Is No Child Left Behind *an Un (or Under) funded Federal Mandate? Evidence from Texas*

Abstract - *The No Child Left Behind Act of 2001 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 paper, 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.*

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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 three through eight and testing at least once in grades 10 through 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 sub–group 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 over 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 state and 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 assuring that all students are able to satisfy the new academic performance standards.

In recent months, several state legislatures have concluded that increased federal funding is not sufficient to cover the costs imposed by NCLB. State legislatures in a number of states have recently passed resolutions urging Congress to change the law. Legislatures in other states are actively considering foregoing federal funding and opting out of the provisions of NCLB. In April 2004, the Maine legislature passed a "Resolve" that prohibits Maine's Department of Education from spending any state money to implement the provisions of NCLB (Advocacy Center for Children's Educational Success with Standards, 2004). 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 *No Child Left Behind* if the costs of implementation exceeded the amount of money provided by the federal government (Lautenschlager, 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.

In recent months several studies have been released that address the question of whether NCLB is in fact an unfunded or under–funded federal mandate imposed on states and their school districts. The National Conference of State Legislatures (2004) published a *Mandate Monitor* in which they suggest that in fiscal year 2005 the gap between the cost of NCLB and the available federal money is at least $10 billion. William Mathis (2003) studied the costs of meeting the accountability standards mandated by NCLB in 10 states and concluded that the additional costs needed to achieve higher educational standards in these states were substantially greater than the money that the federal government proposes to allocate to elementary and secondary education over the next few years. On the other side of the debate are two studies, one prepared by Accountability Works for the Education Leaders Council (2004) and the other by Peyser and Costrell (2004). An important part of their arguments is that NCLB is not an unfunded mandate because the federal government has provided sufficient funds to meet the direct costs of implementing the new federal legislation.

In this paper, we propose to address the question of whether NCLB creates an unfunded or partially funded mandate by looking in detail at the costs of meeting the student performance standards mandated by NCLB. Texas is a good state in which to carry out such a test. Since the early 1990s, Texas has been a leader in providing annual measures of student academic performance and developing a system that holds schools directly accountable for the educational performance of their students. In 2001, the basic elements of the Texas accountability system were adopted by the whole nation, when the Congress enacted the *No Child Left Behind Act of 2001.* 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 created an unfunded mandate in Texas, this would suggest that NCLB is probably creating similar fiscal burdens 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 2002–03 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 three, five, and eight, and a new 11th grade exam that 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.

This paper will 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 relative to the average district in order to meet the state's student performance standards.

In the next section of this paper, we describe the procedure we followed in estimating an educational cost function for K–12 public education in Texas. We detail the data we 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 accountability standards. We also discuss a number of costs that we were unable to include in our analysis. In the final section of the paper, we compare these additional costs to the additional money provided by the federal government to finance NCLB.

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 in detail 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.[1]

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 2001–02 school year. Our dependent variable is, thus, per pupil expenditures in that year. Following quite standard practice, we exclude both spending on transportation and food expenditures 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 effective school districts are in improving the academic performance of its students by relying on

[1] In algebraic terms, a cost function can be represented by the following equation: $E_{it} = h(S_{it}, P_{it}, Z_{it}, F_{it}, \varepsilon_{it}, u_{it})$, where per pupil expenditures, E_{it}, are specified as a function of public school outputs, S_{it}, a vector of input prices, P_{it}, the characteristics of the student body, Z_{it}, other characteristics of the school district such as its size, F_{it}, a vector of unobserved characteristics of the school district, ε_{it}, and a random error term u_{it}.

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 had a well–developed testing system for the majority of students. Until 2002–03, all students in grades three through eight and in grade 10 were tested in the spring of each year as part of the Texas Assessment of Academic Skills (TAAS). In 2002–03, 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 nine and 11. Passing rates on the TAKS are the primary basis for ratings within the Texas accountability system.

For this paper, one of our 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 *annual yearly progress* towards 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, as of this writing (mid May 2004), the second year of TAKS results (for the 2003–04 academic year) have not yet been released by the Texas Education Agency. 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 passing rate on the TAAS reading and mathematics exams administered to students in grades four through eight and in grade 10 in 2001–02. To create a value–added measure, these results are compared to the average passing rate on the TAAS administered to students in 2000–01.

Although we estimate our cost function using TAAS scores, an important objective of this paper 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 under–predict the costs associated with achieving a given passing rate on the TAKS.[2] To deal with this problem, prior to estimating the cost function, we will convert the TAAS passing rates to TAKS rates using a methodology to be described later in the paper. In effect, we will base our cost estimates on the passing rates that a school district would have achieved if the TAKS had been in place in 2001–02.

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. The accountability system also includes standards for grade completion and dropout rates for students in grades seven through 12. As an additional output

[2] The raw score that a student needs to achieve in order to be considered passing is at a different cutoff for the TAKS than for the TAAS.

variable, we include the annual retention rate, defined as one minus the dropout rate. It is important to account for the fact that the more high–school students a district has, the more difficult it will be to achieve any particular retention rate. We, therefore, interact the retention rate with the percent of a district's total number of students enrolled in high school.[3] 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.[4]

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.[5]

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 payrolls 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, to those with high grade–point averages or to 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 isolate 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 Taylor (2004). Her index separates variations in compensation arising from uncontrollable district characteristics

[3] Although the accuracy of the dropout rate has been questioned, we decided to include these data in our analysis primarily because dropout rates are part of both the state and NCLB accountability standards, and efforts to reduce dropout rates (or increase retention rates) will presumably contribute to the costs of education.

[4] The 1100 criterion for the SAT and the 24 for the ACT were established by the Texas Education Agency.

[5] As instruments for the endogenous school output 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 residents' preferences for education, their incomes, the tax prices they face for education spending, and the intergovernmental aid their school district receives. To the extent that the median voter model provides a reasonable explanation for school district spending decisions, it is appropriate to use median income and the tax price faced by the median voter as instruments. In the first–stage regression, we also include each district's Tier 1 Foundation School Program aid as another instrument. Finally, we include as instruments several socioeconomic variables that may be related to the preferences for public education. These include the percentage of households with children, the percentage of household heads who are homeowners, and the percentage of adults who have earned a four–year college degree.

(such as area cost of living) from variations arising from factors that districts 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.[6] In fact, these higher 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 *No Child Left Behind* includes a requirement that students classified as economically disadvantaged must show annual yearly progress towards 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 and Child Nutrition 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 kinds of disability.

Both *No Child Left Behind* and the Texas accountability system explicitly require districts to meet student performance standards not only for all students, but separately for subgroups of white, black, 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. However, as higher scores for any given subgroup will contribute to higher average scores, the impact of each subgroup is implicitly part of the average passing rate that we include in the cost function. Because we expect that the cost per student of meeting the accountability standard will vary by subgroup, we need to account for the relative size of each subgroup within each school district. The percent of students who qualify for the Free and Reduced Price Lunch Program already captures the importance of the economically disadvantaged subgroup. We include the percentage of students who are black 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

[6] Cost function studies that have found that school districts with high concentrations of students with these characteristics face higher than average costs include Downes and Pogue (1994), Duncombe, Ruggiero, and Yinger (1996), Duncombe and Yinger (1998), Reschovsky and Imazeki (2003), and Imazeki and Reschovsky (2004).

each school district's student body that is enrolled in high school. 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. We deal with the problem of differential dropout rates by, as previously discussed, including as an outcome measure the high school retention rate interacted with the percent of students attending high school in a district.

There exists a long history of research on economies of scale in public education. In a recent review of this literature, Andrews, Duncombe, and Yinger (2002) present strong evidence that small school districts have higher costs per student than larger school districts. Although the results are less 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.

Efficiency

Some school districts may have higher per pupil expenditures, not because of higher costs, but because they are not using their resources efficiently. 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 costs.[7] The measurement of school district efficiency using these statistical methods is, however, highly sensitive to the way that school district output is measured. Thus, 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 paper we address the issue of efficiency by assuming that school districts will operate more efficiently if they face a competitive local educational market. Taylor (2000, p. 7), after reviewing the literature on government competition, concludes that, "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." 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 counties can be used to define local "markets" for education.[8] 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.

COST FUNCTION RESULTS

We estimate the cost function for K–12 education using data for academic year

[7] See, for example, Duncombe, Ruggiero and Yinger (1996), McCarty and Yaisawarng (1993), and Deller and Rudnicki (1993).

[8] A Herfindahl index for school districts in county k can be calculated using the following formula:

$$Herfindahl\ Index = 1 - \sum_i \left(\frac{enrollment_i}{enrollment_k}\right)^2.$$

For a county with just one district and no competition, the index will equal zero. For a county with n equally–sized districts, the index will equal $1 - 1/n$. Thus, the index approaches one as the number of districts, and presumably competition, increases.

2001–02.[9] In Texas education from kindergarten through 12th grade is provided by 975 K–12 school districts. Because of missing data, we were forced to drop 148 K–12 districts from our estimation sample. The 827 districts that remain in our sample, however, educate 98.3 percent of all students in the 1,040 school districts in Texas.[10] 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.[11] In general, all coefficients have the expected signs. Each of the outcome measures has a positive sign, indicating that it costs more to achieve higher levels of performance. 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 percentage of minority students and students eligible for free and reduced–price lunch are positive and statistically significant. Consistent with previous studies, we found a U–shaped relationship between per–pupil spending and school district size; with our estimates, average costs are lowest in a district with 56,843 students. At that point, costs begin to rise again. We also find U–shaped relationships between per–pupil spending and the percentage of LEP and disabled students. These results suggest economies of scale in the specialized programs provided for these students. Any district with even one LEP or special education 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 20 LEP students in an elementary grade, the district must offer a bilingual program. Given these requirements, it is not surprising to find that economies of scale can be found for at least lower levels of LEP students. The coefficients on the LEP variables

TABLE 1
DESCRIPTIVE STATISTICS, 827 K–12 SCHOOL DISTRICTS

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Per–pupil expenditures, 2001–02 (excludes transportation and food)	$6,733	$1,345	$4,395	$18,037
2001–02 TAAS passing rate, converted to TAKS 2005 standard	53.3	10.9	18.5	88.2
Composite lagged TAAS pass rate, 2000–01	91.2	5.0	63.7	99.8
Percent of graduates who performed above criteria on SAT or ACT	12.9%	8.5%	0.0%	57.2%
Passing rate on state–defined alternative assessment	71.4	14.4	6.7	100
Annual retention rate	99.5	0.6	96.3	100
Teacher wage index (monthly wage)	$2,400	$125	$2,176	$2,777
Percent of students eligible for free and reduced price lunch	47.3%	18.9%	2.5%	98.1%
Percent of students with learning or speech disabilities	10.8%	3.0%	3.6%	23.9%
Percent of students with other disabilities	3.1%	1.5%	0.2%	24.5%
Percent of students who are black	8.8%	12.5%	0.0%	84.3%
Percent of students who are Hispanic	30.1%	27.2%	0.2%	99.8%
Percent of students with limited English proficiency	10.8%	9.2%	0.0%	58.9%
Percent of students enrolled in high school	29.6%	3.4%	19.9%	58.5%
Student enrollment	4,874	13,148	186	210,670
Herfindahl (efficiency) index	0.608	0.220	0.000	0.887

[9] The data for the lagged test scores are for 2000–01.

[10] In addition to the 975 K–12 districts, there are also 65 elementary and high school districts, for a total of 1040 districts.

[11] We weighted all variables by district enrollment.

TABLE 2
EDUCATION COST FUNCTION, 2001–02
827 K–12 SCHOOL DISTRICTS

Dependent variable: Log of expenditures per pupil Independent variables	Coefficient	t–statistic
Intercept	6.02	1.39
Log of 2001–02 TAAS passing rate, converted to TAKS 2005 standard	0.914**	1.72
Log of composite lagged TAAS pass rate, 2000–01	–2.69*	–2.57
Percent of graduates who performed above criteria on SAT or ACT	0.38	1.18
Log of passing rate on state–defined alternative assessment	0.35	0.89
Retention rate times the percent of students enrolled in high school	104.5*	3.23
Teacher wage index (in logs)	1.44*	4.56
Percent of students eligible for free and reduced price lunch	.477*	3.41
Percent of students who are black	.306*	2.95
Percent of students who are Hispanic	.307*	3.60
Percent of students with learning or speech disabilities	0.688	1.11
Percent of students with other disabilities	–3.03**	–1.90
Percent of students with other disabilities squared	19.1	1.52
Percent of students with limited English proficiency	–.836*	–2.93
Percent of students with limited English proficiency squared	.766**	1.74
Percent of students enrolled in high school	–481.6*	–3.24
Log of student enrollment	–.284*	–3.29
Square of log of student enrollment	.013*	3.01
Herfindahl (efficiency) index	–.102**	–1.88
Sum of squared residuals	8.431	

*indicates statistically significant at the 5% level
**indicates statistically significant at the 10% level

indicate that these economies of scale can be found for districts having up to 54.6 percent of their students receiving specialized services; after that, costs begin to rise. For students with disabilities other than learning or speech disabilities, economies of scale stop at only eight percent, perhaps indicating the more individualized services that such students may require.

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. One 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 these "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.

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 choose 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 does not involve 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 paper, 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 the statewide average values of the other variables in the cost function. This calculation results 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 accountability standards established by the State Board of Education are calibrated in terms of the TAKS exams and there are several elements involved in determining these standards. First is the decision of what grade on any examination will be considered passing (which we refer to as the passing standard), and second are the passing rates, or the increase in passing rates, that are considered high enough to meet the standard (which we refer to as the passing *rate* standard). As explained previously, our cost function is estimated using TAAS 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 TAAS 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 panel recommendation level in 2005. We use data for TAAS 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 TAAS correlates to expected performance on the TAKS (e.g., a student would need a particular TAAS score in order to have passed the TAKS at the 2005 panel recommendation). See Gronberg 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 satisfy the requirements of *No Child Left*

Behind. For school year 2005–06, all students in all grades and in all sub–groups (economic disadvantaged, black, white, and Hispanic) need to achieve a TAKS passing rate of 53.5 percent on the reading/language arts examination and a 41.7 percent passing rate on the mathematics exam, or make "acceptable progress" towards 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 allows 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 unrealistic. According to the 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 improvement is measured as the gain necessary to reach the accountability standard in a set number of years. The *No Child Left Behind* 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 TAAS 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. 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.[12]

The average cost per student assuming the 55 percent passing rate accountability standard is $6,963, measured in 2002 dollars. If we add to that number average per–pupil spending for transportation and food services of $513 (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 $7,476. 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 role by 7.9 percent. Thus, in 2004 dollars, the average cost per pupil of meeting the 55 percent standard would be $8,067.

TABLE 3
DISTRIBUTION OF EDUCATION COST INDICIES

	Cost Index With 55 Percent Passing Rate	Cost Index With 70 Percent Passing Rate
Mean	1.00	1.00
Standard Deviation	0.29	0.27
Minimum	0.55	0.61
Maximum	3.77	3.59
At 10th Percentile	0.75	0.77
At 90th Percentile	1.30	1.28

[12] We calculate our cost index for 968 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 that we use in estimating our cost function because we include districts that are missing one of the outcome values. For the alternative assessment test, the SAT/ACT measure, and the retention rate variable, we substitute the average values–something we do anyway in calculating the cost index. For districts missing the TAAS score, we set it equal to the sample average (TAKS converted) rate of 53.3.

We calculated a second set of cost index values, this time based on a TAKS passing rate standard of seventy percent. Seventy percent is the 2005–06 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 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 $9,919.

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. The lowest cost school district could meet the standard at a cost of about 40 percent less than the district with average costs. On the other hand, the district with the highest cost would need to spend about 375 percent 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 25 percent below average, while the district at the 90th percentile, i.e., only 10 percent of districts have higher costs, has costs that are about 30 percent above average.

To provide an indication of how the cost index varies across school districts characterized in different ways, 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 133 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 and maximum cost index value in each quintile.

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 0.748, and not a single school district in this quintile has a cost index value greater than one. By contrast, the average cost index in the highest poverty quintile is 1.47, and nearly 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 775 smallest K–12 districts (out of the 968

TABLE 4
COST INDEX VALUES BY POVERTY QUINTILES

Student Weighted Quintiles	Number of School Districts	Cost Index Values		
		Average	Minimum	Maximum
1 (lowest)	133	0.75	0.55	0.98
2	256	0.88	0.64	1.43
3	283	0.98	0.75	1.51
4	214	1.18	0.82	2.48
5 (highest)	82	1.47	0.99	3.77
Total	968	1.00	0.55	3.77

TABLE 5
COST INDEX VALUES BY DISTRICT SIZE QUINTILES

Student Weighted Quintiles	Number of School Districts	Cost Index Values		
		Average	Minimum	Maximum
1 (smallest)	775	1.00	0.55	3.77
2	125	0.91	0.56	1.62
3	40	0.99	0.60	1.30
4	20	0.92	0.66	1.50
5 (largest)	8	1.12	0.74	1.52
Total	968.0	1.00	0.55	3.77

district for which we estimate cost functions) educate only 20 percent of public school students. The eight largest districts in the state also educate 20 percent of public school students. The data in Table 5 indicate that the average cost index in the smallest district quintile is 1.02. 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 and LEP 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 1.12, some of the largest districts have below average costs.

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 several alternative accountability standards. We will then discuss several reasons why we believe that our cost estimates result in an under–estimate of the total additional cost of meeting the education accountability standards mandated by the state and by the *No Child Left Behind* legislation.

We start by describing three alternative definitions of a 55 percent passing rate accountability standard. The first definition corresponds with the standard used to calculate the cost index described in the previous section. 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 the current passing rate and then subtract that cost from the predicted cost of 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, i.e., 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.

Our second definition of a 55 percent passing rate standard is identical to our first definition for all districts with current passing rates below 52 percent. All school districts with existing passing rates above 52, including those with current passing rates greater than 55 percent, would be required to show annual yearly progress, which in this case we define as a three percentage point increase in its passing rate.[13] Our third definition is similar to the second definition, except that school districts with passing rates below 52 percent are required to close the gap to 55 in a single year. For all other school districts, we need to calculate the cost of improving the passing rate by three percentage points.

Table 6 presents the results of these calculations of additional costs for the three alternative definitions of accountability standards associated with the 55 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 for the state as a whole, the additional costs of achieving a 55 percent passing rate standard range from $1.7 to nearly $5.5 billion. On a per–pupil basis, costs would have to increase between $421 and $1,344.

The 55 percent passing rate standard, which is the basis of the cost estimates shown in Table 6, reflects what the Commissioner of Education classifies as an *academically acceptable* level of student performance. The Texas accountability standards also include for the 2005–06 school year a passing rate standard of 70 percent for districts to be classified as *recognized* and a passing rate standard of 90 percent for districts to be classified as *exemplary*. In Table 7 we present estimates of the additional cost of achieving passing rates of 60, 70, and 90 percent. The cost calculations are based on a definition of each passing standard that parallels the first definition of the 55 percent passing rate standard. Thus, for example, for the 70 percent passing standard, districts with passing rates greater than 70 percent contribute no additional costs, while any district with a current passing rate of less than 67 percent must close one–third of the passing rate gap between its current passing rate and 70 percent. The cost estimates in Table 7 make it very clear that

TABLE 6
ADDITIONAL COSTS OF MEETING THE 55 PERCENT PASSING RATE STANDARD

Definition of Standard	Additional Cost (Millions of 2004 dollars)	Costs per Pupil (2004 dollars)
Definition 1	1,725.4	423
Definition 2	2,221.0	544
Definition 3	5,486.1	1,344

Source: See text.

TABLE 7
ADDITIONAL COSTS OF MEETING 60, 70, AND 90 PERCENT PASSING RATE STANDARD

Definition of Standard	Additional Cost (Millions of 2004 dollars)	Costs per Pupil (2004 dollars)
60 Percent	2,486.6	609
70 Percent	4,207.0	1,030
90 Percent	7,936.0	1,944

Source: See text.

[13] We chose an annual increase equal to three percentage points because it appears that the statewide average increase in TAAS passing rates between 2000–01 and 2001–02 corresponds to an approximately three percentage point increase in the TAKS passing rate.

the additional costs of achieving higher passing rate standards are substantial. As the passing standard is increased, not surprisingly, costs rise at a more than proportional rate. Thus, while moving from a 55 to a 60 percent passing rate standard would increase costs per pupil by $186, moving from a 60 to a 70 percent passing rate standard would result in a cost increase of $421.

There are several reasons why the cost estimates in Tables 6 and 7 provide an under–estimate of the total additional costs necessary to meet the accountability standards imposed by the State and by *No Child Left Behind*. One of the most serious shortcomings of our empirical approach to estimating the cost of meeting the accountability standards is that, as explained previously, we have had to assume that a school district met any given passing rate standard if its overall passing rate exceeded the standard. In fact, a central tenet of the *No Child Left Behind* legislation is that for a school district to meet an accountability standard, every group of students within a school district must meet the standard.

Although we are not able to provide a precise estimate of the cost of having all sub–groups of students meet the Texas accountability standards, we suspect that the cost estimates provided in Tables 6 and 7 provide a significant under–estimate of the cost of every sub–group meeting the standard. We reached this opinion by examining the data from a number of individual school districts. Consider, for example, the Fairfield Independent School District. This district with around 1,600 students just exceeded the 55 percent passing rate standard, and, thus, according to our first definition of the 55 percent standard, would not require any additional spending to meet the standard. However, when we examine the TAAS passing rate data for the sub–groups, we observe that the passing rate for blacks was 7.8 percent below the overall TAAS passing rate, the rate for Hispanics was 13.4 percent the overall rate, and the rate for economically disadvantaged students was 8.9 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 sub–groups 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 equal, it will cost more than average to improve the educational performance of black, Hispanic, and economically disadvantaged students.

It is also important to emphasize that our estimates of the additional costs needed to meet the federal and state accountability standards are based on a subset of the standards. The basis of our cost estimates is student performance on the reading/language arts and mathematics exams. The TAKS accountability standards for 2005–06 also include passing standards for social studies and science examinations. In addition, there are new examination–linked standards for promotion from grades three, five, and eight, and a new 11th grade examination that 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.

IS *NO CHILD LEFT BEHIND* AN UNDER–FUNDED FEDERAL MANDATE?

According to the U.S. Department of Education, the core of its financial support for NCLB comes through the funding of Title 1, the department's grant program that is targeted to districts with disadvantaged children. In the two years since the passage of NCLB, the federal government has increased its allocations to Title 1 from

$8.2 billion in fiscal year 2002 to $11.6 billion in fiscal year 2004, an increase of 41.3 percent. The allocation of Title 1 funds to Texas during this two–year period rose at an even faster rate—47.7 percent. The increase in Title 1 funds to Texas equaled $328.8 million to a total fiscal year 2004 allocation of $1.018 billion.

A simple comparison of the $329 million two–year increase in Title 1 funds to the annual additional funds required to meet the *No Child Left Behind* adequate performance standards shown in Table 6 (ranging from $1.7 to $5.5 billion) seems to suggest 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 two years and larger than any additional federal education funds that are likely to be provided in future years.

Although in our view these numbers tell an interesting story, do they prove that (at least in Texas) NCLB is a seriously under–funded federal mandate? The answer to this question depends 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 is Texas likely to follow in the future if Congress were to eliminate the major provisions of NCLB? If the argument can be convincingly made that Texas will continue to pursue rigorous standard for the educational improvement of all its students even if NCLB were to disappear, then the claim that NCLB is forcing Texas to pursue policies that it would not otherwise pursue is undercut, and NCLB should not be considered an unfunded mandate.

On the one hand, the fact 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, suggests 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, the Governor 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 Texas, unless forced by the courts or by federal statute, will devote sufficient additional resources to public education to improve the educational performance of currently low–performing students.

The prospect of continued fiscal problems in many states throughout the country, and efforts in a number of states to place limits on property tax revenues suggests to us that most states, left on their own, would not develop the accountability systems and implement the higher education performance standards mandated by NCLB. If this assertion is correct, than we conclude that NCLB is requiring states to pursue policies that they otherwise would not pursue. These policies—namely improving the quality of education for those students who are not currently performing at adequate levels—are very expensive, and, if Texas provides a guide, the federal government is providing only a small portion of the required extra costs.

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