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The No Child Left Behind Act

Have Federal Funds Been Left Behind?

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The federal No Child Left Behind Act (NCLB) imposes new requirements on state education systems and provides additional education funding. This article estimates education cost functions, predicts the spending required to support NCLB standards, and compares this spending with the funding available through NCLB. This analysis is conducted for Kansas and Missouri, which have similar education environments but very different standards. We find that new federal funding is sufficient to support very low standards for student performance, but cannot come close to funding high standards without implausibly large increases in school-district efficiency. Because of the limited federal funding and the severe penalties in NCLB when a school does not meet its state's standards, states have a strong incentive to keep their standards low. NCLB needs to be reformed so that it will encourage high standards.

Keywords: *accountability; costs; education finance; federal aid*

1. Introduction

The No Child Left Behind Act of 2001 (NCLB) both imposes mandates on states and gives them more federal education funding. NCLB is therefore not an *un*funded mandate, but the money it provides may not be sufficient for states to fully achieve the standards it sets. Using data from Kansas and Missouri, this article estimates education cost functions,

calculates the extra costs required to meet the NCLB standards, and compares these extra costs to the increases in federal funding.

The movement toward accountability in elementary and secondary education began well before NCLB. Indeed, accountability was a major part of education reform in most states during the 1990s (Ladd 2001). By 2001, over forty states had school report cards, over half had school performance ratings, and many provided assistance or sanctions for low-performing schools (Meyer et al. 2002). When NCLB became law in January 2002, the federal government became seriously involved for the first time in setting broad parameters, implementation timelines, and sanctions for state accountability systems (Erpenbach, Forte-Fast, and Potts 2003).

With a few exceptions (Driscoll and Fleeter 2003; Imazeki and Reschovsky 2004b, 2006), however, estimates of the costs of NCLB are far from precise or complete (GAO 2003; Mathis 2003; Robelen 2005). Moreover, a few states, including Utah and Connecticut, have passed legislation to ignore provisions of NCLB that require state funding or have sued the federal government for inadequate funding (Archer 2005; Sack 2005). In a recent survey of state education officials, over two-thirds cited adequacy of federal funding for NCLB as a moderate or serious challenge that has affected their ability to assist schools not making adequate yearly progress (Center on Education Policy 2006). The decline in education grants in the President's 2008 Budget (OMB 2007) has raised additional concerns about the sufficiency of federal funding for meeting the increasing standards set by NCLB.

Building on the work of Driscoll and Fleeter (2003) and especially Imazeki and Reschovsky (2004a, 2006), this article estimates the spending by school districts that is necessary to comply with NCLB standards and compares this spending with funding provisions in Title I of NCLB. Specifically, we estimate cost functions for Kansas and Missouri, and use the results to predict the spending required to provide students the opportunity to reach NCLB standards. Because of lack of consensus on the fiscal responsibility of the federal government (Robelen 2005), we develop several alternative estimates of the Title I funding gap. Kansas and Missouri provide a particularly interesting case study, because both states share many similarities in their education environment but differ significantly in the stringency of their accountability standards. They are also states with significant diversity in school district size and demographics but have student performance and spending levels similar to the national average (NCES 2006).

2. Education Accountability and NCLB

While the merits of education accountability systems have been debated extensively in the academic literature (Ladd 2001; Hanushek and Raymond 2001), the implications of the different choices for school finance systems have received much less attention. In this section we discuss the key decisions in designing an education accountability system, the accountability design in NCLB, and the fiscal implications of accountability.

2.1 Design of Education Accountability Systems and NCLB

Education accountability is an application of performance management to education. Key choices in the design of a performance management system include: accountability for whom; accountability for what; and the consequences of success or failure. Education accountability systems focus on holding either students or school personnel (teachers and administrators) accountable. Students are held accountable for passing a certain set of classes or for reaching a certain score on specified tests. Students who fail to meet the standards may not be allowed to graduate from high school or might receive a different type of high school degree.

School or school-district accountability systems hold school personnel accountable for student performance, as measured by student test scores, graduation rates, or gains in test scores (Ladd 2001; Hanushek and Raymond 2001). Programs can differ in the extent to which they consider the impact on the standards of factors outside the control of school district personnel, such as concentrated poverty. For example, some systems set standards for a district relative to other schools with approximately the same poverty rate and enrollment.

All accountability systems require performance to be measured on a regular basis. NCLB requires states to implement math and reading exams in third through eighth grades and in at least one grade in high school by 2005–06, and science exams once in elementary, middle, and high school by 2007–08. In addition, districts are required to report participation rates on the exams and graduation rates from high school. Moreover, NCLB requires districts to collect and report assessment information by racial, socioeconomic, and special needs sub-groups.

NCLB sets as its target that *all* students reach proficiency on these measures by 2013–14. States are provided a fair amount of discretion in defining the level of performance that is ‘‘proficient’’ and in setting intermediate

performance targets for years before 2013–14. Thus, states have an incentive to set low proficiency levels and to backload required proficiency improvement (Kim and Sunderman 2004; Ryan 2003). To highlight differences in the stringency of accountability standards, figure 1 compares the intermediate targets and actual performance levels for Kansas and Missouri. In 2002, Kansas set the proficiency level for its students at about 50 percent compared to 13 percent in Missouri.[1] While for both states the average student was well above these targets through 2004, the average proficiency rate in Missouri was less than 40 percent of the rate in Kansas. Since all states must reach 100 percent proficiency by 2014, a much faster improvement in performance is required in Missouri than in Kansas.

NCLB requires states to make adequate yearly progress (AYP) until 2014. Rules for determining AYP have evolved over the last five years, and states are now allowed several paths to establishing AYP (Center on Education Policy 2006; Erpenbach, Forte-Fast, and Potts 2003). Recent changes have made determining AYP much more complex (Hoxby 2005) and can significantly reduce the performance improvement required of a school below the performance targets (Center on Education Policy 2006).

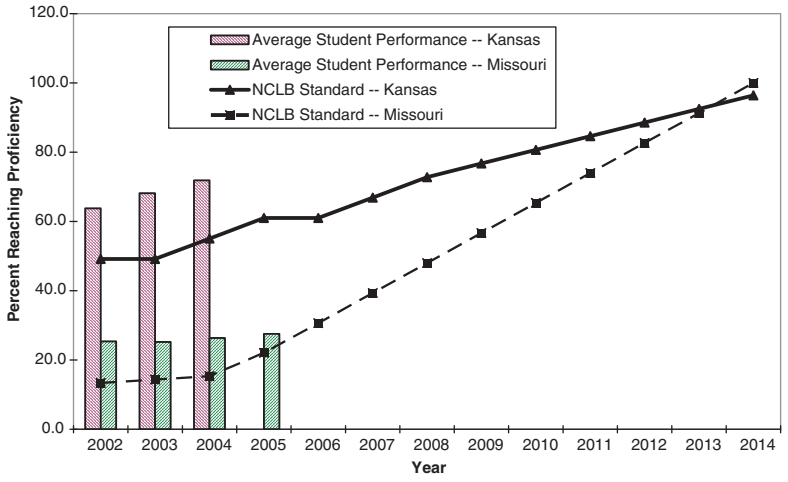
In our analysis of the funding impacts of NCLB, we use the intermediate performance targets set for each year, rather than the requirements to make AYP. First, the requirements to make AYP, which can vary significantly across states and even across schools, are difficult to duplicate. Second, these accommodations just postpone the ultimate requirement of reaching 100 percent proficiency by 2014. If schools are going to have a reasonable probability of getting close to this standard, then they need to make significant improvements in the intervening years.

The penalty component of NCLB uses high stakes and punitive consequences for schools receiving Title I funding and not making AYP.

> After two years, students in failing schools are allowed to choose another public school (including a charter school) within the same district. After three years, the students . . . can receive tutoring (at public expense) from an outside provider, public or private. Those schools that fail for four consecutive years must replace school staff, and those that fail for five years in a row must essentially surrender control to the state government, which can in turn reopen the school as a charter school, turn over management to a private company, or take over the school itself. (Ryan 2003, 10)

In 2006–07 schools faced for the first time closure or reorganization if they had not made AYP. The stringency of these sanctions is likely to create a significant response in many schools. Some of these responses, such

Figure 1
Average Student Performance Compared to NCLB Intermediate Targets in Kansas and Missouri



Sources: Kansas State Department of Education and Missouri Department of Elementary and Secondary Education.

as a focus on math and reading (Davis 2006), are likely to meet program goals, whereas others, such as test score inflation (Koretz 1996) or actual cheating (Jacob and Levitt 2003), may be undesirable.

2.2 Education Accountability and State Budgets

Several commentators have examined whether NCLB is an underfunded mandate (Peyser and Costrell 2004; Mathis 2003). Existing studies on this topic differ widely in terms of what costs are included and how these costs are calculated (Robelen 2005). The potential costs of implementing an education accountability system include the costs of the testing system, of enforcing the consequences, and of making the required changes in the school finance system.

Testing costs are relatively small and easy to calculate. Most states had math and reading exams in place before NCLB, and a few states, such as Texas, had exams from third through eighth grade. Estimates for testing costs have ranged from $5 million to $25 million (Hoxby 2002; GAO

2003; Driscoll and Fleeter 2003). The costs of enforcing NCLB sanctions are more difficult to calculate. For schools that fail, NCLB requires districts to develop school improvement plans, provide funding for supplemental services, or provide access to another school in the district. Ultimately, states may be required to reconstitute schools. NCLB also requires districts to hire only highly qualified teachers, and Driscoll and Fleeter (2003) estimate that this requirement will cost approximately forty dollars per pupil in Ohio.

The amount that state and local governments must pay to reach NCLB standards may be large, especially if standards are high, as in Missouri. Any cost calculation is bound to be controversial because scholars do not agree on several issues: how should spending needed to reach a given student performance level using current best practices be determined; what are the extra costs for reaching a performance standard in districts with a high concentration of disadvantaged students; and what is the extent to which an accountability program can boost school-district efficiency. In a recent analysis for Ohio, Driscoll and Fleeter (2003) estimate that "intervention costs" represent over 95 percent of additional costs from NCLB and average $760 per pupil. In a study of NCLB in Texas, Imazeki and Reschovsky (2006) estimate that meeting AYP associated with a passing rate of 70 percent would require $4.4 billion of additional spending, or $1,064 per pupil. National estimates of states' costs to implement NCLB range from $8 billion (Peyser and Costrell 2004) to $150 billion (Mathis 2003).

3. Costing Out NCLB

Several approaches for estimating the cost of reaching a given student performance standard have been developed (Baker 2006), and adequacy studies have been carried out in at least thirty states (Hoff 2005).[2] We use the so-called cost function method to estimate the spending required to meet NCLB standards. In this section, we discuss data and measures, present cost function results, and estimate the cost of meeting NCLB standards in Kansas and Missouri.

3.1 Data Sources and Measures

Applied to education, the term "cost" stands for the minimum spending, based on current best practices, needed for the students in a district to

reach a given performance level. Because we have data on spending, not costs, the cost function approach must control for school district efficiency; that is, we must recognize that not all districts use current best practices. To model the relationship between spending, student performance, and other important characteristics of school districts, a number of education researchers have employed one of the tools of production theory in microeconomics, namely, cost functions.[3] A cost function for school districts relates five factors to spending per pupil: student performance; the price of school resources, such as teacher salaries; the district's enrollment; student characteristics that affect educational performance, such as poverty; and factors that affect school district efficiency.

The cost function estimates in this article are based on three years of data for three pre-NCLB years (1999–2000 to 2001–2002) for school districts in Kansas and Missouri plus either two years (Kansas) or three years (Missouri) after the passage of NCLB. Most of the data are supplied by the state education departments in Missouri and Kansas. This section is organized by major category of variables, and summary statistics are reported in table 1.

District Expenditures. The dependent variable used in the cost function is inflation-adjusted district operating expenditures per pupil.[4] In Kansas, our measure includes expenditures for six functional areas: instruction, student support, instructional support, school administration, general administration, operations and maintenance, and other.[5] Our measure for Missouri is current expenditures, which excludes capital, debt service, special education, and transportation.

Student Performance. For Kansas, our measures of student performance come from the state accountability system, Quality Performance and Accreditation (QPA). We use the share of students reaching proficiency on criterion-referenced exams in math and reading in three grades (fourth, seventh, and tenth for math, and fifth, eighth, and eleventh for reading). The QPA also includes a cohort graduation rate.[6] To construct an overall measure of student performance, we calculate a simple average of these seven measures. For Missouri, the key exam scores used to assess AYP are proficiency rates for three math and three reading exams (grades third, seventh, and eleventh for communication arts, and grades fourth, eighth, and tenth for math). Our measure of performance is an average of these scores.

Table 1
Descriptive Statistics for Variables Used in Cost Models

	Kansas (2004)		Missouri (2005)	
Variables	**Mean**	**Standard Deviation**	**Mean**	**Standard Deviation**
Per pupil spending (inflation-adjusted)	$6,400	$1,200	$5,405	$1,338
Performance measure	71.8	7.9	25.6	7.2
Cost variables				
Teacher salaries (inflation-adjusted)	$36,093	$2,701	$24,282	$2,909
Percent free lunch students	26.7	11.3		
Percent subsidized lunch students			46.1	16.0
Poverty variable multiplied by pupil density	5.1	22.5	16.6	70.9
Adjusted percent bilingual headcount	4.2	7.4		
Enrollment	1485.5	3834.2	1670.7	3568.4
Enrollment categories (share of districts in each category)				
Under 100 students	0.013	0.115	0.050	0.219
100 to 150 students	0.040	0.197	0.047	0.211
150 to 250 students	0.110	0.314	0.132	0.339
250 to 500 students	0.301	0.459	0.203	0.403
500 to 1,000 students	0.254	0.436	0.238	0.427
1,000 to 1,500 students	0.087	0.282	0.093	0.291
1,500 to 2,500 students	0.087	0.282	0.089	0.285
2,500 to 5,000 students	0.060	0.238	0.085	0.285
5,000 to 15,000 students	0.030	0.171	0.041	0.198
Over 15,000 students	0.017	0.128	0.021	0.145
Efficiency-related variables				
Per pupil income	$87,950	$31,021	$63,962	$35,112
Per pupil property values	$57,065	$43,629	$61,631	$41,074
State aid ratio	0.08	0.10	0.06	0.06
Local tax share	1.62	0.88	1.23	0.49
College education variable (2000)	17.97	6.75	13.11	8.05
Percent of population 65 or older (2000)	16.84	5.47	15.19	4.25
Percent of housing units that are owner occupied (2000)	88.59	5.66	77.28	8.02
Sample Size	299		516	

Note: State aid variable is per pupil state aid divided by per pupil income. For Kansas, this variable also includes federal aid. Teacher salaries in Kansas are estimated for teacher with average experience and in Missouri based on teachers with five years or less of experience. Inflation adjustment is using the CPI for urban wage earners (2000 base).

Student Enrollment. For Kansas we use the enrollment measure in the General State Aid formula, namely, fulltime equivalent students (FTE). This measure equals total enrollment from first to twelfth grades plus half of total enrollment in kindergarten and pre-kindergarten programs. For Missouri we construct a rough measure of average daily membership by averaging enrollment in September and January.

Student Need. Cost functions usually include student need measures for child poverty, limited English proficiency (LEP), and special education. The poverty measures used most often in state aid formulas are the percent of students receiving a free lunch (Kansas) or a subsidized lunch (Missouri). While the reliability of these measures has been challenged, especially for secondary students, they generally track closely with the child poverty rate produced by the Census Bureau.[7] Some national evidence suggests that student performance is significantly worse in high-poverty inner city schools than in high-poverty rural schools (Olson and Jerald 1998). To explore this possibility, we create another variable, namely, the percent free (or subsidized) lunch students multiplied by pupils per square mile, a measure of urbanization.

We do not have a consistent source of LEP data across states or even across school districts within some states. In Missouri, LEP measures are not used in the state aid formula, and consistent data are not collected. An alternative variable from the Census is the percent of students who live in a household where English is not spoken well at home, which is consistently lower than LEP rates calculated by states. This variable was not statistically significant and was dropped. In Kansas, the LEP measure in the state aid formula is flawed, so we use data on the bilingual headcount reported to Kansas State Department of Education.

Measures of special education students are problematic because of the potential for over-classification of special education students to increase state aid (Cullen 2003). To avoid this potential endogeneity, we remove spending on special education from our dependent variable and do not include the share of special education students as an explanatory variable.

Teacher Salaries. Teacher salary is the most important resource price affecting school district spending. In addition, teacher salaries are highly correlated with salaries of other certified staff, so that teacher salaries serve as a proxy for all staff salaries. To develop a comparable salary measure across districts, data on individual teachers are used to predict what teacher salaries would be in each district if teachers had average experience and education.[8]

Efficiency Indicators. Some school districts may have higher spending than others relative to their level of student achievement not because of higher costs, but because of inefficient use of resources. In our cost analysis, as in any other, this inefficiency can take two forms, which cannot be separated. First, some districts may be inefficient because they do not use current best practices. Examples of this type of inefficiency include poor management practices or excess compensation for school officials. Second, some districts may choose to focus on subject areas, such as art, music, and athletics, with a limited impact on test score performance in math and reading or on the graduation rate. As in any other study of production and cost, inefficiency can only be defined with respect to the production of certain, specified outputs. Once measures of student achievement have been selected, additional spending by a district relative to the spending by comparable districts with the same achievement levels by those measures is an indication of inefficiency.

Because efficiency cannot be measured directly, we include in the cost model variables that have a conceptual link to efficiency and that have been found to be significant in previous cost/efficiency studies. These variables include fiscal capacity and factors affecting voter involvement in monitoring local government. Research on New York indicates that taxpayers in districts with high property wealth, income, and state aid may have less incentive to put pressure on district officials to be efficient or may be more apt to spend money on non-tested subjects (Duncombe and Yinger 2000). In addition, voters might have more incentive and capacity to monitor operations in school districts with relatively more college-educated adults, more elderly residents, a larger share of households that own their own homes, or where the typical voter pays a larger share of school taxes (median housing price over per pupil property values).

3.2 Cost Function Estimates

The cost function for school districts in Kansas and Missouri are estimated using log-linear multiple regression techniques. Because spending, performance, and salaries may be set simultaneously in the budgeting process, we treat student performance and teacher salaries as endogenous variables using an instrumental variable method (two-stage least squares).[9] Hypothesis testing is done with robust standard errors (controlling for district-level clustering).

The cost function results in table 2 indicate that the relationships between the different variables and per pupil spending fit expectations and

Table 2
Cost Function Estimates for Kansas and Missouri School Districts

Variables	Kansas (2000-04)		Missouri (2000-05)	
Intercept	−2.11360		−7.00420	**
Performance measure	0.50124	**	0.36817	*
Cost variables				
Teacher salaries	0.67969	**	1.25667	*
Percent free lunch students	0.00435	*		
Percent subsidized lunch students			0.00549	*
Poverty variable multiplied by pupil density	0.00055		0.00000	*
Adjusted percent bilingual headcount	0.00158	**		
K12 districts (1 = yes)			0.11902	*
Consolidated districts (1 = yes)	0.21058	*		
Enrollment categories				
100 to 150 students	−0.12166	*	−0.15733	*
150 to 250 students	−0.22828	*	−0.32205	*
250 to 500 students	−0.36138	*	−0.47308	*
500 to 1,000 students	−0.42874	*	−0.59449	*
1,000 to 1,500 students	−0.50830	*	−0.67928	*
1,500 to 2,500 students	−0.56852	*	−0.75076	*
2,500 to 5,000 students	−0.56608	*	−0.82422	*
5,000 to 15,000 students	−0.51823	*	−0.84564	*
Over 15,000 students	−0.62161	*	−0.81584	*
Efficiency-related variables				
Per pupil income	0.13505	*	0.19209	*
Per pupil property values	0.05599	*	−0.00735	
Total aid/income ratio	0.78701	*	1.23551	*
Local tax share	−0.02146		−0.09089	*
Percent of adults that are college educated (2000)	−0.00423	*	0.24879	
Percent of population 65 or older (2000)	−0.00209		−0.37339	**
Percent of housing units that are owner occupied (2000)	−0.00145		−0.16346	
Year indicator variables				
2001	−0.01176		−0.00095	
2002	−0.00464		−0.01005	
2003	−0.04626		−0.02675	
2004	−0.08047		−0.05696	*
2005			−0.04433	
Sample Size	1463		3068	

Note: Estimated with linear 2SLS regression with the log of per pupil operating spending (Kansas) or current spending (Missouri) as the dependent variables. Performance and teacher salaries are treated as endogenous variables with instruments based on variables for adjacent counties for Kansas, and for labor market areas for Missouri (see text). Robust standard errors are used for hypothesis testing (controlling for clustering at district level). The performance index, teacher salaries, per pupil income, per pupil property values, and local tax share are logged. * indicates statistically significant from zero at 5% level. ** indicates statistically significant from zero at 10% level.

are generally statistically significant. To start, a 1 percent increase in student performance is associated with a 0.50 percent increase in per pupil expenditures in Kansas, and a 0.37 percent increase in Missouri.

Turning to the cost variables, we find that a 1 percent increase in teacher salaries is associated with a 0.68 percent increase in per pupil expenditures in Kansas and a 1.25 percent increase in Missouri. The coefficients on the poverty variables and the bilingual variable for Kansas have the expected positive sign and are statistically significant, but the coefficient on the density-poverty interaction is not significant at conventional levels. In the case of Missouri, the subsidized lunch and its interaction with density are both statistically significant with the expected sign. These results correspond to an average poverty weight, defined as the percent increase in spending for a child in poverty, of fifty-five in Kansas and sixty-four in Missouri, with higher weights in central cities. Weights of this type often appear in state aid formulas (Duncombe and Yinger 2005a). The implied weight for a bilingual student in Kansas is sixteen.

As expected, the operating costs are higher for smaller school districts. School districts in Kansas with 100 or fewer students (the omitted category) are almost 57 percent more expensive to operate than districts with 1,500 to 5,000 students, and in Missouri they are 82 percent more expensive than districts with 2,500 to 5,000 students (table 3). For both states, economies of scale are largely exhausted by the time a district reaches about 2,500 pupils.

Several efficiency variables also prove to be important. Income and state aid have the expected positive sign and are statistically significant in both states. As expected, the tax-share variable has a negative coefficient in both states, but it is significant only in Missouri. In addition, our results suggest that efficiency in Kansas declines with property values and increases with the share of adults who have a college education and that efficiency in Missouri increases with the share of adults who are age sixty-five or older.

The year dummy variables capture changes in spending over time holding student performance and cost factors constant. One possible interpretation of these variables is that they capture changes in efficiency in the average school district. In both states, we find that spending decreases with time, a sign of increasing efficiency. This decrease is 8 percent in Kansas over a four-year period, which corresponds to an efficiency improvement of about 2 percent per year (with compounding), and 4.4 percent in Missouri over a five-year period, which corresponds to an annual efficiency improvement of 0.9 percent. These year variables are

Table 3
Per Pupil Spending Increases Required to Support a Particular NCLB Standard by Census District Types

	Actual Expenditures Per Pupil	Percent Increase in Predicted Spending to Reach NCLB Standard in		
		2007	2009	2011
Kansas				
Total state	$6,118	−1.9	5.0	10.3
Census district type				
Large central cities	$6,112	8.7	16.4	22.3
Medium cities	$6,079	−7.5	−0.9	4.0
Urban fringe of large cities	$5,535	−7.1	−0.5	4.5
Urban fringe of medium cities	$5,615	−5.9	0.8	5.9
Large town	$6,456	0.1	7.2	12.6
Small town	$6,105	−0.9	6.2	11.5
Rural metro	$7,029	−3.5	3.3	8.5
Rural non-metro	$5,901	−5.4	1.3	6.4
Missouri				
Total state	$6,248	18.5	35.5	49.5
Census district type				
Large central cities	$8,742	61.0	84.1	103.2
Medium cities	$5,873	10.8	26.8	39.9
Urban fringe of large cities	$6,813	9.4	25.1	38.0
Urban fringe of medium cities	$4,720	10.8	26.7	39.8
Large town	$5,399	11.8	27.8	41.0
Small town	$5,446	18.0	35.0	48.9
Rural metro	$5,328	11.7	27.7	40.9
Rural non-metro	$5,653	19.3	36.4	50.5

Note: Actual expenditures per pupil are for operating spending in Kansas for 2004, and for current expenditures in Missouri for 2005 in nominal dollars, calculated as student weighted averages.

not statistically significant, however, so this is only weak evidence of efficiency gains.

These cost results can be translated into cost indexes, which indicate how much more a district needs to spend than the average district to reach the same performance level (Duncombe and Yinger 2005a). In Kansas and Missouri, large central cities have the highest costs because of both high poverty and above-average wage costs. We estimate that to reach the same performance standard as the average district, these cities would need to spend nine percent more in Kansas and twenty percent more in

Missouri. Costs in some rural districts (rural metro in Kansas and rural non-metro in Missouri) are about 7 percent more than in the average district, due primarily to their small size. The lowest costs are in suburban districts (urban fringe or medium cities), because of below-average poverty and economies of size.

3.3 Predicting the Cost to Meet NCLB Standards

The cost function results can be used to estimate the amount each school district must spend to reach a given performance standard, holding its efficiency constant at its current level. We estimate the spending required to meet intermediate NCLB targets in 2007, 2009, and 2011. Table 3 reports required spending increases by Census district type, based on the standards set by Kansas and Missouri and our estimated cost functions.

A comparison of the required spending increases highlights the difference in standards between the two states. To meet 2007 NCLB standards, spending in the average district (weighted by enrollment) will not have to increase at all in Kansas but will have to increase 18.5 percent in Missouri. By 2011, the spending increase in Kansas would need to be 10 percent compared to 50 percent in Missouri. In both states, the estimated required spending increases for the large central cities are particularly high.[10] These increases range from 9 percent in 2007 to 22 percent in 2011 in Kansas and from 61 percent in 2007 to 103 percent in 2011 in Missouri. In Kansas, rural districts are favored in the formula (Duncombe and Yinger 2005b), so they do not need a spending increase, on average, to reach 2007 standards, and need only a 6 percent to 9 percent increase to meet the 2011 standards. In contrast, the Missouri aid formula does not make significant adjustments for economies of size, and the projected spending increase to meet the 2011 standards in rural districts ranges from 41 to 51 percent.

4. Determining Whether NCLB Is Under-Funded

Title I has been the principal federal compensatory aid program for four decades. In this section, we examine whether NCLB is under-funded.

4.1 Determining Whether NCLB Is Under-Funded

The issue of under-funding depends largely on the federal responsibility for funding the accountability provisions of NCLB. While testing and administrative costs associated with NCLB are not inconsequential, they

are relatively small. Costs associated with providing students the services and support to meet the higher standards are potentially much larger, and their magnitude depend on the efficiency improvements generated by NCLB. To our knowledge only two studies have done detailed estimates of costs of meeting NCLB performance standards (Driscoll and Fleeter 2003; Imazeki and Reschovsky 2006).

The federal responsibility with regard to funding NCLB is a matter of debate. Section 9527(a) of NCLB can be interpreted as protecting states and districts from implementing any provisions of NCLB that are unfunded.

> Nothing in this title shall be construed to authorize an officer or employee of the Federal Government to mandate, direct, or control a State, local educational agency, or school's curriculum, program or instruction, or allocation of State or local resources, or mandate a State or any subdivision thereof to spend any funds or incur any costs not paid for under this act.

A group of school districts and the State of Connecticut have filed suits arguing that this provision prevents the U.S. Department of Education (DOE) from requiring compliance with NCLB requirements that are not fully funded by federal aid (Hendrie 2005). In contrast, DOE argues, in part, that states bear the primary responsibility for funding education and that they can avoid NCLB requirements by declining federal aid to education. Title I was designed only to supplement state compensatory education, says DOE, and the federal government has no obligation to fully fund the costs of meeting these requirements.[11]

While courts may ultimately decide the issue, we build on the cost-function approach of Imazeki and Reschovsky (2006) to examine four scenarios with regard to the fiscal responsibility of the federal government. Assuming broad federal responsibility, Title I funds can be compared to the projected spending to meet NCLB standards. Narrowing the focus to only the post-NCLB responsibility, the increase in Title I funds since 2001 can be compared to the increase in spending associated with the higher performance standards. If Title I is viewed as just a compensatory education program, Title I funds could be compared to costs associated with bringing low-income children up to the standard. Finally, the increase in Title I funds could be compared to the increase in costs associated with raising performance of low-income children from their current levels up to NCLB standards in a particular year.

Tables 4 and 5 provide estimates of the four scenarios. We assume no increase in real dollars in Title I funding after 2005, based on the

(text continues on page 400)

Table 4
Title I Aid in 2005 as a Share of Required Spending, Spending Increase, and Spending to Support Poverty in Kansas School Districts

	NCLB Standard in					
	2007		2009		2011	
	Title I as Percent of Required Spending					
Total state	3.0		2.8		2.6	
Census district type						
Large central cities	5.9		5.5		5.2	
Medium cities	2.3		2.2		2.1	
Urban fringe of large cities	2.2		2.1		2.0	
Urban fringe of medium cities	2.0		1.9		1.8	
Large town	4.5		4.2		4.0	
Small town	3.7		3.5		3.3	
Rural metro	3.1		2.9		2.8	
Rural non-metro	2.0		1.8		1.7	
	Title I Increase as Percent of Required Spending Increase					
Total state	65.2	(33.4)	27.3	(71.3)	20.9	(88.7)
Census district type						
Large central cities	50.3	(100.0)	16.4	(100.0)	11.4	(100.0)
Medium cities	15.4	(33.3)	55.5	(66.7)	11.2	(66.7)
Urban fringe of large cities	47.5	(34.8)	12.0	(60.9)	8.5	(87.0)
Urban fringe of medium cities	27.2	(20.0)	39.2	(80.0)	26.0	(100.0)
Large town	105.1	(50.0)	21.9	(83.3)	14.8	(100.0)
Small town	135.6	(42.9)	22.5	(73.8)	34.5	(90.5)
Rural metro	45.4	(30.4)	32.7	(70.8)	22.0	(86.3)
Rural non-metro	55.5	(30.0)	18.8	(72.0)	12.8	(94.0)

(continued)

Table 4 (continued)

	NCLB Standard in					
	2007		2009		2011	
	Title I as Percent of Spending Required to Support Children in Poverty					
Total state	8.3		7.8		7.4	
Census district type						
Large central cities	8.0		7.4		7.1	
Medium cities	8.9		8.3		7.9	
Urban fringe of large cities	7.9		7.4		7.0	
Urban fringe of medium cities	7.6		7.1		6.8	
Large town	8.9		8.3		7.9	
Small town	8.9		8.3		7.9	
Rural metro	8.5		7.9		7.5	
Rural non-metro	7.6		7.1		6.8	
	Title I Change as Percent of Required Spending Increase to Support Children in Poverty					
Total state	725.4	(29.6)	119.5	(75.7)	60.5	(96.6)
Census district type						
Large central cities	34.3	(100.0)	18.0	(100.0)	13.4	(100.0)
Medium cities	27.9	(33.3)	96.1	(66.7)	691.2	(100.0)
Urban fringe of large cities	6390.6	(30.4)	62.0	(73.9)	44.4	(91.3)
Urban fringe of medium cities	70.7	(20.0)	36.2	(60.0)	18.7	(80.0)
Large town	134.9	(50.0)	38.1	(83.3)	26.7	(100.0)
Small town	570.4	(35.7)	78.5	(78.6)	62.8	(100.0)
Rural metro	96.0	(27.3)	129.5	(75.8)	55.0	(96.3)
Rural non-metro	383.9	(26.0)	177.1	(74.0)	54.5	(98.0)

Note: Calculated as simple district averages. The share of districts needing extra funds is in parentheses.

Table 5
Title I Aid in 2005 as a Share of Required Spending, Spending Increase, and Spending to Support Poverty in Missouri School Districts

Census District Type	NCLB Standard in 2007		NCLB Standard in 2009		NCLB Standard in 2011	
	Title I as Percent of Required Spending					
Total state	4.1		3.6		3.3	
Census district type						
Large central cities	2.7		2.4		2.2	
Medium cities	2.6		2.3		2.1	
Urban fringe of large cities	2.2		2.0		1.8	
Urban fringe of medium cities	3.0		2.6		2.4	
Large town	2.5		2.2		2.0	
Small town	4.4		3.9		3.5	
Rural metro	2.7		2.4		2.2	
Rural non-metro	4.8		4.2		3.8	
	Title I Increase as Percent of Required Spending Increase					
Total state	13.9	(93.4)	6.4	(99.0)	8.0	(100.0)
Census district type						
Large central cities	2.9	(100.0)	2.1	(100.0)	1.7	(100.0)
Medium cities	9.1	(100.0)	3.0	(100.0)	2.0	(100.0)
Urban fringe of large cities	8.7	(83.1)	5.1	(94.9)	34.9	(100.0)
Urban fringe of medium cities	15.6	(91.7)	3.5	(100.0)	2.3	(100.0)
Large town	3.1	(66.7)	6.2	(100.0)	3.6	(100.0)
Small town	10.7	(93.0)	5.6	(100.0)	3.7	(100.0)
Rural metro	7.4	(93.8)	3.8	(100.0)	2.6	(100.0)
Rural non-metro	17.2	(95.6)	7.6	(99.3)	5.3	(100.0)

(continued)

Table 5 (continued)

Census District Type	NCLB Standard in 2007		NCLB Standard in 2009		NCLB Standard in 2011	
	Title I as Percent of Spending Required to Support Children in Poverty					
Total state	6.6		5.7		5.2	
Census district type						
Large central cities	3.2		2.8		2.5	
Medium cities	4.7		4.1		3.7	
Urban fringe of large cities	5.0		4.4		4.0	
Urban fringe of medium cities	5.8		5.1		4.6	
Large town	5.3		4.6		4.2	
Small town	7.0		6.1		5.5	
Rural metro	5.4		4.8		4.3	
Rural non-metro	7.2		6.3		5.7	
	Title I Change as Percent of Required Spending Increase to Support Children in Poverty					
Total state	32.4	(96.9)	10.2	(100.0)	6.7	(100.0)
Census district type						
Large central cities	3.5	(100.0)	2.5	(100.0)	2.0	(100.0)
Medium cities	23.8	(100.0)	6.2	(100.0)	3.9	(100.0)
Urban fringe of large cities	25.4	(86.4)	11.9	(100.0)	6.5	(100.0)
Urban fringe of medium cities	36.3	(100.0)	6.9	(100.0)	4.7	(100.0)
Large town	42.0	(100.0)	9.8	(100.0)	6.2	(100.0)
Small town	22.8	(100.0)	8.4	(100.0)	5.9	(100.0)
Rural metro	22.5	(100.0)	6.6	(100.0)	4.6	(100.0)
Rural non-metro	38.6	(97.3)	11.3	(100.0)	7.6	(100.0)

Note: Calculated as simple district averages. The share of districts needing extra funds is in parentheses.

relatively small increases in Title I funding in 2007 and in the President's 2008 Budget (OMB 2007). For the second and fourth scenarios, some districts already spend enough to meet the new standards, so we also indicate (in parentheses) the share of districts needing extra Title I funds.

If the federal fiscal responsibility is to fund a significant share of the spending required to meet NCLB standards, then Title I funding is inadequate in both Kansas and Missouri. Title I funds as a percent of projected spending range from 3 percent (2007) to 2.6 percent (2011) in Kansas and 4.1 percent to 3.3 percent in Missouri (first panel of tables 4 and 5). Title I funding covers a larger share of spending in large central cities in Kansas, but still represents a small fraction of the estimated spending to meet NCLB standards.

If the increase in Title I funds since 2001 is compared to the increase in spending to move to NCLB standards in 2007, 2009, or 2011, the Title I funding shares are considerably higher (second panel). In Kansas, this share is 65.2 percent in 2007 but drops to 20.9 percent in 2011. The comparable shares in Missouri are 14 percent and 8 percent. The highest shares are for the large and small towns in Kansas, where the increase in Title I funds provides more than enough money to meet 2007 standards, on average. Even for these districts, however, the Title I funding share is below 35 percent by 2011.

An alternative way to look at federal responsibility is to focus on the compensatory education objective of Title I. The third panel compares Title I funds to the total spending needed to bring low-income students up to a given standard. The share of compensatory education costs covered by Title I funds is only about eight percent in Kansas in all three years and between five and six percent in Missouri. Increases in Title I cover a larger share of the added spending districts must make to support low-income children. As shown in the fourth panel the increase in Title I in Kansas more than covers the added costs of disadvantaged students in 2007 and 2009, but by 2011 Title I's share drops to 60.5 percent. In Missouri, with its higher standards, Title I covers 32.4 percent of these added expenses in 2007, but this percentage declines to 6.7 by 2011.

4.2 School-District Efficiency Increases Required to Meet NCLB Standards

If the new federal funds provided through Title I are not sufficient to bring a district up to the NCLB standards, then school officials can reach these standards either by becoming more efficient or by receiving

additional revenue from the property tax or state aid. To obtain additional perspective on NCLB, we now examine the increase in efficiency that is required for school districts to reach the NCLB standards after accounting for their increased federal aid.

Recall that spending equals costs divided by efficiency. We can observe current spending, and we can forecast the spending required to meet a NCLB standard assuming efficiency does not change. Then we can calculate the percentage change in efficiency that is required to bring spending required to meet the NCLB standard down to the sum of current spending plus the increase in Title I funding.[12]

Because the Kansas NCLB standards are low, the required efficiency improvement in Kansas also is relatively low. The average district would not have to improve its efficiency at all to reach the 2007 standard in Kansas, and the required efficiency improvement is 2.7 percent to reach the 2009 target and 7.9 percent to reach the 2011 target. As discussed earlier, we find some weak evidence that, in the average district, efficiency increased about 2 percent per year between 2000 and 2004. If efficiency improvements at this rate were to continue, it would take another four years, that is, until 2008, to reach the efficiency level required for the 2011 standards. These optimistic assumptions do not bring all districts up to the standard, however. We find that 10 percent of school districts could not reach even Kansas's low 2011 standard without an increase in efficiency of 18 percent or more.

Because of Missouri's relatively high NCLB standards, efficiency in the average district would have to increase 19.4 percent to meet the 2007 standard, 36.6 percent to meet the 2009 standard, and 50.8 percent to meet the 2011 standard. Our cost model finds possible efficiency improvements in Missouri from 2000 to 2005 but they are very small, less than 1 percent per year, and are not statistically significant. Moreover, in Missouri, as in Kansas, we estimate that 25 percent of districts could not reach the 2011 standard without an efficiency boost of at least 63.7 percent, and 10 percent could not reach this standard without a boost of 80 percent or more. There is no evidence that increases of this magnitude are possible.

5. Conclusions and Policy Recommendations

With the passage of the No Child Left Behind Act, the federal government became seriously involved for the first time in regulating state accountability systems. This article uses education cost functions to estimate the

spending required to support NCLB standards in Kansas and Missouri and compares this spending with the funding available through NCLB.

We find that the increase in Title I aid falls far short of the spending increases required to meet 2011 state NCLB standards. In fact, this aid covers only 20.9 percent of the required increase in spending per pupil in Kansas and only 8 percent in Missouri. We also find that the increase in Title I does not fully cover the added costs associated with helping children in poverty. Based on the 2011 state NCLB standards, the Title I increase covers 60.5 percent of these additional costs in Kansas and only 6.7 percent of these costs in Missouri. Even unprecedented improvements in school district efficiency would not close these large gaps.

Our results differ for Kansas and Missouri largely because Kansas has a much lower standard for student performance. Thus, NCLB creates an unpleasant choice for states: avoid the NCLB sanctions by setting low standards for student performance or avoid NCLB sanctions by setting high standards and significantly raising state and/or local taxes to ensure that these standards can be reached. The severity of the NCLB sanctions therefore undermines the approach many states, including Missouri, were using before NCLB, namely, to set high standards and to phase them in, using relatively weak sanctions, over a long period of time.

The impact of these incentives can be seen in Missouri, where in January 2006 the Missouri State Board of Education approved new cut-offs for the state tests that ''should result in more students scoring at the 'proficient' and 'advanced' levels'' (Missouri Department of Elementary and Secondary Education, MDESE, 2006). In 2005, 30 percent of students reached proficiency in reading and 25 percent in math; under the new standards these percentages are expected to rise to 44 and 43 percent, respectively.

Thus, the problem with NCLB is not that it is an under-funded mandate. A state can meet the NCLB mandates with existing Title I funds if it sets student-performance standards low enough. Instead, the problem with NCLB is that it gives states a strong incentive to dumb their standards down. This incentive undermines the main purpose of NCLB, which is ''to ensure that all children have a fair, equal, and significant opportunity to obtain a *high-quality* education and reach, at a minimum, proficiency on *challenging* State academic achievement standards and state academic assessments'' (NCLB, Section 1001; emphasis added). This perverse incentive could be eliminated, of course, by more federal funds, so it is accurate to say that NCLB does not provide the funding needed to meet its own objectives. Because NCLB does not actually set standards, however, we cannot measure the degree to which it is under-funded in this sense.

Any re-authorization of NCLB should remove the perverse incentive at the heart of the current legislation. States should not be rewarded, in the sense of avoiding NCLB sanctions, for setting low standards. One possibility is to calibrate state standards based on their correlation with National Assessment of Education Progress test scores, the only national tests currently available for a random sample of students in each state. More specifically, a revised NCLB could give the Secretary of Education authority to rank state standards and establish a process that would allow states to appeal their rank. States with stricter standards could then be given either more funding or lower sanctions when they fail to meet their standards.

Another possible reform in NCLB is to weaken the sanctions considerably so that no state is pushed to lower its standards. This is, of course, what NCLB already does in the short run by basing sanctions on a flexible definition of AYP. The current system only postpones the day of reckoning, however, because states are still expected to bring all their schools up to their specified standards by 2014. Shifting to a simplified version of AYP as the ultimate target would lessen the pressure for high-standard states to lower their standards.

NCLB also does not adequately recognize the high costs of educating disadvantaged students. There is some irony here because Title I is an act dedicated to "improving the academic achievement of the disadvantaged." Nevertheless, we find that the extra funds provided by NCLB would be insufficient to meet the educational needs of low-income students even if they were exclusively devoted to these students, which they are not. Moreover, the use of sub-groups increases the chance that schools serving disadvantaged students will fail (Kim and Sunderman 2004). Although the objective of these requirements, namely, to ensure that all children are brought up to the standards, is laudable, their consequence is that schools serving disadvantaged students face some perverse incentives (Ryan 2003) and are more likely than other schools to be sanctioned for reasons outside their control. To avoid this unfair situation, NCLB needs to increase the extent to which its funds are directed toward disadvantaged students and/or reward states that provide the additional funds that schools with disadvantaged students require.

Notes

1. The NCLB standards in figure 1 are average proficiency rates on three math and three readings exams. Kansas also uses a graduation rate standard of 75 percent, which is why the

combined index is less than 100 percent. Both states also include participation rates in exams and attendance rates in their standards, but we ignore these rates because they are already high in most districts.

2. Cost functions are criticized by Hanushek (2005) and defended by Baker (2006) and Duncombe (2006). Hanushek's (2005) claim that cost-functions ignore efficiency is belied by the efficiency corrections in Duncombe and Yinger (2000, 2005a), Duncombe, Lukemeyer, and Yinger (2003), and Imazeki and Reschovsky (2004a).

3. Cost function studies have been conducted in other states, including New York (Duncombe and Yinger 2000, 2005a; Duncombe, Lukemeyer, and Yinger 2003), Arizona (Downes and Pogue 1994), Texas (Imazeki and Reschovsky 2004a, 2004b, 2006; Gronberg et al. 2004), and Wisconsin (Reschovsky and Imazeki 1998).

4. The measure of inflation is the CPI for urban wage earners, with a base-year of 2000.

5. Spending on special education, transportation, vocational education, food service, and school facilities is excluded. Details are discussed in Duncombe and Yinger (2005b).

6. The graduation rate equals the number of graduates in a given year divided by total graduates plus dropouts in this year and the three previous years.

7. The correlation between the share free lunch (Kansas) or subsidized lunch (Missouri) and the Census child poverty rate in 2000 is about 0.70 for both states.

8. Specifically, the natural logarithm of a teacher's salary is regressed on the logarithm of their total experience and indicator variables (0–1) for whether they had a master's, doctorate, or law degree (Kansas) or had a graduate degree (Missouri). Teacher salaries are also inflation-adjusted.

9. In both states, the instrument for salaries is an index of private wages in the district's labor market. Other instruments in Kansas are based on averages (of test proficiency rate, percent real property, log of teacher salaries) or maximums (graduation rate, per pupil personal property, and per pupil total value) in districts in neighboring counties, and in Missouri are averages for districts in the same labor market area (enrollment, percent African American students, and percent Hispanic students). Our instruments pass tests for overidentification (Wooldridge 2003) and generally pass a weak instrument test (Bound, Jaeger, and Baker 1995). The instruments for the outcome variable for Kansas have a fairly low partial F-statistic (3.3), but the F-statistic is statistically different from zero at conventional levels.

10. The Census classification for the large central cities was modified to include only the cities with above-average costs (St. Louis, Kansas City, Hickman Mills, and Center). The other districts (Park Hill and Northern Kansas City) are included in the category for medium cities.

11. The suits are *Pontiac School District v. Spellings,* Case No. 2:05-CV-71535 (E. D. Mich 2005); *Connecticut v. Spellings,* Case No. 3:05-CV-1330 (D. Conn 2005). As of this writing, the district court ruled against the school districts in *Pontiac S.D.* They have appealed.

12. Current spending, E(S), equals cost to meet current performance, C(S), divided by efficiency, e, which has a maximum of 1.0. Now let C(S*) be the cost required to meet a standard, S*. Then at the current efficiency level, spending required to meet the standard is $C(S^*)/e = E(S^*)$, which we can forecast based on our cost model. Let T be the increase in Title I funding. Then we want to solve for a new efficiency level, e^*, at which $[C(S^*)\text{-}T]/e^* = E(S)$. Now $C(S^*)/e^* = [C(S^*)/e]\ [e/e^*] = E(S^*)[e/e^*]$. So $e^* = [E(S^*)e\text{—}T]/E(S)$. We report $(e^*\text{-}e)/e$ in the text.

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