about 45 percent below average, while the district at the 90th percentile (i.e., only 10 percent of districts have higher costs) has costs that are 45 percent above average.

To provide an indication of how the cost index varies across school districts, we have divided school districts into quintiles defined in terms of the percentage of poor students in each district and district size. In defining quintiles we weight districts by student enrollment so that each quintile contains 20 percent (one-fifth) of all Texas K–12 students. Thus, the first poverty quintile includes the 153 districts with the lowest percentage of poor students; these districts enroll approximately 20 percent of all public school students. Table 4 displays the average cost index value (based on the 55 percent passing rate standard) in each quintile, in addition to the minimum
<table>
<thead>
<tr>
<th>Student Weighted Quintiles</th>
<th>Number of School Districts</th>
<th>Average</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (smallest)</td>
<td>574</td>
<td>1.03</td>
<td>0.60</td>
<td>4.44</td>
</tr>
<tr>
<td>2</td>
<td>125</td>
<td>0.86</td>
<td>0.56</td>
<td>1.23</td>
</tr>
<tr>
<td>3</td>
<td>19</td>
<td>0.69</td>
<td>0.56</td>
<td>1.10</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>0.83</td>
<td>0.63</td>
<td>1.70</td>
</tr>
<tr>
<td>5 (largest)</td>
<td>8</td>
<td>0.56</td>
<td>0.70</td>
<td>1.17</td>
</tr>
<tr>
<td>10th percentile</td>
<td>624</td>
<td>1.06</td>
<td>0.66</td>
<td>4.44</td>
</tr>
<tr>
<td>90th percentile</td>
<td>2</td>
<td>1.12</td>
<td>1.06</td>
<td>1.47</td>
</tr>
<tr>
<td>Total</td>
<td>967</td>
<td>1.00</td>
<td>0.56</td>
<td>4.44</td>
</tr>
</tbody>
</table>

and maximum cost index value in each quintile. The table also shows the values for the 10th and 90th percentiles.

The data in table 4 show quite clearly the importance of poverty (and poverty-related factors) in the determination of cost index values. Thus, the average cost index in the lowest poverty quintile is 0.77, and all but three school districts in this quintile have cost index values less than one. By contrast, the average cost index in the highest poverty quintile is 1.5, and almost all the school districts in this quintile have cost index values substantially higher than one.

Table 5 displays student weighted quintiles of district size. We observe that the 774 smallest K-12 districts (out of the 967 districts for which we calculate cost index values) educate only 20 percent of public school students. The 8 largest districts in the state also educate 20 percent of public school students. The data in table 5 indicates that the average cost index in the smallest district quintile is 1.03. There is, however, a tremendous variation in the costs faced by small districts. For some small districts, other factors, such as the characteristics of their student body, compensate for small size and result in low cost index values. In other small districts, especially in rural areas, diseconomies of scale caused by small size combine with large numbers of economically disadvantaged students, resulting in very high cost index values. Table 5 also shows that while the average cost index value in the largest district quintile is 0.96, there is a wide range of costs among the largest districts.

The combined effects of poverty and size are perhaps seen best in table 6, which shows the cost index values by urban category. Costs are clearly highest in rural districts outside metropolitan areas, which tend to be small and have relatively high rates of poverty.
Table 6. Cost Index Values by Urban Category

<table>
<thead>
<tr>
<th>Number of School Districts</th>
<th>COST INDEX VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
</tr>
<tr>
<td>Large city</td>
<td>32</td>
</tr>
<tr>
<td>Medium city</td>
<td>49</td>
</tr>
<tr>
<td>Urban fringe of large city</td>
<td>122</td>
</tr>
<tr>
<td>Urban fringe of medium city</td>
<td>14</td>
</tr>
<tr>
<td>Rural, outside metro area</td>
<td>6</td>
</tr>
<tr>
<td>Small town</td>
<td>173</td>
</tr>
<tr>
<td>Rural, inside metro area</td>
<td>184</td>
</tr>
<tr>
<td>Total</td>
<td>967</td>
</tr>
</tbody>
</table>

5. THE ESTIMATION OF THE COSTS OF MEETING ACCOUNTABILITY STANDARDS

In this section, we draw upon the results of our cost function estimation and our cost index calculations to provide estimates of the additional costs that will be required to meet the accountability standards. We will then discuss several reasons why we believe these cost estimates provide a systematic underestimate of the total additional cost of meeting the education accountability standards mandated by the state and by the NCLB legislation.

The calculation of additional costs needed to meet the accountability standards parallels the procedure we followed in constructing the cost index. School districts that have TAKS passing rates that are equal to or greater than 55 percent require no additional money to meet the standard. For districts with TAKS passing rates between 52 and 55 percent, we calculate the cost of moving from the current rate to the 55 percent passing rate, and for districts with current passing rates below 52 percent, we calculate the cost of moving one-third of the way to the 55 percent standard. The one-third gain is a measure of the required annual improvement mandated by the Texas accountability system.

In order to determine the cost of any given improvement in passing rates, we use our cost function results to calculate, for each school district, the predicted cost of achieving the actual passing rate and then subtract that cost from the predicted cost of meeting the passing rate goal. For example, a school district with a 40 percent passing rate would need to raise its passing rate to 45 percent, that is, one-third of the way to 55. The additional cost of achieving this required annual improvement would be the difference between the predicted cost of achieving a 45 percent passing rate and the predicted cost of achieving a 40 percent passing rate.
The additional cost calculations are made using data from 2002. We again use the Employment Cost Index to transform the cost calculations into 2004 dollars. Our calculations indicate that the additional costs of achieving a 55 percent passing rate standard are $1.347 billion. This amount is equivalent to $575 per pupil. We also conduct a similar calculation on the basis of a 70 percent passing rate standard. If that standard were in place, we estimate that Texas school districts would face $1.668 billion of additional costs, or $7,068 per pupil (again measured in 2004 dollars). To put these cost numbers in perspective, the $1.5 billion additional cost of meeting the 55 percent passing rate standard represents 5.5 percent of total public school revenue in 2004, while the $4.4 billion cost of meeting the 70 percent standard is equivalent to 15.6 percent of total 2004 revenue.74

Although the additional cost estimates presented in the previous paragraph represent huge amounts of money, several reasons lead us to believe that these numbers provide a systematic underestimate of total additional costs necessary to meet the accountability standards imposed by NCLB. First, in estimating costs, data problems forced us to assume that a school district met any given passing rate standard if its overall passing rate exceeded the standard. In fact, a central tenant of the NCLB legislation is that for a school district to meet an accountability standard, every subgroup of students within a school district must meet the standard. For the purposes of NCLB, these subgroups include African American, Hispanic, white, economically disadvantaged, special education, and LEP.

Although we are not able to provide a precise estimate of the cost of having all subgroups of students meet the Texas accountability standards, we are quite certain that our estimates of additional costs provide a significant underestimate of the cost of every subgroup meeting the passing rate standards. We reached this opinion by examining the data from a number of individual school districts. Consider, for example, the Fairfield Independent School District (ISD). This district, which has around 4,600 students, just exceeded the 55 percent passing rate standard and thus, according to our calculation, would not require any additional spending to meet the 55 percent passing

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66. Not surprisingly, costs rise quite rapidly as student performance standards are raised. At a 50 percent passing rate standard, supplemental costs would equal $6.6 billion.
67. In a cost function study completed for the Texas legislature, Greenberg et al. (2004) conclude that the average cost per pupil of achieving the 55 percent passing rate standard is $646, a figure that is more than 15 percent lower than our estimate of average per pupil costs of meeting the same standard. Because they ignore a large set of other student performance standards plus various curricular requirements that school districts must meet, Greenberg and his colleagues are able to argue that most school districts have more than enough money to meet the student performance standards mandated by NCLB. For a full discussion of the problem that our cost estimates differ from Greenberg et al.'s, see Imerman and Roschovsky 2005.
rate standard. When we examine the TAUS passing rate data for the subgroups, however, we observe that the passing rate for African Americans was 7.8 percent below the overall TAUS passing rate, the rate for Hispanics was 11.4 percent below the overall rate, and the rate for economically disadvantaged students was 8.3 percent below the overall rate.

The clear implication of these numbers is that Fairfield ISD will have to spend additional money to bring the passing rates of these subgroups of students up to the required passing rate standard. Although we are unable to assign a particular number for the required additional costs, our cost function results imply that, everything else being equal, it will cost more than average to improve the educational performance of African American, Hispanic, and economically disadvantaged students.

A second reason that we underestimate the costs of meeting the accountability standards is that our cost estimates are based on a subset of the standards facing school districts. Recall that our measure of student performance is the average score on the reading/language arts and mathematics exams. The actual accountability standards require that students meet the passing rate standards on each exam. A close look at the test score data suggests that in a number of districts an average passing rate above the standard reflects a relative high passing rate in the reading exam and a low (below standard) passing rate on the mathematics exam. This suggests that in these districts, additional resources will need to be devoted to improving performance on the mathematics exam.

The TAUS accountability standards for 2005-6 also include passing standards for social studies and science examinations. NCSE requires testing of students in science and social studies beginning in 2007. In addition, there are new examination-linked standards for promotion from grades 5, 8, and 10 to a new eleventh-grade examination will be required for graduation. Although we can provide no empirical estimate of the additional costs associated with meeting these standards, it is difficult to believe that there will be no additional costs involved.

6. IS NO CHILD LEFT BEHIND AN UNDERFUNDED FEDERAL MANDATE?

According to the U.S. Department of Education, the core of its financial support for NCSE comes through the funding of Title I, the grant program that is targeted to districts with disadvantaged children. In the three years since the passage of NCLB, the federal government has increased its allocations to Title I from $8.2 billion in fiscal year 2002 to a proposed $12.6 billion in fiscal year 2005, an increase of 55 percent. The allocation of Title I funds to Texas during this three-year period rose at an even faster rate—75 percent. The increase in
Title I funds to Texas equaled $519 million to a total proposed fiscal year 2005 allocation of $1.2 billion.

A simple comparison of the $519 million three-year increase in Title I funds to our $1.5 billion estimate of the additional funds required to meet the NCLB adequate performance standards suggests very clearly that the costs of achieving the student performance goals established by NCLB are substantially higher than the amount of additional federal funds that have been provided over the past three years and, given the large federal budget deficit, probably larger than any additional federal education funds that are likely to be provided in future years.

Furthermore, while Title I allocations are made in nearly all Texas school districts, our $1.5 billion estimate consists of the sum of additional costs in the 567 school districts that were not already meeting the 2005 standards of a 35 percent passing rate on the TAKS exam. Recall that districts that had already achieved a 55 percent passing rate were not considered in need of additional funds. As 16 percent of the $519 million three-year increase in Title I allocations went to the 401 districts in our sample that were already meeting the student performance standard, the difference between the $1.5 billion additional costs and the availability of Title I funds is even greater than indicated by the aggregate numbers.

The aggregate data also do not tell us how Title I funds are distributed across districts within Texas. In order to see how the three-year increase in Title I funds compares to the additional funds needed to bring individual districts up to the 35 percent passing rate standard, we compared the increase in Title I funds for each district to the additional funds needed by that district. Specifically, we created a ratio of these two numbers, where a ratio of one would suggest that the additional cost of meeting the standard are fully covered by the increase in Title I funding. Table 7 shows the distribution of this ratio across districts with different costs by comparing pupil-weighted quantiles of the cost index. Although there are 567 districts that we predict would require additional funds, in 96 of these districts Title I funds decreased between 2002 and 2005. These 96 districts were dropped from the analysis in table 7.14 Only 5 of the lowest-cost districts both required additional funding and had an increase in Title I funds. On average, Title I funds covered a little more than two-fifths of the additional costs in the remaining districts, but as table 7 shows, there is no clear pattern as to which districts received the highest share of Title I funding increases relative to costs. Districts in the highest-cost
Table 7. Tile Funding Ratio by Cost Index Quintiles

<table>
<thead>
<tr>
<th>Student Weighted Quintiles</th>
<th>Number of School Districts</th>
<th>Average Cost Index</th>
<th>Predicted Additional Cost</th>
<th>Average</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st percentile</td>
<td>5</td>
<td>0.75</td>
<td>0.16</td>
<td>0.064</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>2nd percentile</td>
<td>68</td>
<td>0.84</td>
<td>0.48</td>
<td>0.001</td>
<td>4.21</td>
<td></td>
</tr>
<tr>
<td>3rd percentile</td>
<td>98</td>
<td>0.91</td>
<td>0.41</td>
<td>0.001</td>
<td>3.18</td>
<td></td>
</tr>
<tr>
<td>4th percentile</td>
<td>124</td>
<td>0.99</td>
<td>0.51</td>
<td>0.002</td>
<td>3.14</td>
<td></td>
</tr>
<tr>
<td>5th percentile</td>
<td>150</td>
<td>1.28</td>
<td>0.37</td>
<td>0.002</td>
<td>3.51</td>
<td></td>
</tr>
<tr>
<td>10th percentile</td>
<td>0</td>
<td>0.37</td>
<td>0.37</td>
<td>0.002</td>
<td>2.30</td>
<td></td>
</tr>
<tr>
<td>50th percentile</td>
<td>139</td>
<td>1.37</td>
<td>0.49</td>
<td>0.001</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>471</td>
<td>1.07</td>
<td></td>
<td></td>
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</tr>
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</table>

Although our view these numbers tell an interesting story, do they prove that at least in Texas NCLB is a seriously underfunded federal mandate? The answer to this question depends in part on the answer to another question: What educational policies would Texas have pursued in the absence of NCLB? We might also want to ask, What policies would Texas be likely to follow in the future if Congress were to eliminate or substantially weaken the major provisions of NCLB? If the argument can be convincingly made that even without federal mandates, Texas would continue to pursue standards for the educational improvement of all its students that are just as rigorous as the current NCLB standards, then the claim that NCLB is forcing Texas to pursue policies that it wouldn’t otherwise pursue is undercut, and NCLB should not be considered an unfunded mandate.

Needless to say, in Texas, as in other states, it is exceedingly difficult to predict what state policies would have been enacted in the absence of federal policies, and how state policies would change if federal mandates are weakened. We suspect that even if NCLB had never been enacted, many states would have taken steps to address large gaps in academic achievement among various racial and socioeconomic groups. Whether these state policies would have imposed standards as rigorous as those mandated by NCLB is an open question. In Texas, one can find “evidence” both in support and in opposition to the argument that in the absence of NCLB Texas education standards would have been as rigorous as the federal standards imposed by NCLB.

19 Predicted additional costs of meeting the academic accountability standards were generally very low in school districts where the ratio of increases in Tile 1 to predicted additional costs substantially exceeded one.
On the one hand, the facts that Texas established its student accountability system nearly a decade before the passage of NCLB and that this system was recently made more rigorous with the establishment of the TAKS exams suggest that Texas was and continues to be willing to administer a strict student and school accountability system. On the other hand, the state’s share of education funding has been falling rapidly in recent years, from 47 percent in 2000 to about 38 percent in 2004. Rather than pursuing policies to increase the funding of public education in Texas, Governor Perry and many members of the legislature appear to be devoting most of their energies to pursuing policies that would mandate large property tax reductions. In this policy environment, it seems unlikely that the governor or the legislature would devote sufficient additional resources to public education, unless pressured to do so by the demands of NCLB or by the courts.30

7. WHAT IS THE FEDERAL ROLE?

The past few years have been a period of severe fiscal pressure for most state governments. Although the recession that began in 2001 was mild by historical standards, state government revenues fell dramatically, leading to large budget deficits in most states. While state revenues have begun to grow again, in 2005 they still remain below their prerecession levels. The combination of (i) pressure to increase spending, especially for Medicaid; (ii) a shrinking sales tax base (relative to the size of the economy) due to increasing Internet and mail-order sales; and (iii) efforts to shrink the federal deficit that involve large cuts in grants to state and local governments is likely to result in a continuation of annual state budget crises in 2005 and into the future (Kalabokakis and Reschovsky 2005).

This prospect of continued fiscal problems in many states, coupled with renewed efforts in a number of states to place limits on property tax revenues, suggests to us that many states, left on their own, would not develop the accountability systems or implement the higher education performance standards mandated by NCLB. In this article, we have demonstrated that closing existing achievement gaps and ensuring that students meet state-imposed standards for an adequate education will involve increased expenditures on K-12 education, and if Texas serves as a good example, the federal government is providing only a small portion of this necessary extra spending.

30. In Texas, the prospect of judicial intervention is quite real. In September 2004, a district court ruled in AEP v. State that the Texas system of school finance was unconstitutional because it failed to provide school districts with adequate revenue to achieve the achievement goal among racial groups and between economically advantaged and disadvantaged children. The ruling is being appealed to the Texas Supreme Court.
If Texas, a state that implemented both annual student testing and an accountability system more than a decade ago, must spend more money in order to close its achievement gap, it seems highly likely that most other states will also need to increase their investment in K-12 education if they are to meet the goals set out in NCLB. There is also little question that this additional spending will place a substantial fiscal burden on most state governments.

The unanswered question is how the costs of improving public education in the United States should be split between the federal government and the states. On the one hand, education is a core responsibility of state government, arguably its most important function, and one that is enshrined in most state constitutions. Furthermore, the residents of most states would probably agree that large differences in the educational performance of children from poor and affluent families and between white and minority children constitute evidence of failure of their state’s system of public education. This suggests that within our federal system of government, it is appropriate for state governments to take primary responsibility for the education of their children. Independently of federal regulations, evidence of achievement gaps should spur states to take whatever steps are necessary to close those gaps.

On the other hand, the fact that some states have an above-average proportion of “high-cost” students, and the fact that some states have fewer fiscal resources than others, suggest that for equity reasons, the federal government should be playing a role in helping finance the efforts of state governments to close their achievement gaps. Also, the fact that the nation’s economic growth is in part a function of the human capital of all its residents, independent of where they live, provides an economic efficiency argument for federal involvement in the financing of education. How big that federal role should be is a difficult political question. Its answer is at the core of any national debate about the nature of our federal system.

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