

Gannon et al. vs. State of Kansas

Eric A. Hanushek

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The recent lawsuit on spending in Kansas raises a number of issues and suggests that, as a matter of the state constitution and of educational policy, the state should increase its level of spending on the public schools. This report provides factual information that will help the court in understanding both the issues and the likely outcomes of any court intervention.

The report is based on my experience in research and policy analysis relevant to K-12 education in the United States. This research has spanned over four decades and has addressed the key issues in this case. My background can be seen in the curriculum vitae that is attached as an appendix to this report.

Student Performance

The primary fact that is relevant to these discussions is that the Kansas schools are doing quite well. As shown in Exhibit 1, in comparison to all other states, students in the fourth grade ranked seventh in the nation in mathematics.¹ These comparisons come from the National Assessment of Educational Progress, or NAEP, in 2011. The NAEP is an assessment of student achievement conducted regularly by the U.S. government. It is often referred to as the "Nation's report card", because it provides valid comparisons of the learning of students in different states. Kansas eighth graders also rank in the top quarter of the nation as seen in Exhibit 2.

Exhibits 3 and 4 show that the state does even better in educating disadvantaged students. The students who are eligible for free or reduced price lunch are fourth in the nation among their peers in fourth grade mathematics and eighth in the nation in eighth grade math.

Similar strong performance is seen in reading, displayed in Exhibits 5-8. Kansas students do relatively well on reading assessments and disadvantaged students are particularly well-served – systematically ranking even better nationally than more advantaged students.

Spending

A second component of the good performance of Kansas is that it gets these top rankings in achievement while spending less than the national average (Exhibit 9). While some people appear to argue that it is a problem that Kansas spends below the majority of states, this is of course a very strange argument. The best situation is one where there was high achievement with low public spending on schools. (An alternative argument is that "if we could just raise funding, achievement could be even better." This is shown to be a doubtful proposition below).

Although consistent spending data are available only through 2009, Exhibit 10 shows that Kansas has had a greater growth in spending over the decade of the 2000s. Kansas had slightly lower growth in real school spending during the 1990s (compared to the national average), but it increased its spending growth in the 2000's when the rest of the nation cut back.

It is not possible with available data to judge how Kansas and the other states adjusted to the recession of 2008. It appears that most states reacted to the recession in a similar way – cutting overall

¹ All charts follow the text of the report. Numbers of exhibits are found in the bottom right hand corner.

state spending noticeably but ensuring that the share of funding cuts borne by the schools was minimized. Few states nationally, however, found it possible to continue the growth in school spending during and after the recession when state revenues declined precipitously.

Standards and Student Outcomes

Currently there is considerable attention to developing new standards for what should be achieved by students. There are several arguments wrapped together in these discussions. First, each state has developed its own set of standards on what students should know at each grade and in each subject. This development was required by federal accountability regulations under No Child Left Behind (NCLB) if the state did not already have sufficiently well-developed standards. Second, a variety of people have been concerned that the states standards were not demanding enough. They particularly were concerned that the state standards would not lead to people who were college and career ready. This concern led many to re-evaluate the standards in the different states. Third, NCLB required each state to develop an assessment that measured performance compared to the state's learning standards. Fourth, NCLB required each state to choose a particular level of learning – referred to as a cut score – under the standards that corresponded to “proficient.” In other words states would set a bar that would meet requirements in NCLB, even though this bar may have little to do with the true expectations of the state for learning as contained in the learning standards.

In the last few years, there has been a movement by a vast majority of states to agree on common standards, often called the common core. While these have not been fully developed and while the corresponding assessments for these have yet to be constructed, states are anticipating a move to these standards.

The entire range of issues in this area has confused some, in part because media and lay people often do not understand the distinctions and simply refer to each of the elements (learning standards, assessments, and cut scores) as educational standards. The reality is that neither cut scores nor standards have historically had anything to do with actual student performance.

In order to see this, it is possible to compare state-by-state measures of the different elements. On the one hand, there are different independent ratings of the quality of the learning standards along with the assessments. The most comprehensive is probably that of Education Week (2012). They have developed a comprehensive grading across grade-specific standards, testing, and the accountability that goes with them in each state. This ranking provides aggregate grades for each state. Another widely acknowledged rating of state standards by subject is produced by the Fordham Institute (Finn, Jullian, and Petrilli (2006)). These competing rankings are correlated with those of Education Week, though not perfectly.

A second point of comparison is the particular choice of cut scores on tests. Since each state can choose its own cut score on its state assessment, it is not easily to compare the choices across states. However, Bandeira de Mello (2011) has mapped the state assessment scores into the scale scores of NAEP. This mapping permits direct comparisons of the states' choices across states according to a common measure of learning.

Kansas has established cut scores on state tests that are below the national average. This choice, however, has few implications for the performance of Kansas schools, for their current costs, or for their future costs. Exhibits 11-14 display the relationship between the cut score and the grade on the standards from Education Week. These exhibits show that having more rigorous standards and assessments is not related to the choice of cut scores for NCLB.

Most importantly, actual performance of students on each of the relevant tests is unrelated to the cut scores on the tests. There clearly is no relationship between the cut score and the true performance as measured by NAEP as seen in Exhibits 15-18.

Finally, there is a slight negative relationship between the quality of a state's standards (as measured by either Education Week or the Fordham Institute) and the state's score on the relevant NAEP tests. In other words, higher standards do not ensure higher performance.

These exhibits are consistent with the more in-depth analysis in Loveless (2012). Loveless looks specifically at the question of how adoption of the common core standards is likely to affect achievement, and he concludes that there is not likely to be much impact.

The importance here is that Kansas should not expect much change in achievement just from changing its official learning standards. Nor should it expect any large cost implications. What counts is how well the schools currently provide education.

Spending and Poverty

The financing of Kansas schools is adjusted to deal with poverty in the districts. Extra funds are available to districts that have higher poverty rates. This is seen explicitly in Exhibits 19 and 20. These exhibits are different ways to picture the relationship between poverty (measured by the percentage eligible for free and reduced price lunch in each of the Kansas districts) and the per pupil spending in the district. The line in Exhibit 19 is simply the regression line that best characterizes the relationship, and the positive slope is statistically significant. Exhibit 20 shows the same scatter of districts except that the size of the circle represents the total enrollment in each Kansas district.

It is not the case either that the relationship is driven by small, rural districts. If we just look at districts with 2,000 or more students (Exhibits 21 and 22), we see precisely the same pattern of increased spending in districts with greater concentrations of poor children.

Spending and Performance

A crucial element of this lawsuit is whether or not providing more money to districts will lead to improved performance. The lack of relationship between spending and performance has been questioned in a variety of circumstances (see below). But the situation in Kansas is potentially different.

Exhibits 23-27 provide a graphical depiction of the story in Kansas. Consider Exhibit 23. It plots the effect of more spending on district performance after adjusting for the level of poverty as measured by the free and reduced price lunch rate.

In other words, after allowing for difference in the background of students, there is no consistent pattern of higher achievement with higher spending. In fact the dominant view from the graphs is how wide the variation in performance is when looking at districts that are spending the same amounts.

These patterns for 2011 scores across districts and for different grades provide a picture of widely different performance that is not explained by differences in spending. The best interpretation is that it matters how money is spent and that this is much more important than how much.

The observations from the districts in Kansas also indicate that simply providing greater funds is unlikely to lead to overall improvements in achievement.

National Picture of Spending and Performance

The obvious issue is whether the lack of performance with increased funding is simply an artifact of Kansas in 2011. Extensive research for the nation as a whole, however, reaches the same conclusion throughout the nation.

The aggregate picture in the U.S. can be seen by comparing resources and performance over time. Exhibit 28 shows that resources in U.S. schools have risen dramatically since 1960. Indeed except possibly for the 2008 recession, total spending per pupil has risen steadily in constant dollar terms. This rise has happened with the deepening of the teacher preparation (more master's degrees and greater experience) and with the reductions in pupil-teacher ratios.

Exhibits 29 and 30 provide the story of how student performance has evolved. These exhibits provide performance on reading and math tests of NAEP for 17-year-olds from 1970 to 2008. Over this period, student performance has been flat while spending per pupil has quadrupled.

The aggregate story is reinforced by detailed statistical investigations into student performance. Exhibit 31 summarizes the estimated impacts of teacher-pupil ratios, teacher education, and teacher experience for the highest quality studies.² The vast majority of studies find no significant relationship between the different inputs and student performance. There is no support for any relationship with teacher advanced degrees, and limited support for experience. Subsequent analysis has shown that the suggestive impacts of experience have almost entirely connected to the first year or two of teaching.³

Exhibit 32 provides evidence from the Tennessee class size experiment. This experiment suggested that small kindergarten classes may help students but that class size reduction in later grades does little or nothing for achievement (Hanushek (1999b)). This is consistent with the large literature on class size (Hanushek (1999a)).

Court Ordered Spending Increased - New Jersey

The courts in a number of states have intervened to order substantial increases in spending. New Jersey has been the best known, because the courts have been involved in school spending and

² Hanushek (2003) provides a detailed analysis of the studies of achievement.

³ See, for example, Rivkin, Hanushek, and Kain (2005).

policy for four decades.⁴ The dramatic spending increases called for by the courts (Exhibit 34) have had little to no impacts on achievement. Compared to the rest of the nation, performance in New Jersey has not increased across most grades and racial groups (Exhibits 35-40). These results suggest caution in considering the ability of courts to improve educational outcomes.

Court Ordered Spending Increased – Wyoming

The court actions in Wyoming provide an interesting contrast to Kansas. Wyoming courts have intervened to provide dramatically higher spending growth there as compared to the rest of the nation and as compared to Kansas (Exhibit 42). The comparison of the experience in Wyoming with that in Kansas is especially interesting. The populations in the two states are quite similar (Exhibit 43). Given the slightly stronger family backgrounds and given the large infusions of funds, students in Wyoming might be expected to do dramatically better than those in Kansas. Exhibit 44 shows rankings of states in grade 8 mathematics on NAEP, where Kansas students do noticeably better than Wyoming students. This pattern also holds for grade 4 mathematics (Exhibit 45). Grade 4 reading is virtually the same for the two states. The only place where Wyoming appears ahead of Kansas is grade 8 reading, which might be expected because reading scores have been shown to be less affected by schools (and more affected by families).

These differences show up dramatically in preparation for college (Exhibit 46). Kansas students graduate high school at higher rates, have higher scores on SAT or ACT tests, and have a higher chance of going to college than Wyoming students. All of these might naively have been thought to go in the opposite direction given the supposed advantages of Wyoming schools.

Teacher Effectiveness

The research on student achievement has, as indicated above, shown that just providing more money is not a consistent way to improve student outcomes. Moreover, the standard policies to reduce class size, to increase teacher education, or to raise teacher salaries have proven ineffective.

The one general policy area that has been identified as having real leverage for improving student outcomes is increasing teacher quality.⁵ Teachers have a dramatic impact on student achievement, and this subsequently affects earnings and adult successes (Exhibit 48).

Ineffective teachers have a particularly powerful (negative) impact on student achievement. A small portion of our teachers dramatically lower achievement, perhaps explaining all of the difference between the performance of U.S. students and those in Canada or Finland (Exhibit 49). These differences in achievement have dramatic effects on the future economic well-being of the U.S.⁶

⁴ The history of court involvement here and in other states can be found in Hanushek and Lindseth (2009).

⁵ The calculations of value are found in Hanushek (2011). These are reinforced analysis of the long run impact of teacher value added in Chetty, Friedman, and Rockoff (2011).

⁶ See the economic calculations in Hanushek and Woessmann (2011).

Costing Out an Adequate Education

Particularly with the involvement of the courts in educational funding cases, there has been a demand for consultants to estimate what it would cost to support a given level of achievement in the schools. These studies have been developed using different approaches. Professional judgment studies involve school personnel in developing hypothetical schools that will support higher achievement. Evidence based methods rely on consultants to select programs from the research literature that can be used in developing model schools. Successful schools approaches develop base costs from the current schools that are achieving at a high level and use these base costs to project spending needs for all schools in a state. Finally, cost function or econometric approaches use formal statistical models in an attempt to discern what spending is necessary for some level of achievement.

These methods are now well-understood. None provides a sound basis for estimating the spending that would be required for an adequate education. And none can provide a scientifically sound method for the courts to decide on how much spending is necessary.

The flaws in these studies have now been extensively analyzed.⁷ The professional judgment approach is biased by using a school-based group that is asked to draw up wish lists of programs, but these lack any empirical basis.⁸ The evidence based method suffers from a lack of a strong empirical basis for introducing specific programs.⁹ The successful schools model cannot adequately allow for other nonschool influences on achievement, and it presents no methodology for extrapolating to achievement levels outside of those currently seen in a state. Finally, the cost function approach fails to identify how costs are determined, and it necessarily builds in inefficiencies of schools.¹⁰

A central problem with all of these costing out approaches is that they build in inefficiencies of the current school operations. Specifically, all assume that the general structure of teacher salaries should be retained and that the only policy to be used is a general pay increase for all teachers – both effective and ineffective.¹¹ Any other poorly designed or poorly executed program is also retained in the estimation of “necessary” costs.

When these estimation methods are compared to actual outcomes, they have done very poorly. For example, the Augenblick Palaich and Associates (2003) study in North Dakota (using a professional judgment methodology) produced spending patterns that could be checked with actual achievement. When this was done, the schools that were farthest below the amount required by the model actually

⁷ Alternative reviews and analysis are available in Hanushek (2006), Hanushek (2007a), and Hanushek and Lindseth (2009).

⁸ See Hanushek (2005) for specifics on the use of these techniques in the New York City litigation (Campaign for Fiscal Equality vs. the State of New York).

⁹ A review is available in Hanushek (2007b).

¹⁰ See Costrell, Hanushek, and Loeb (2008) on specifics of these analyses.

¹¹ Perhaps the largest inefficiency in school operations is that teacher salaries are unrelated to teacher effectiveness. See Hanushek (2007c).

produced the highest achievement, while those with sufficient funds produced the lowest achievement.¹²

With these methods, the difficulties are not small problems or nuances. None of these methods observes normal scientific methods, and none provides a rigorous approach for specifying costs that can be useful for policy decisions.

¹² See details in Hanushek and Lindseth (2009).

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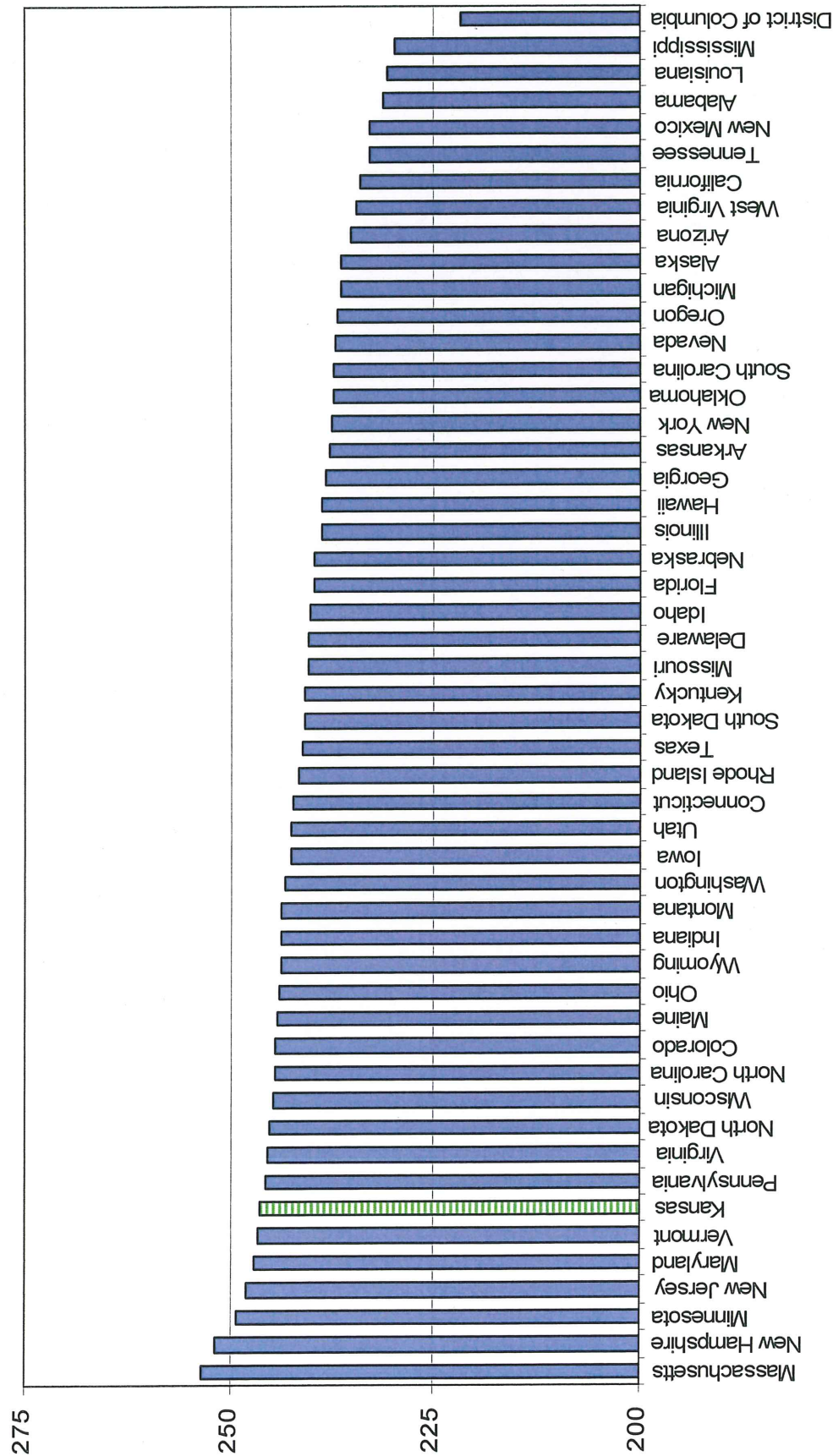
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Report Exhibits for Gannon et al. vs. State of Kansas

Eric A. Hanushek

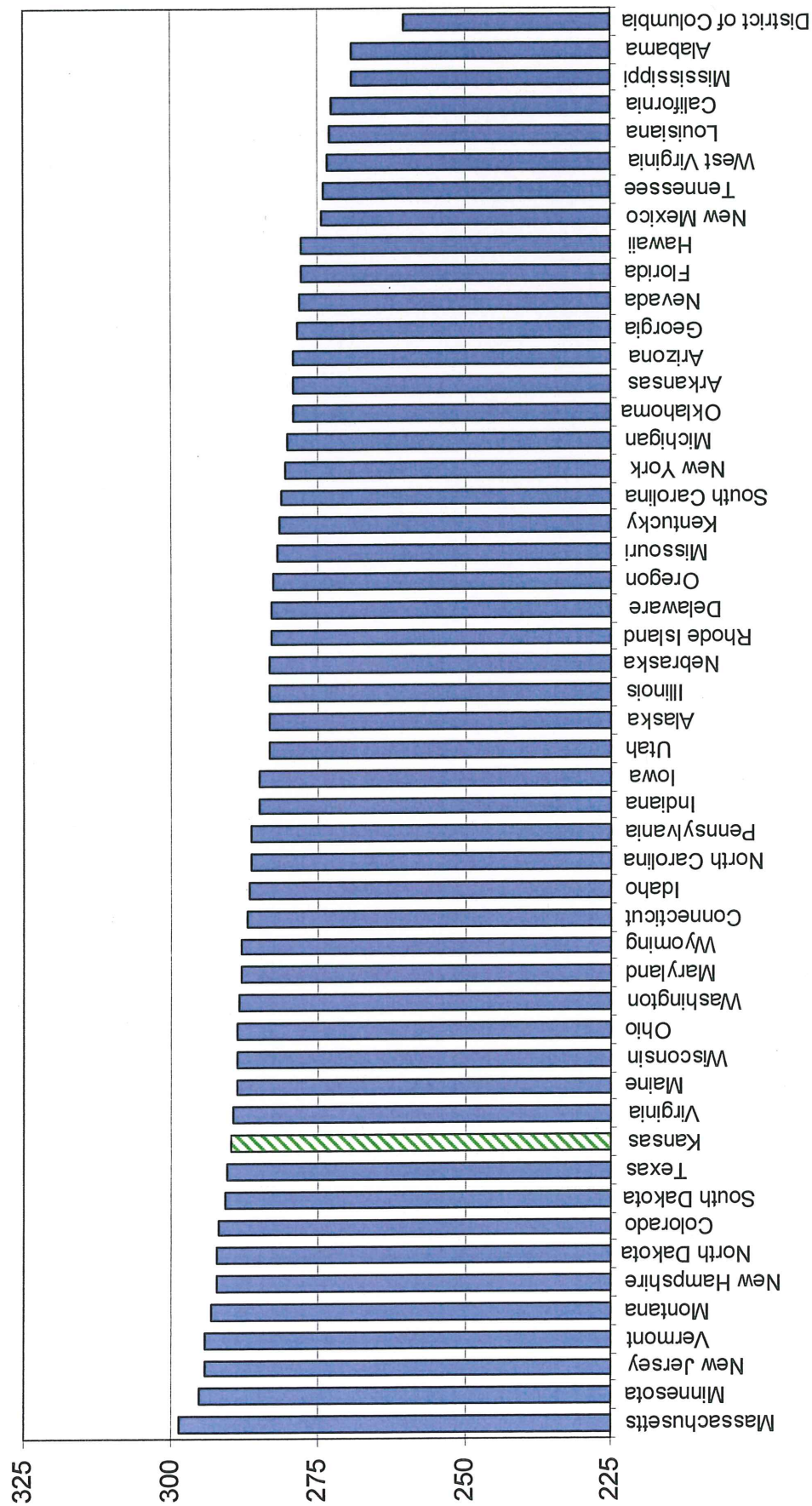
February 2012

NAEP 4th Grade Mathematics, 2011



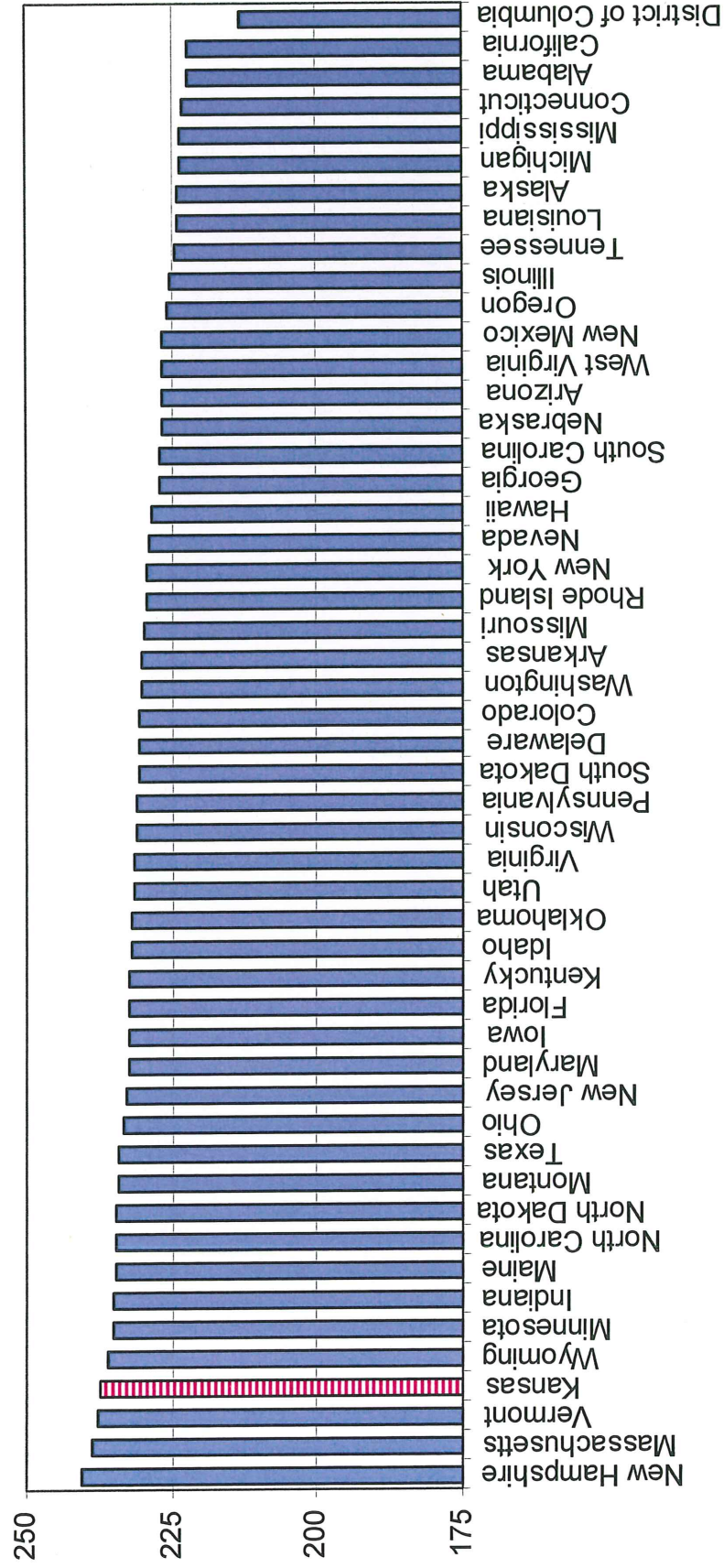
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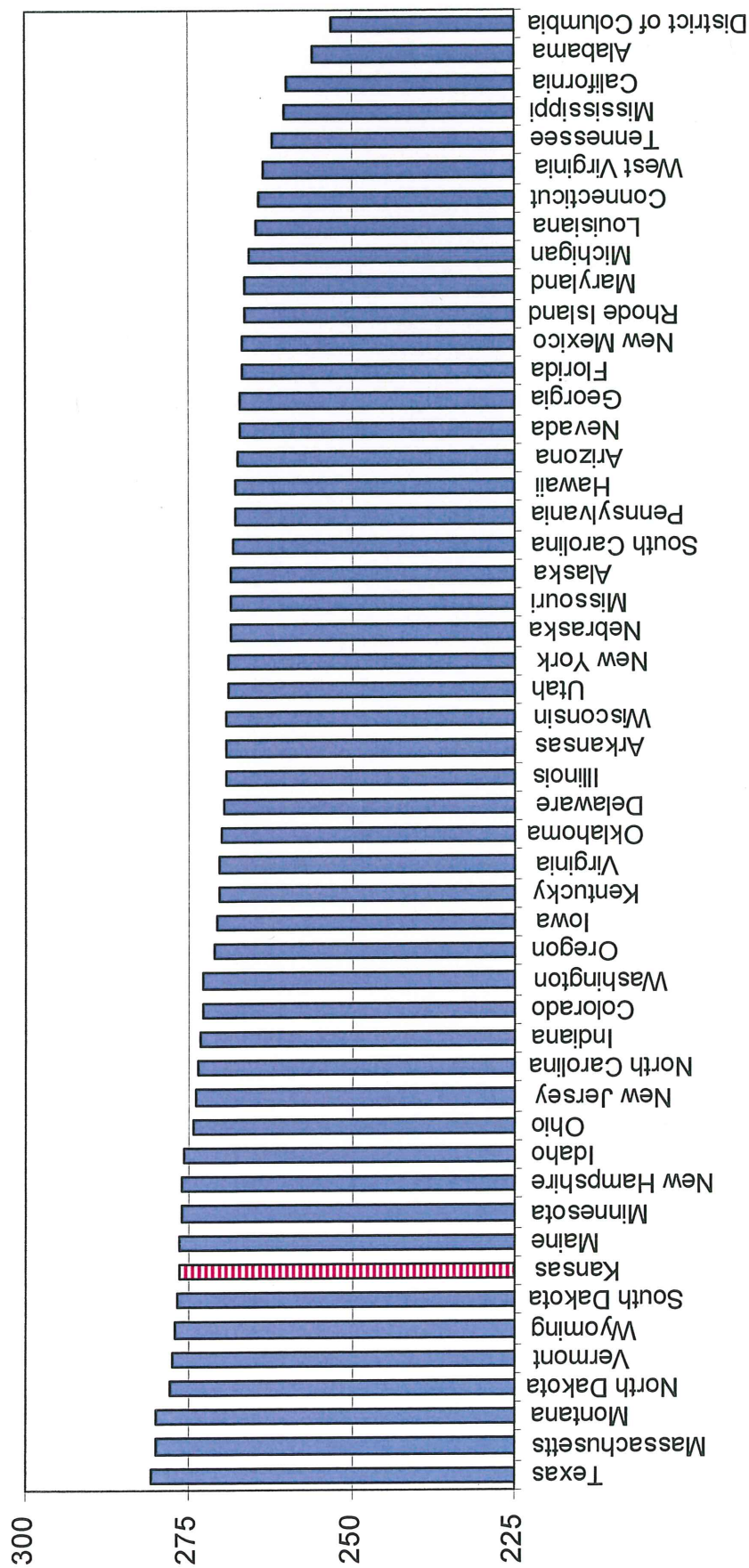
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NAEP 4th Grade Mathematics, 2011 Free and Reduced Price Eligible



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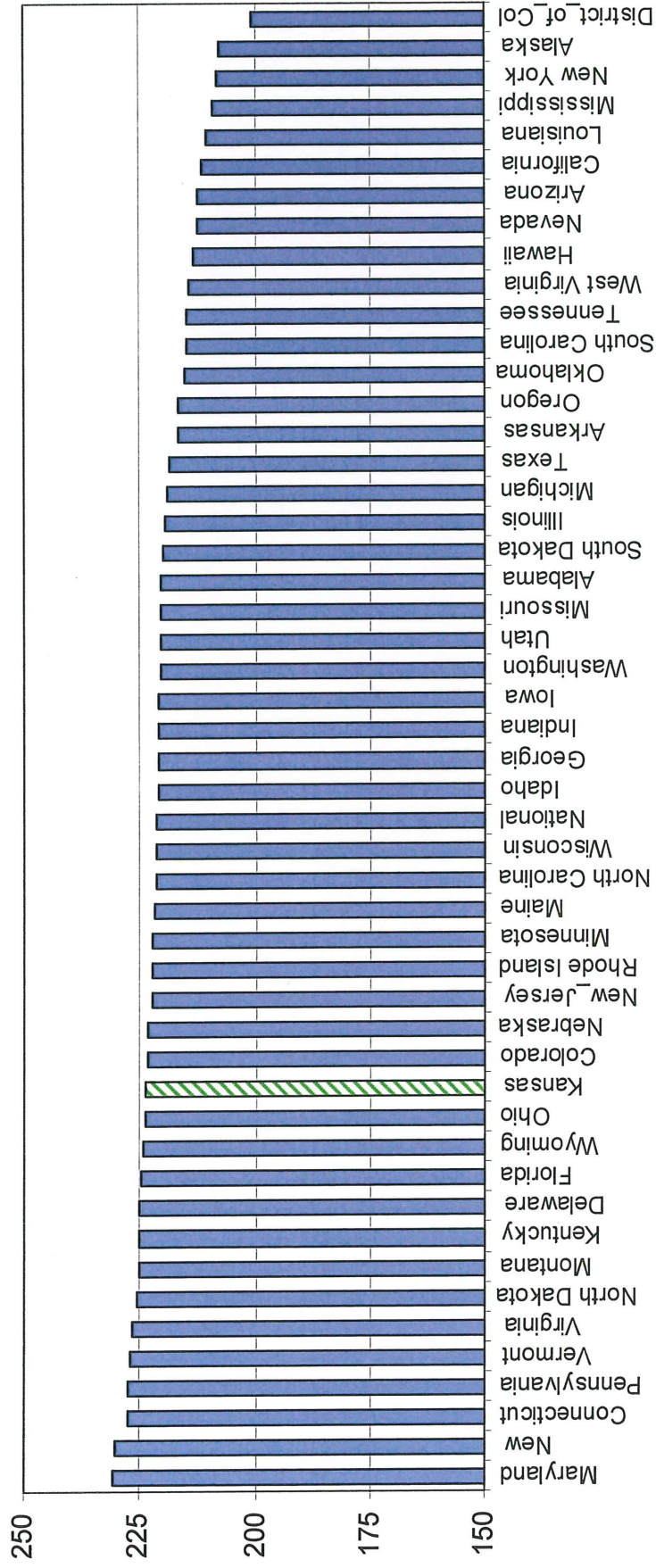
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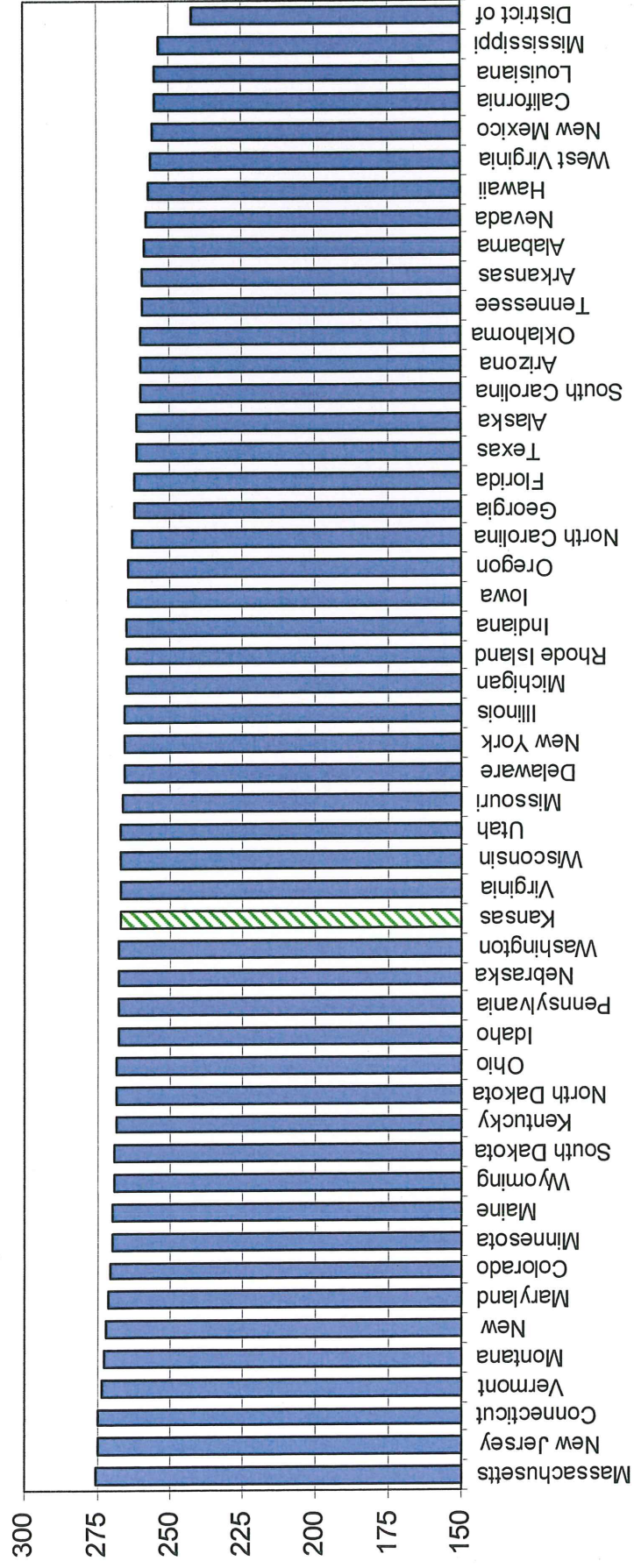
Gannon et al. vs. Kansas

NAEP 4th Grade Reading, 2011



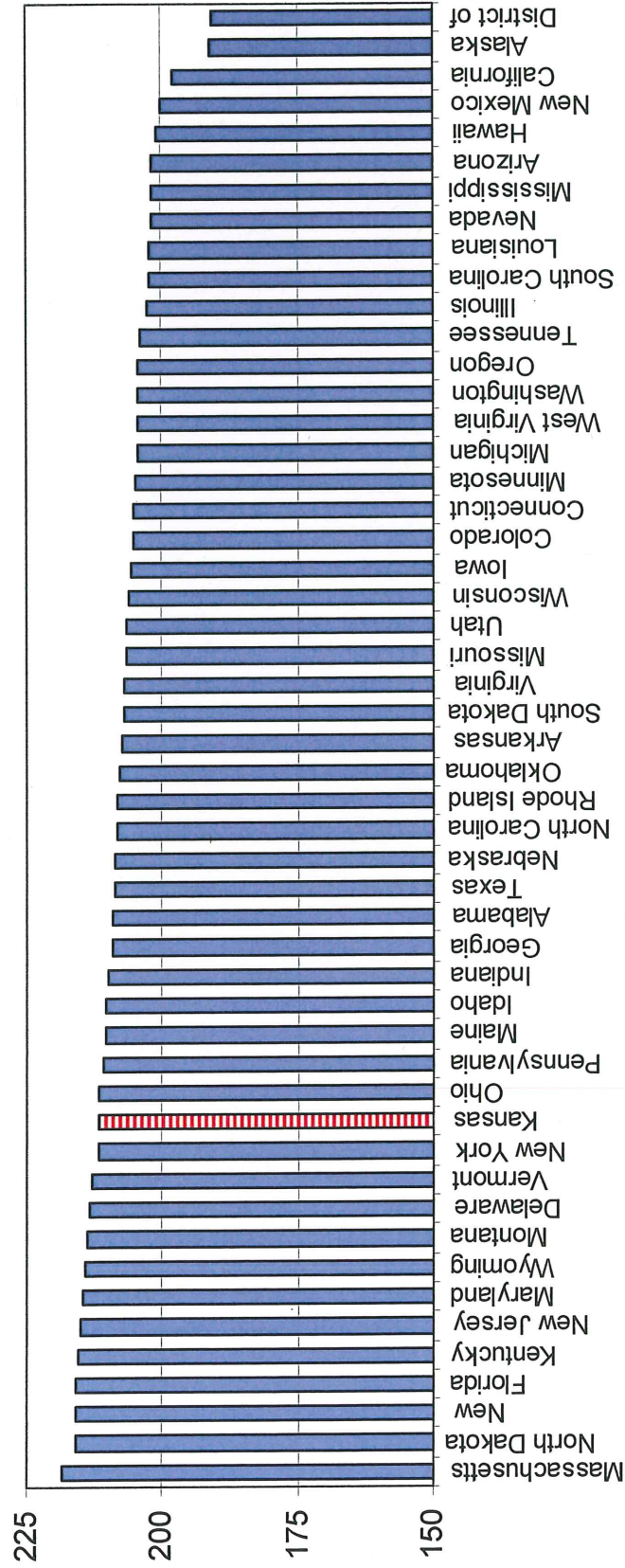
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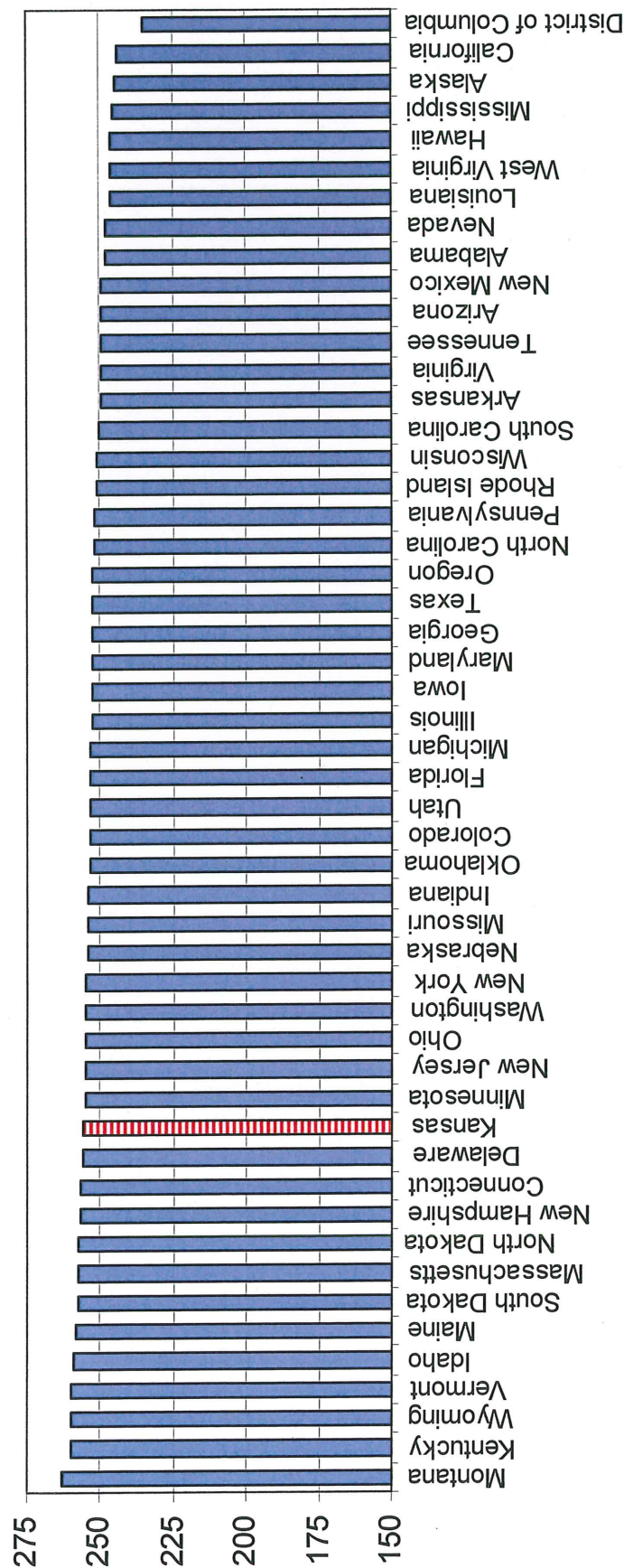
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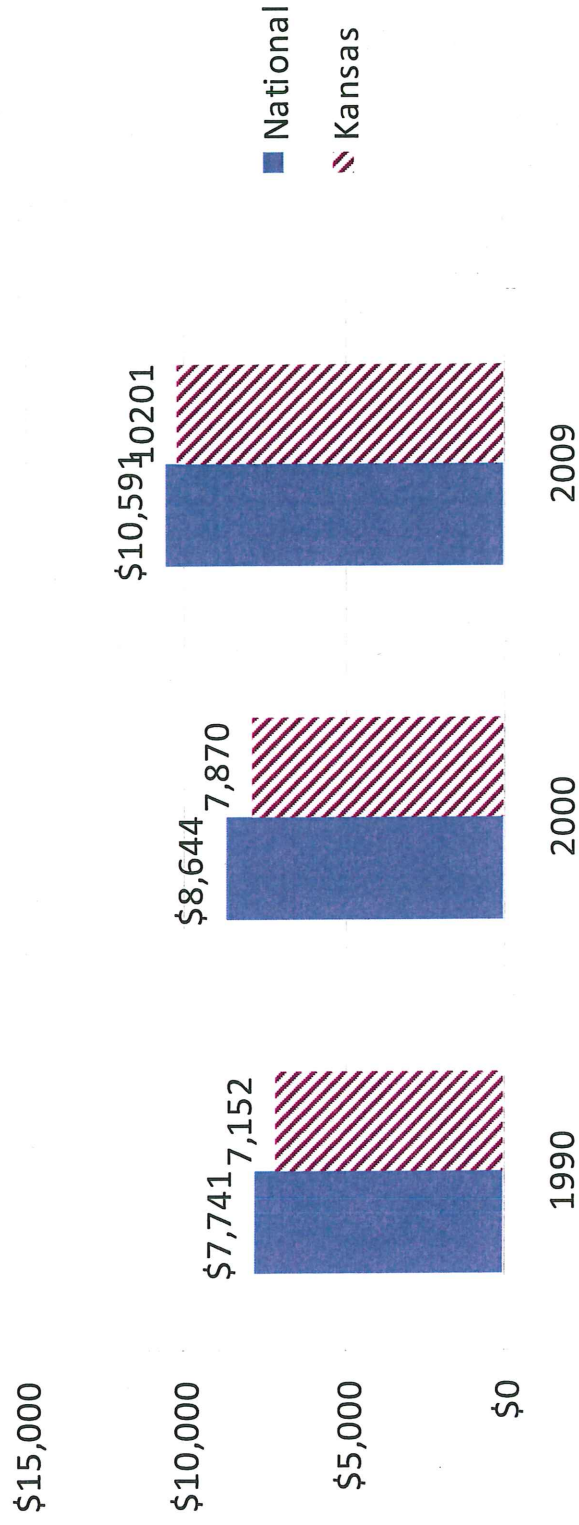
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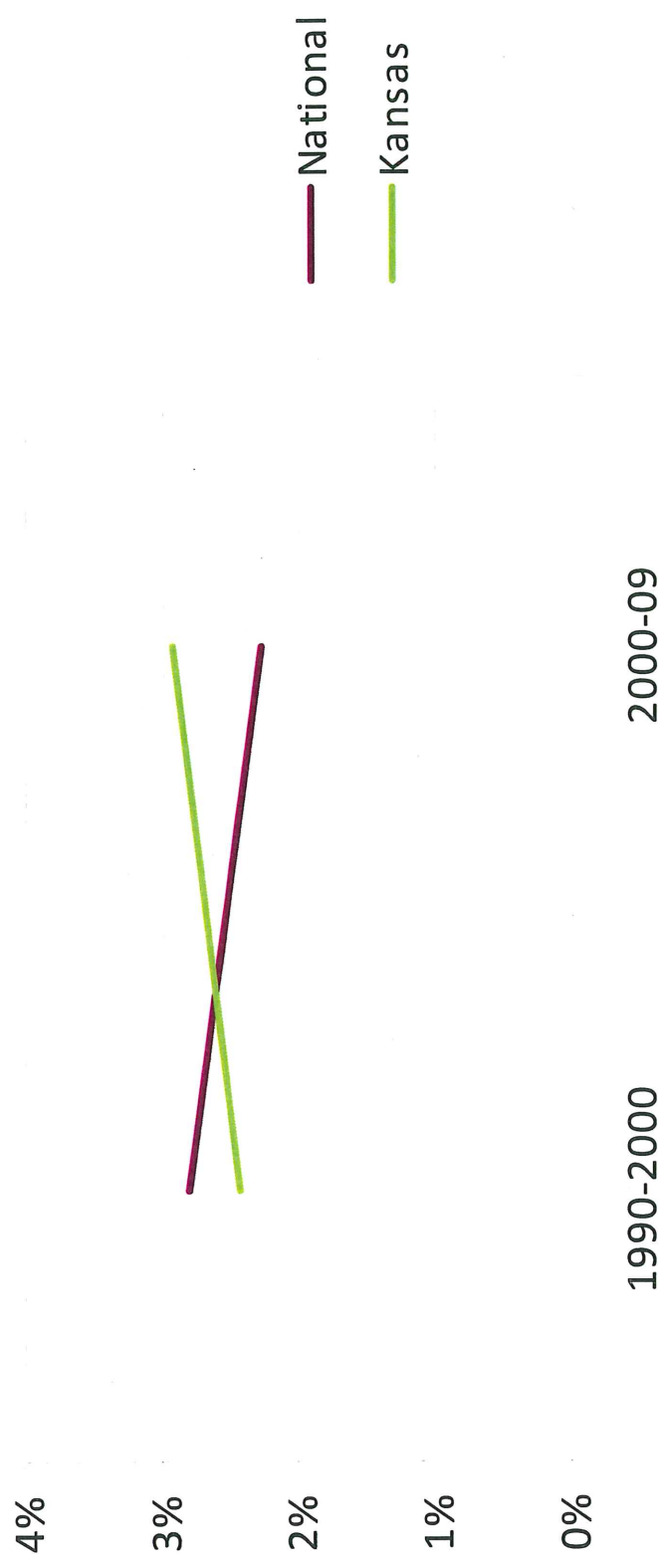
Source: Authors calculations from data at <http://nationsreportcard.gov/>

Expenditure per Pupil (adjusted for inflation)



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

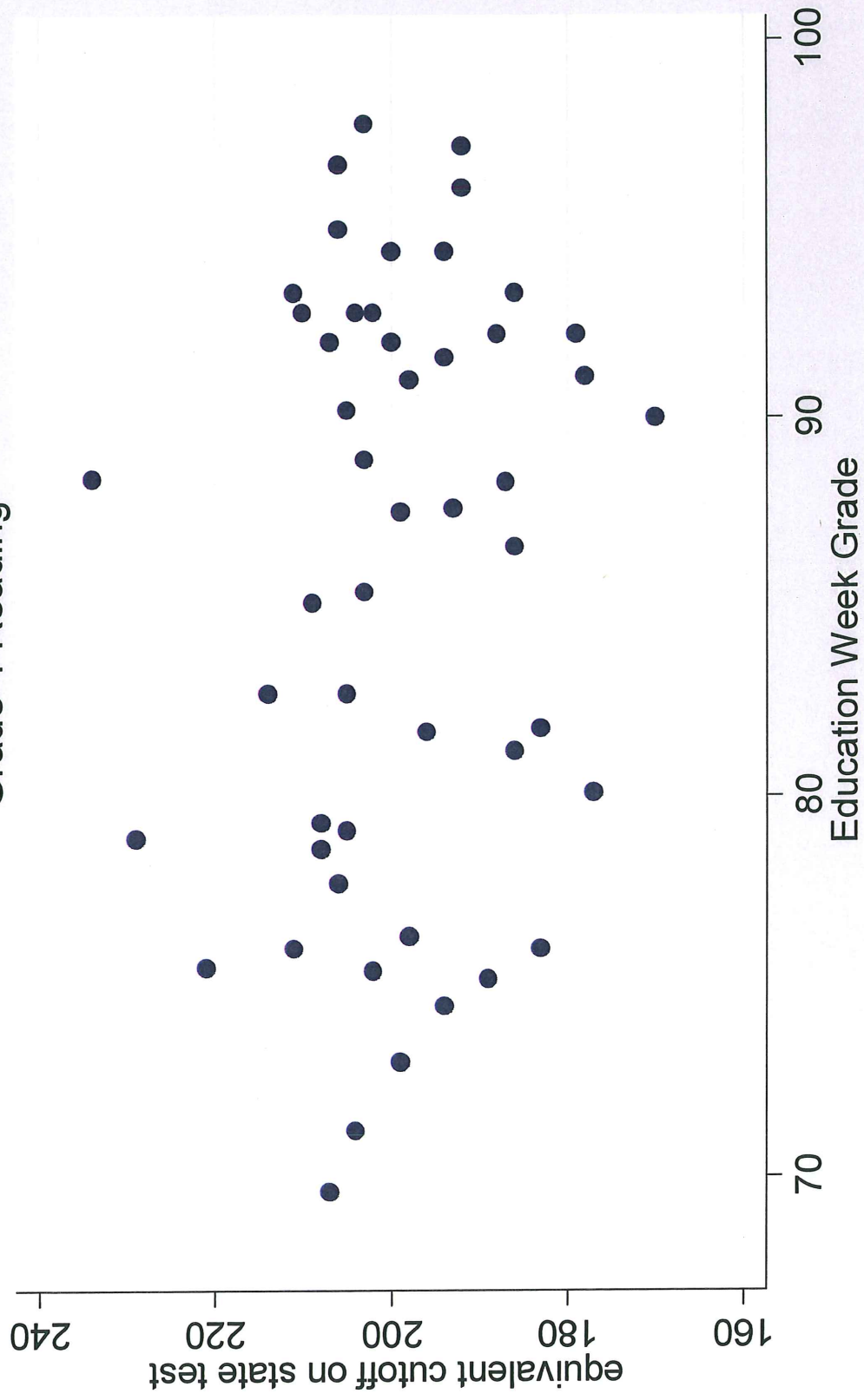
Annual Growth in Expenditure per Pupil



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

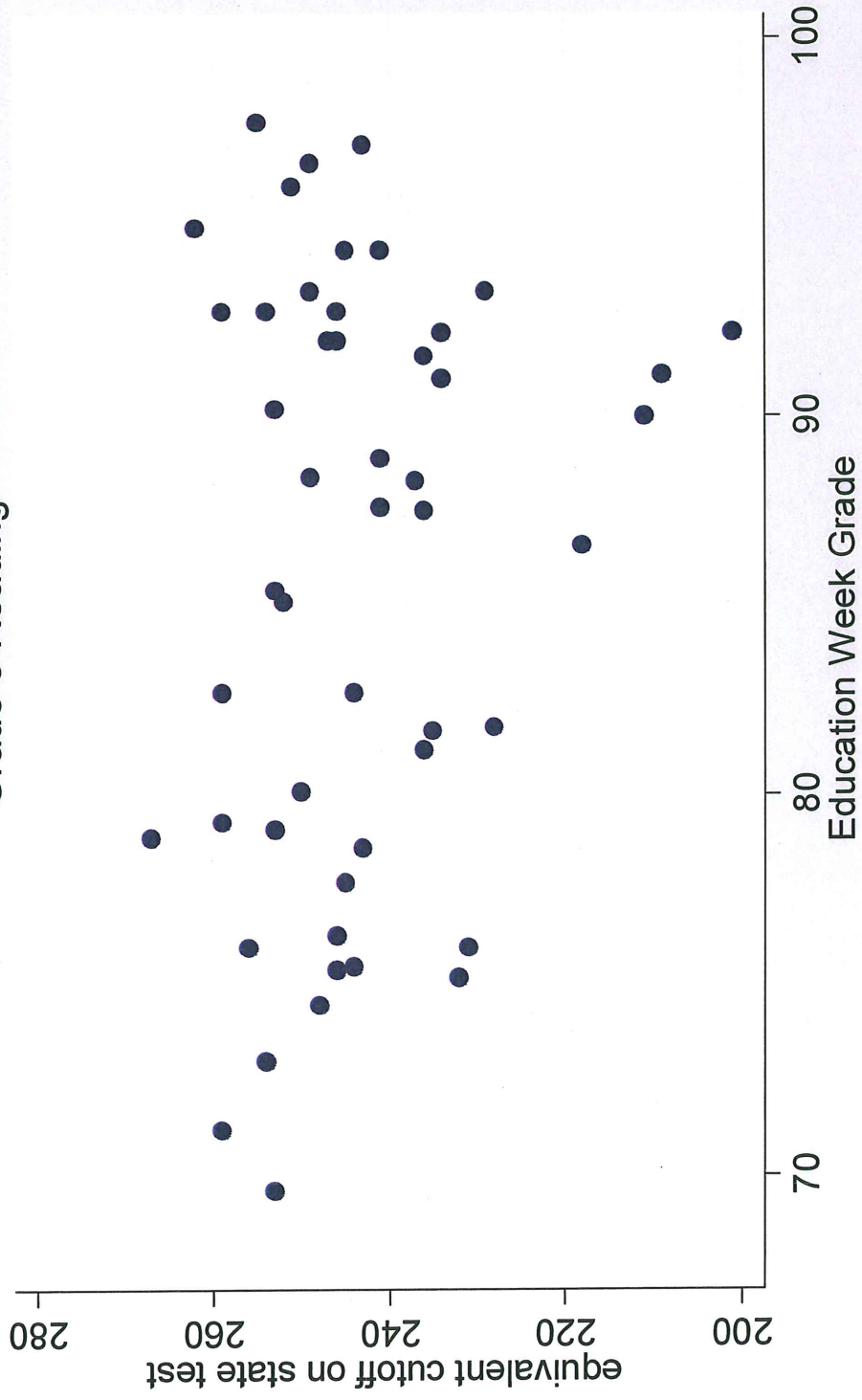
NAEP Cutoff Scores v. Education Week Grade

Grade 4 Reading



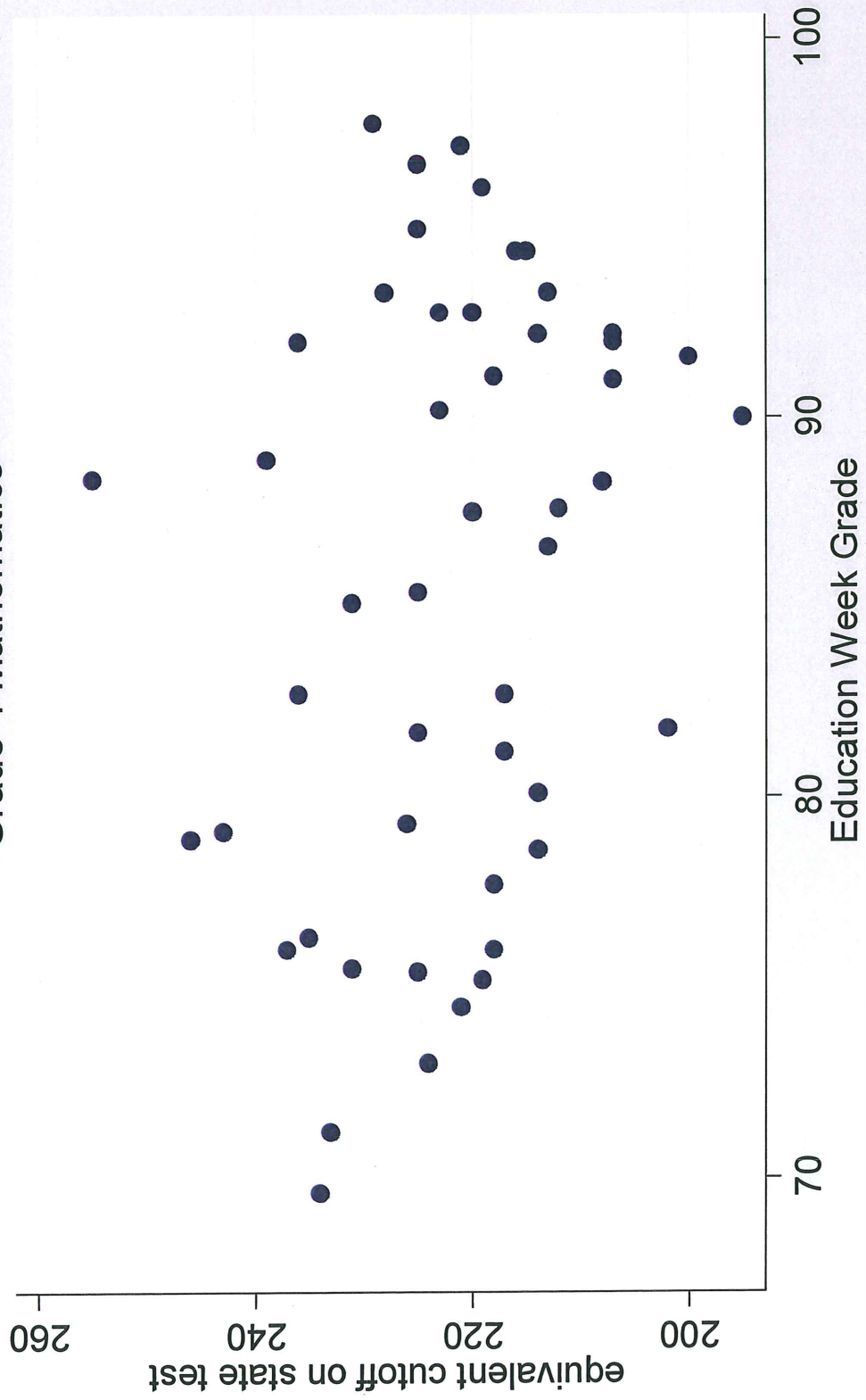
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Grade 8 Reading



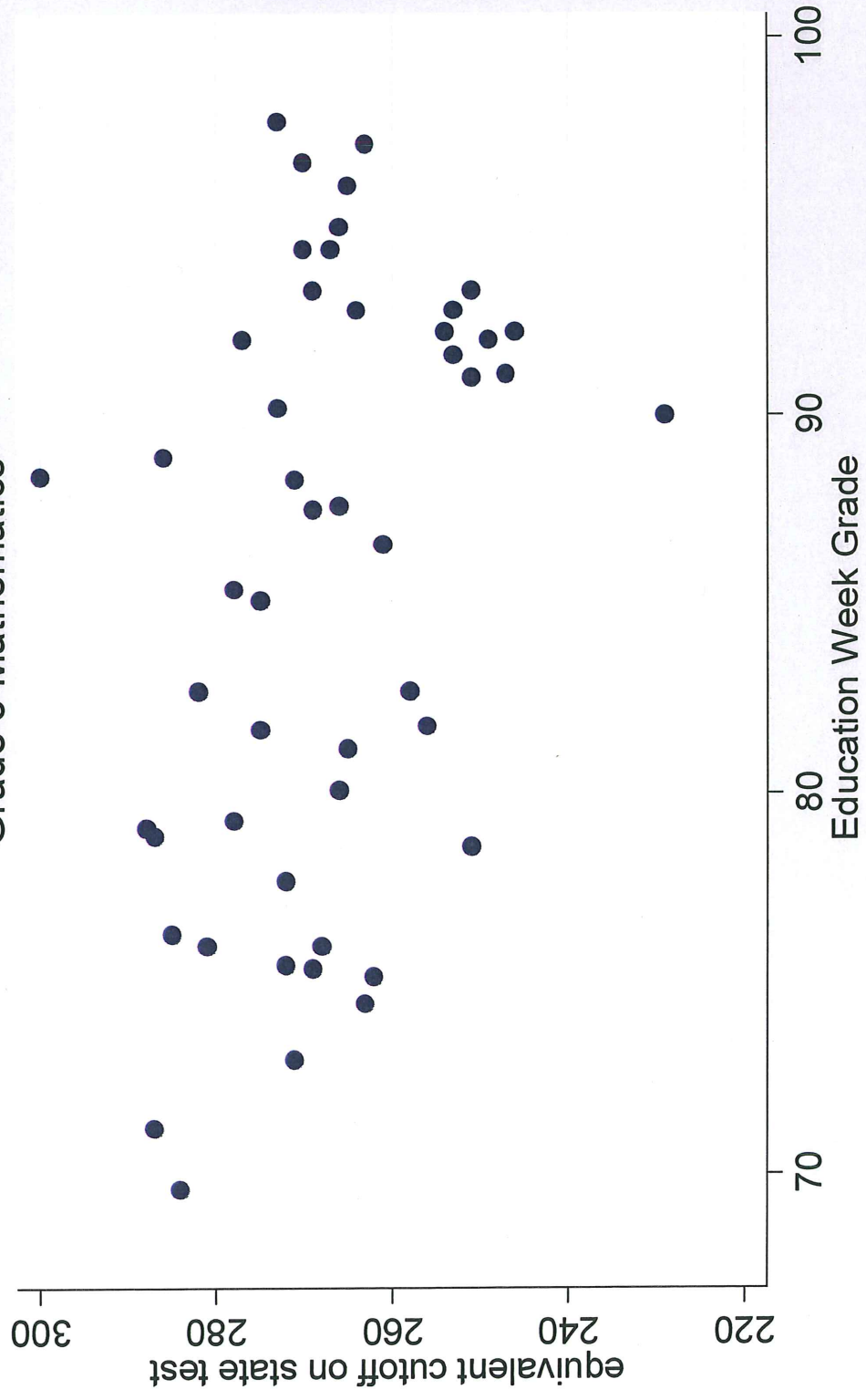
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Grade 4 Mathematics



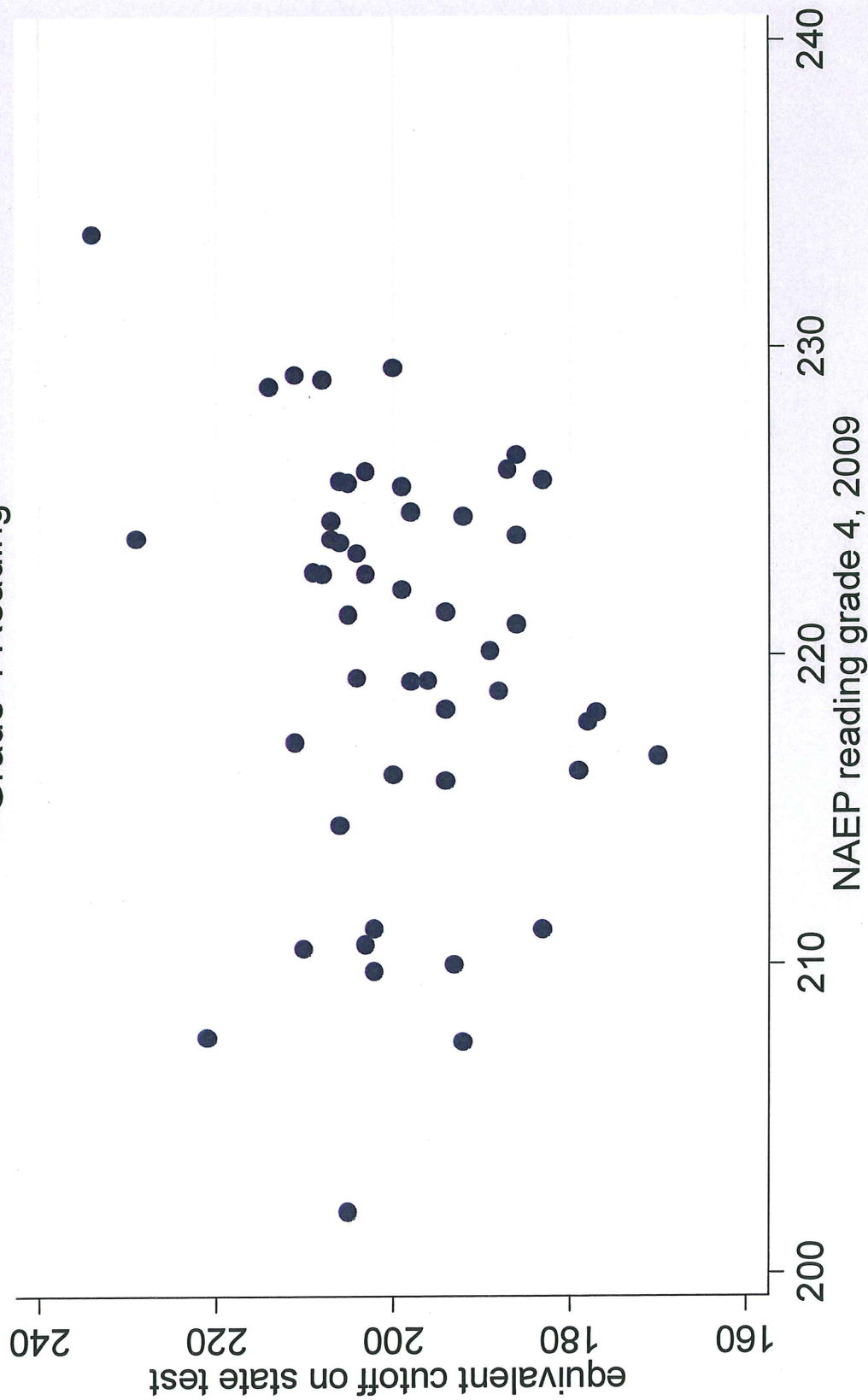
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Grade 8 Mathematics



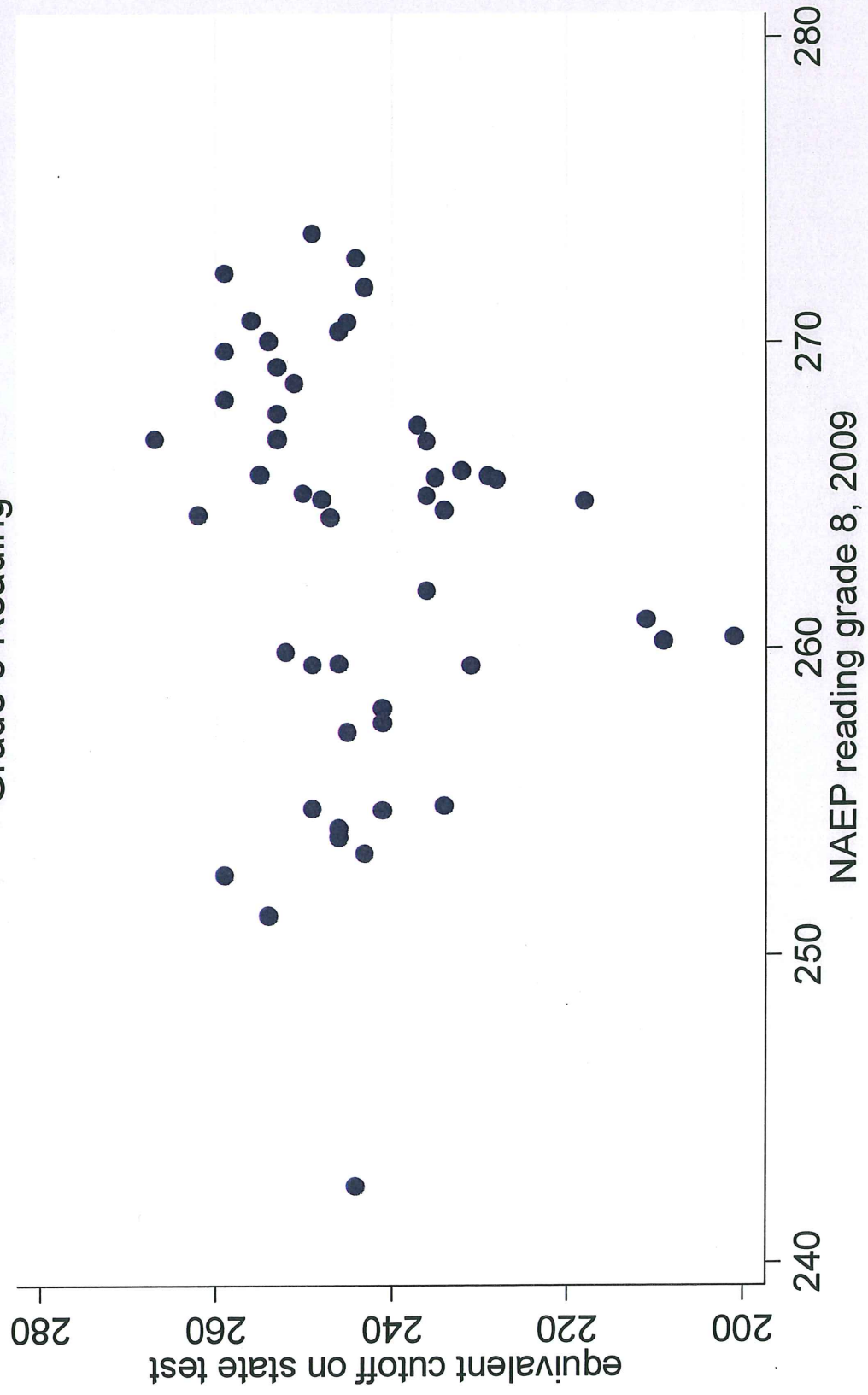
NAEP Cutoff Scores v. Actual Performance

Grade 4 Reading



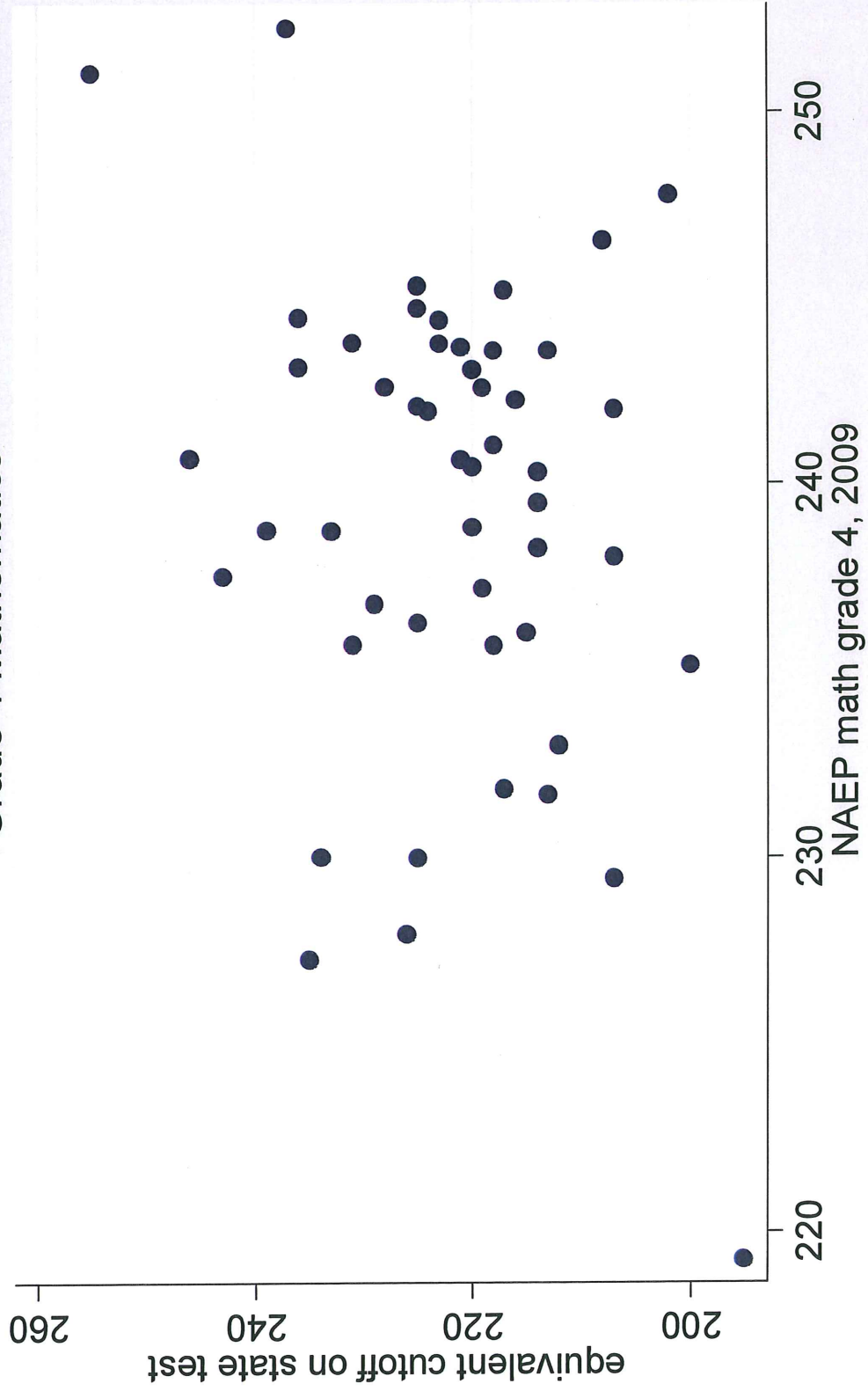
NAEP Cutoff Scores v. Actual Performance

Grade 8 Reading



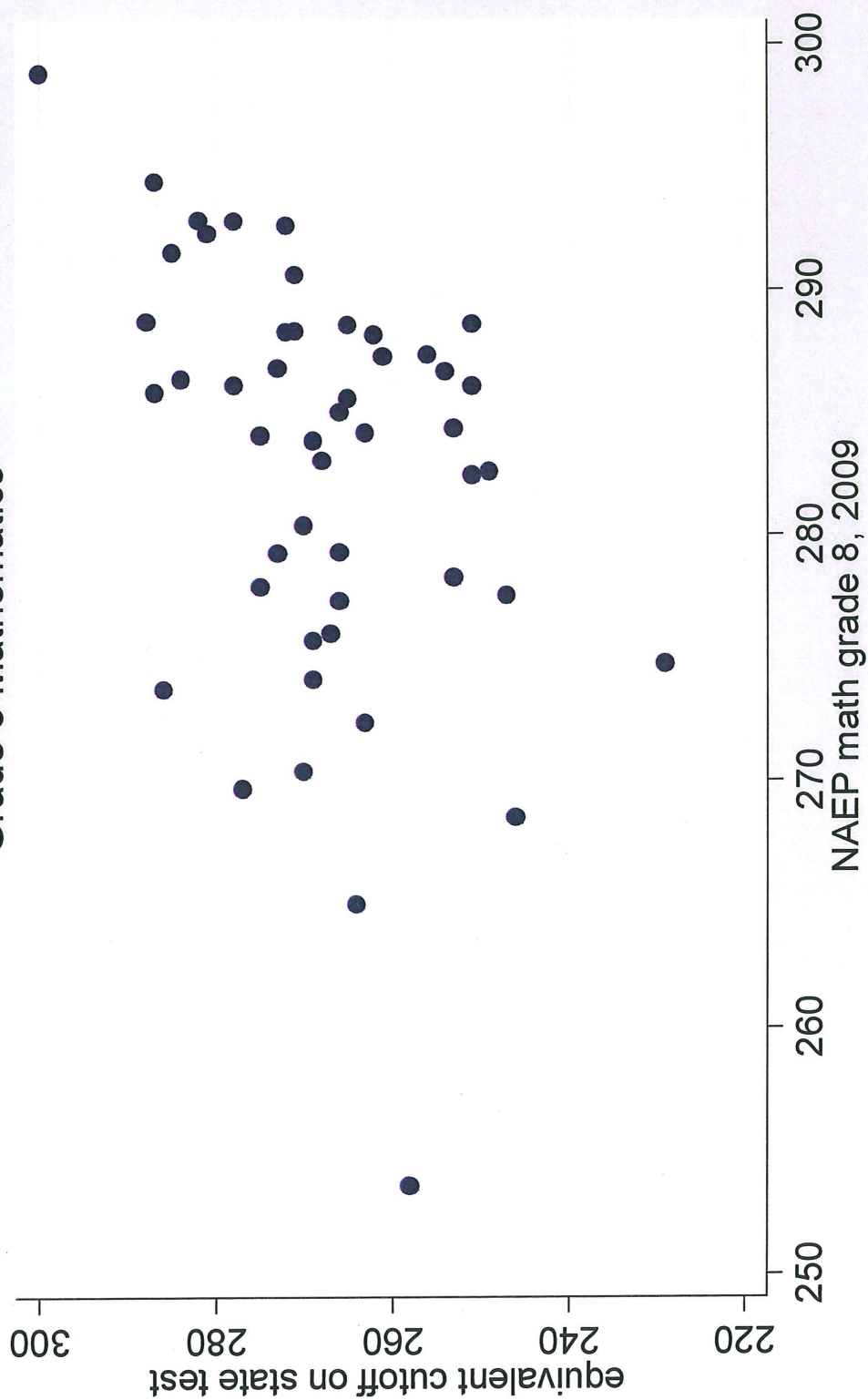
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Grade 4 Mathematics



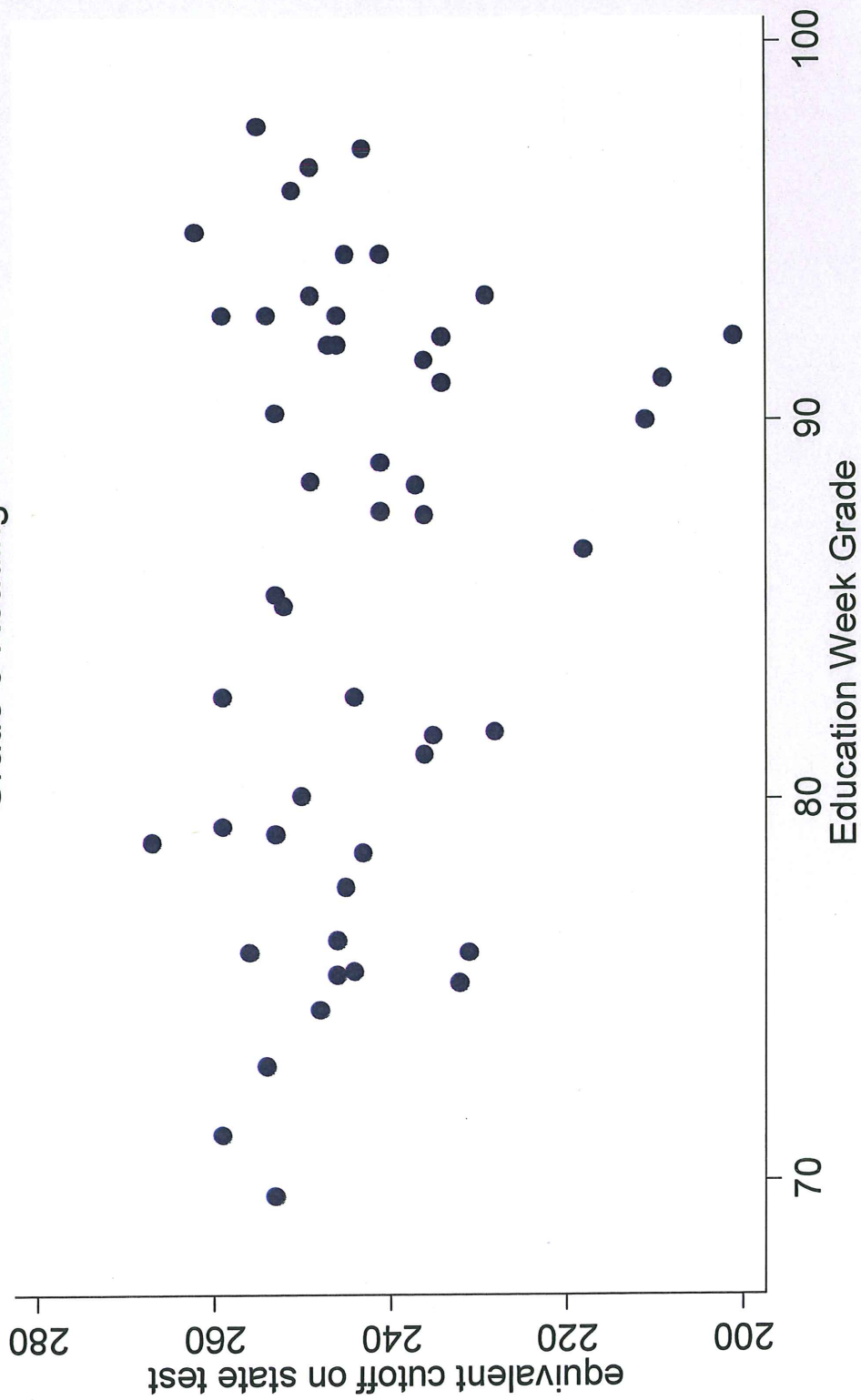
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Grade 8 Mathematics

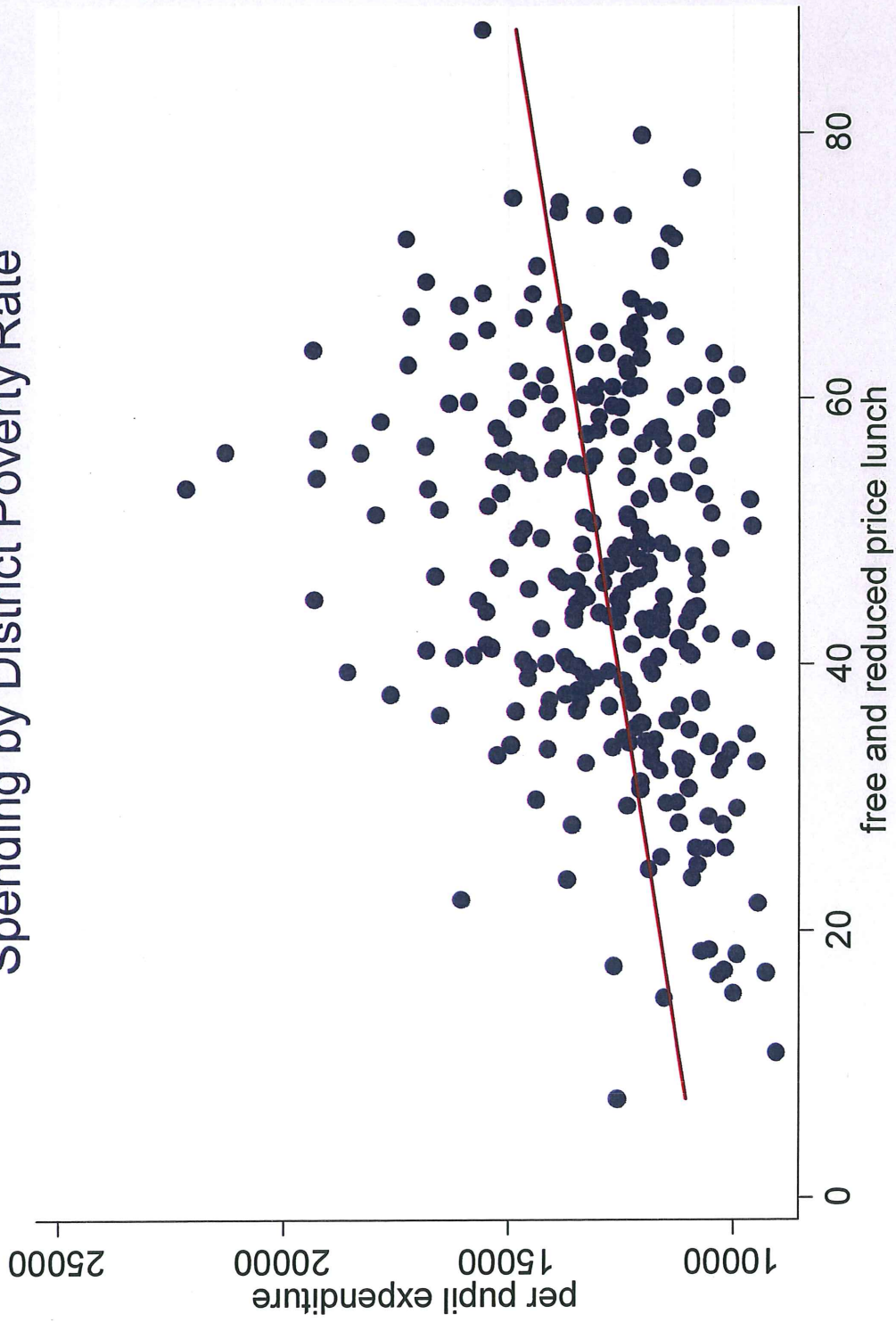


NAEP Cutoff Scores v. Education Week Grade

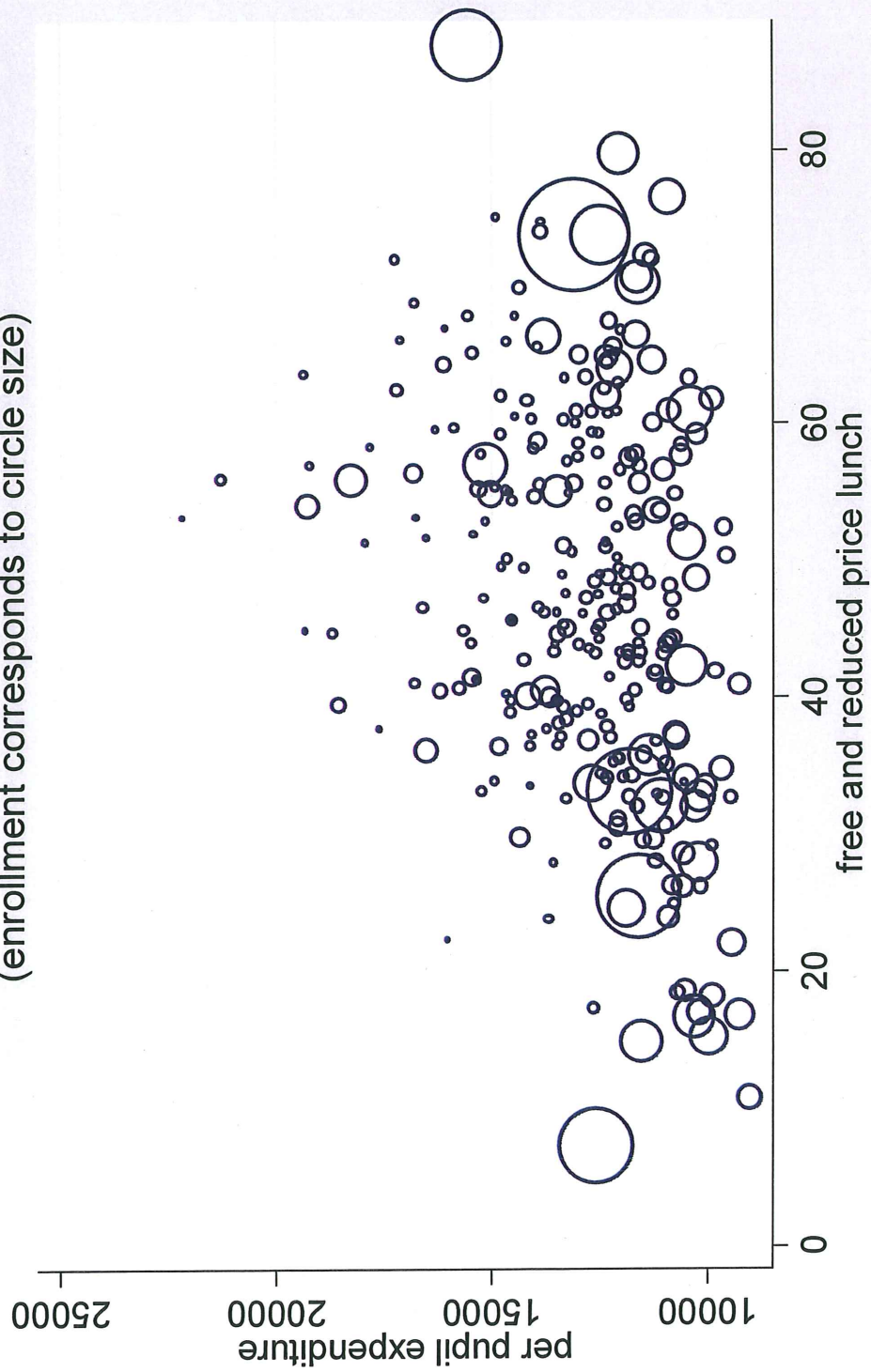
Grade 8 Reading



Spending by District Poverty Rate

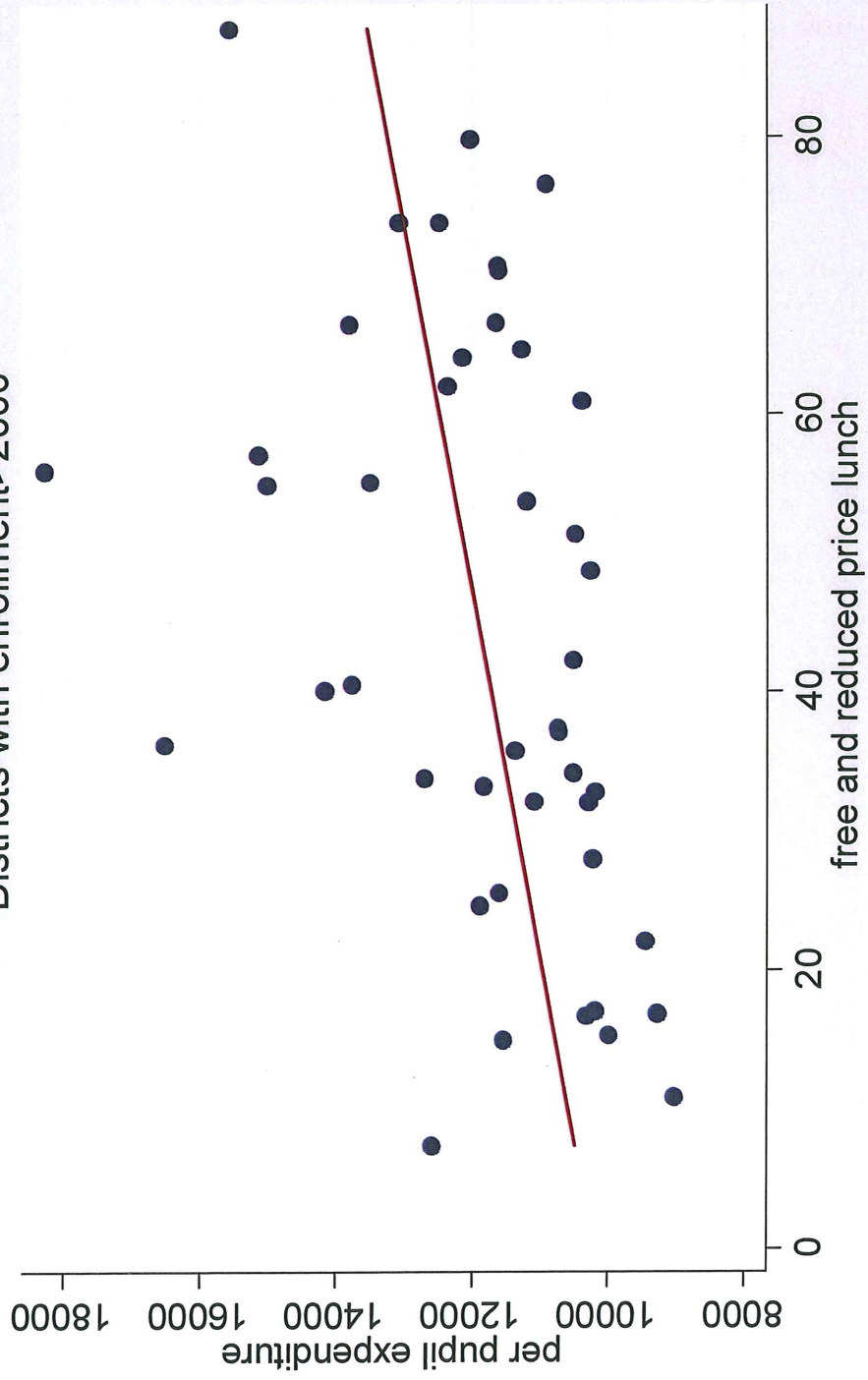


Spending by District Poverty Rate (enrollment corresponds to circle size)



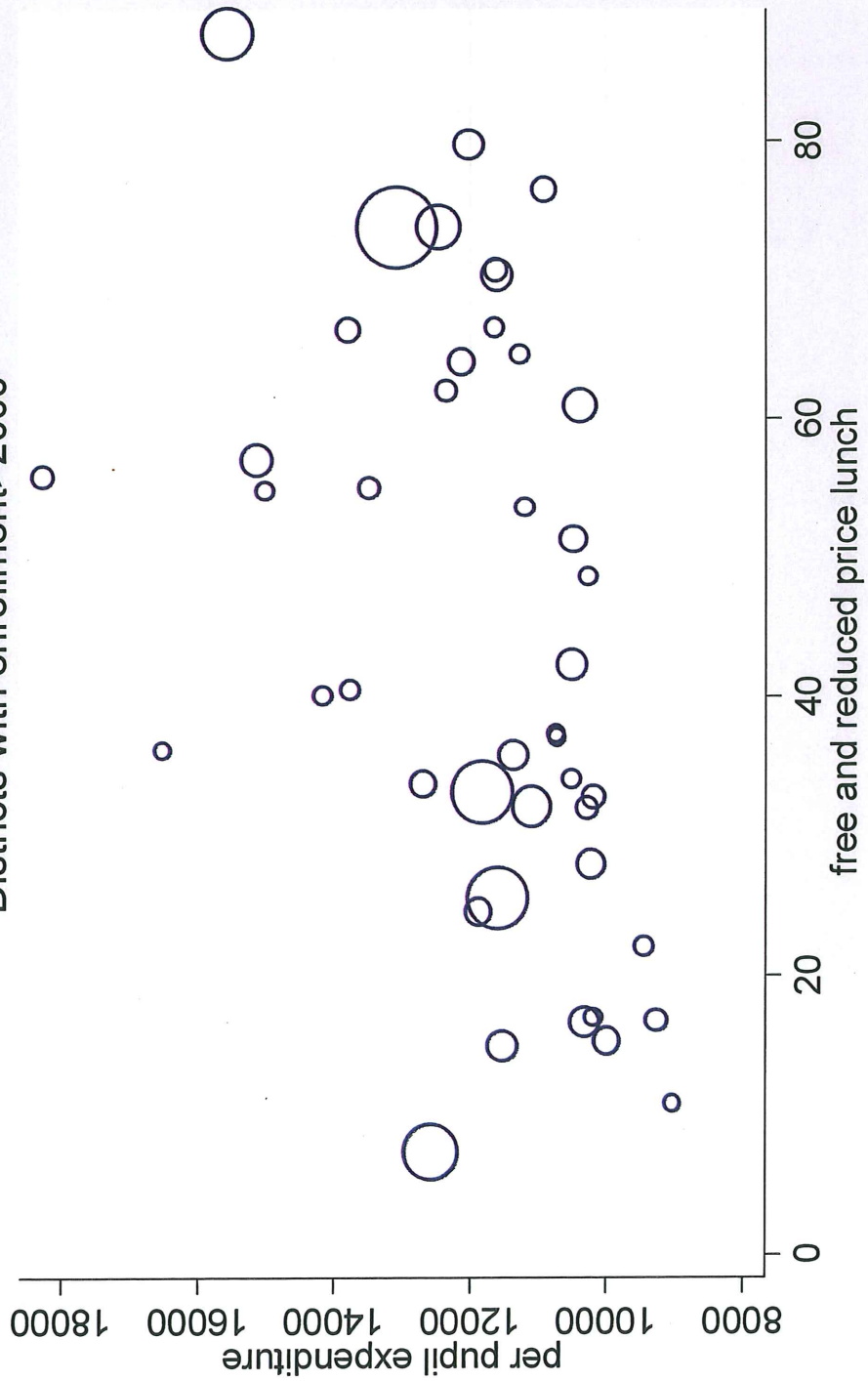
Spending by District Poverty Rate

Districts with enrollment > 2000



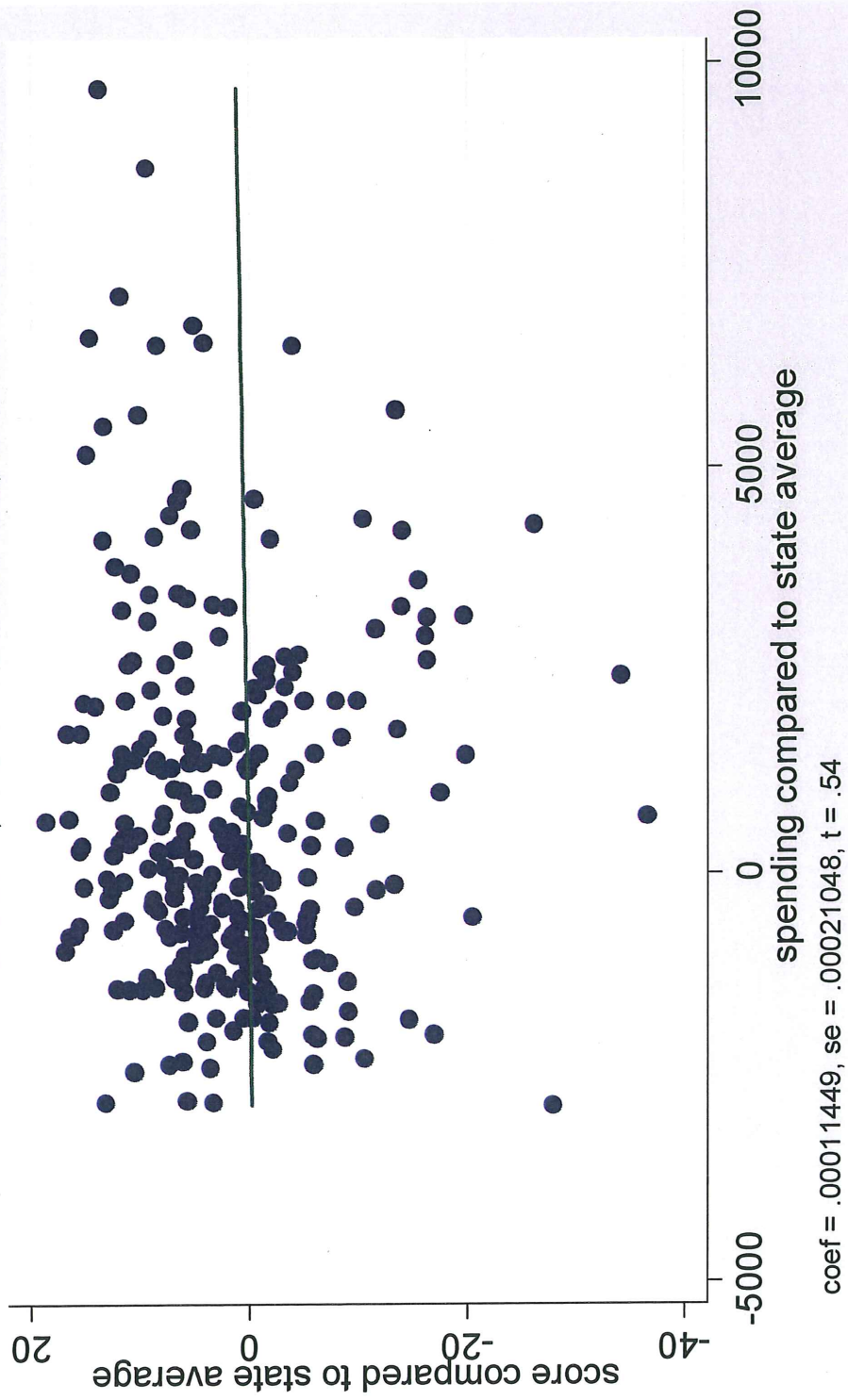
Spending by District Poverty Rate

Districts with enrollment > 2000



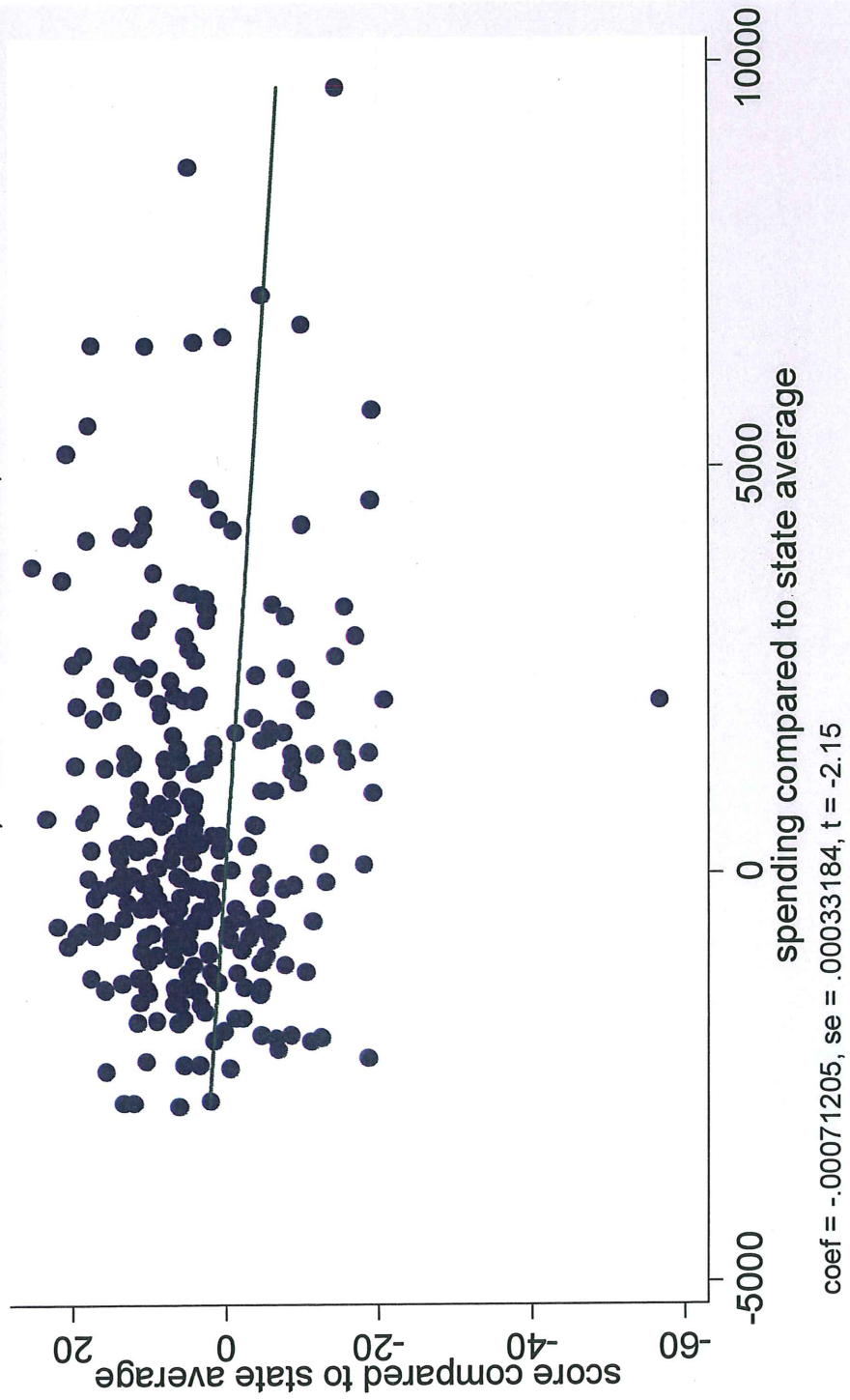
Effect of Spending on Performance -- Adjusted for Poverty

Grade 4, Math -- all districts, 2011



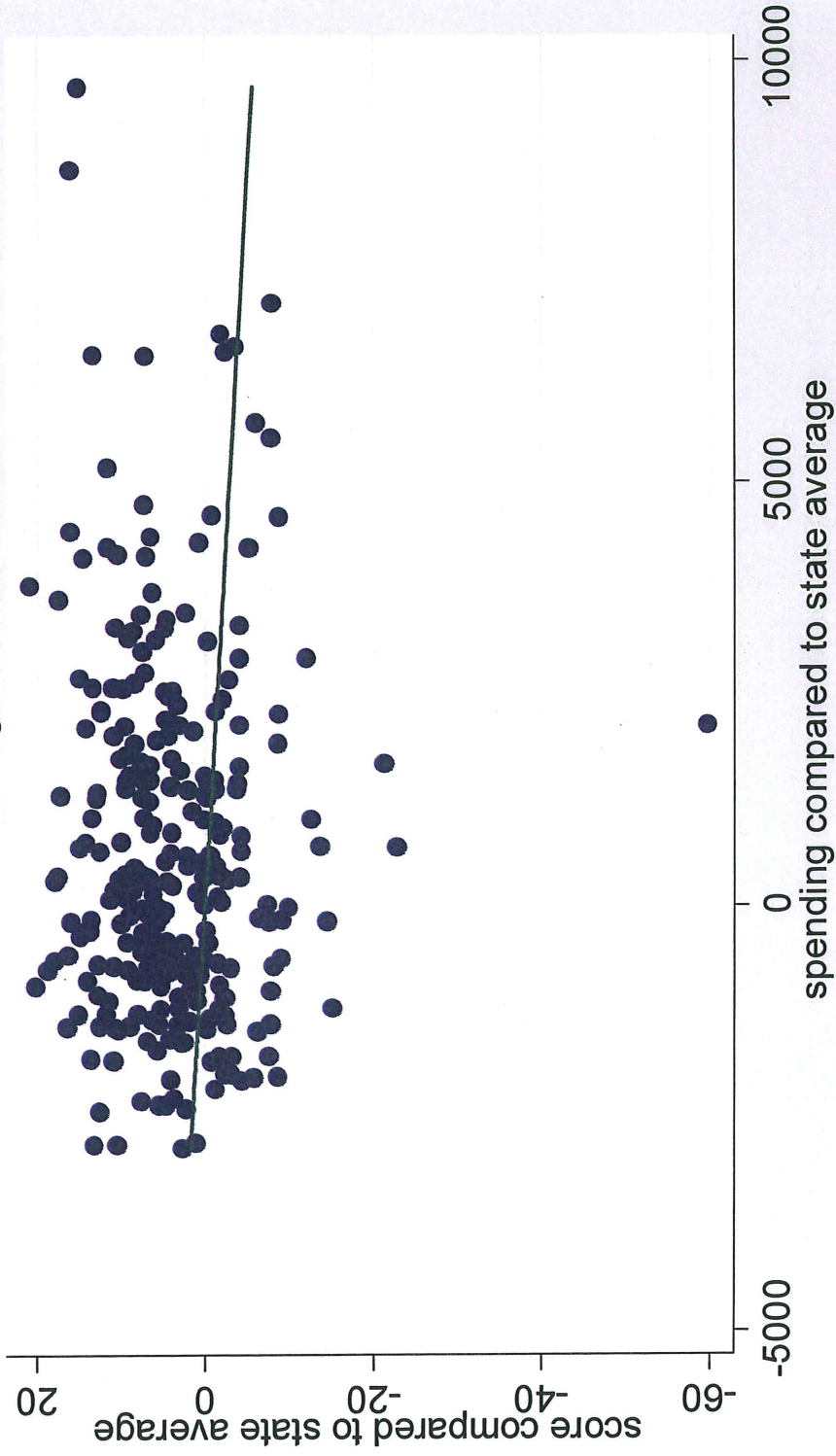
Effect of Spending on Performance -- Adjusted for Poverty

Grade 6, Math -- all districts, 2011



Effect of Spending on Performance -- Adjusted for Poverty

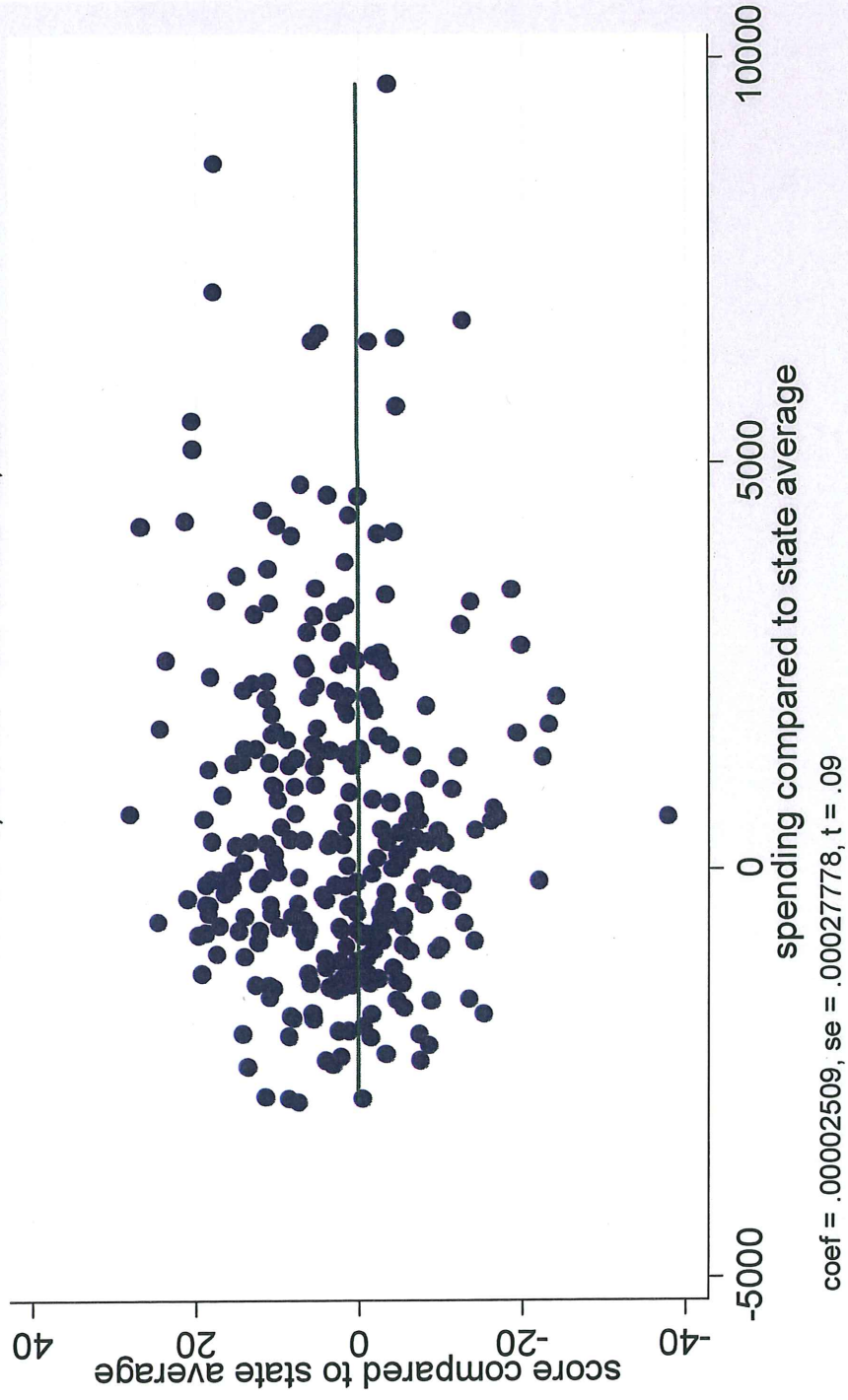
Grade 6, Reading -- all districts, 2011



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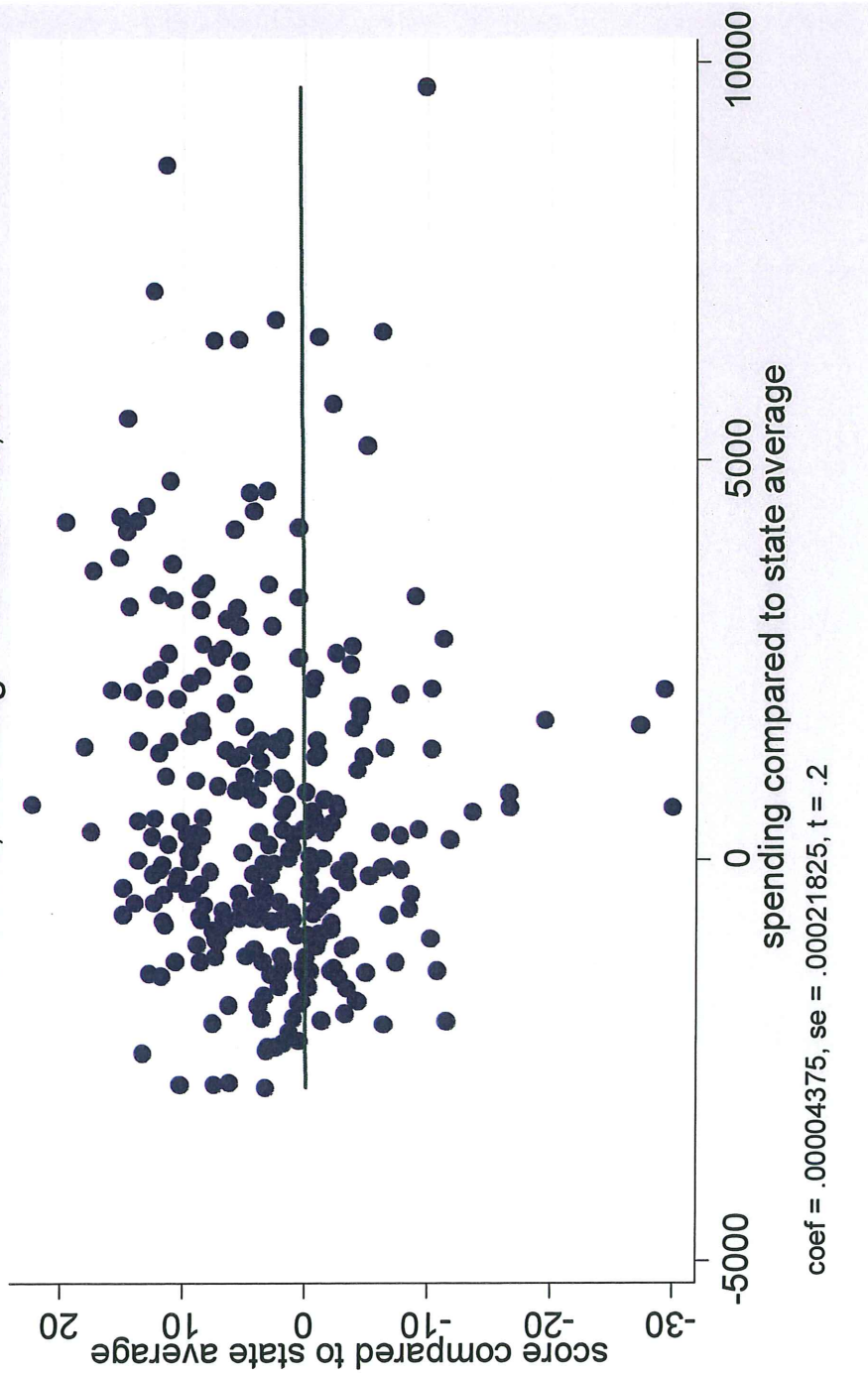
Effect of Spending on Performance -- Adjusted for Poverty

Grade 8, Math -- all districts, 2011



Effect of Spending on Performance -- Adjusted for Poverty

Grade 8, Reading -- all districts, 2011

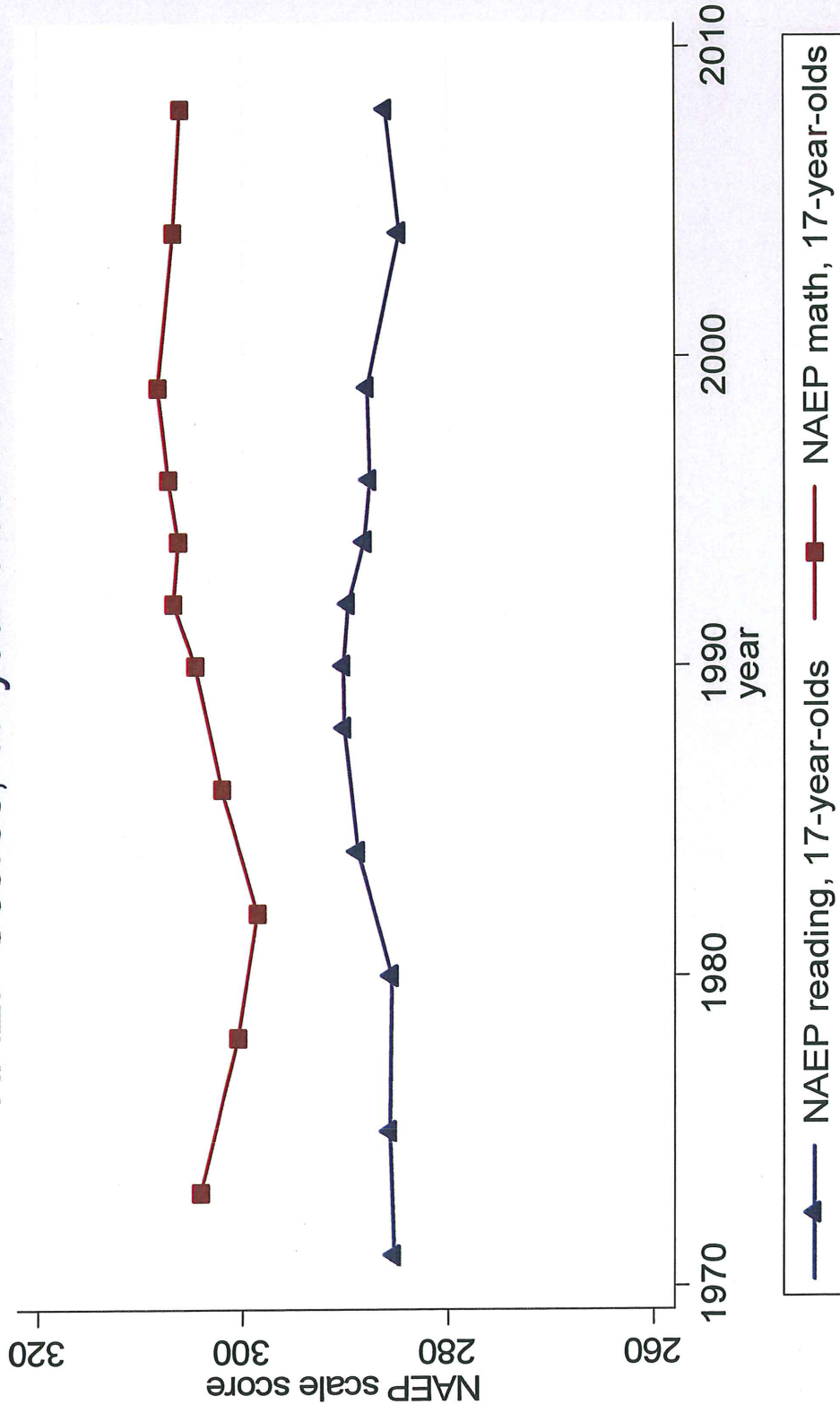


Public School Resources in the United States, 1960-2009

	1960	1980	2000	2009
Pupil-teacher ratio ^a	25.8	18.7	16.0	15.3
% teachers with master's degree or more	23.5	49.6	56.8	n.a.
Median years teacher of experience	11	12	14	n.a.
Real expenditure per student (2008-9 \$'s)	\$2,560	\$5,775	\$8,765	\$10,591

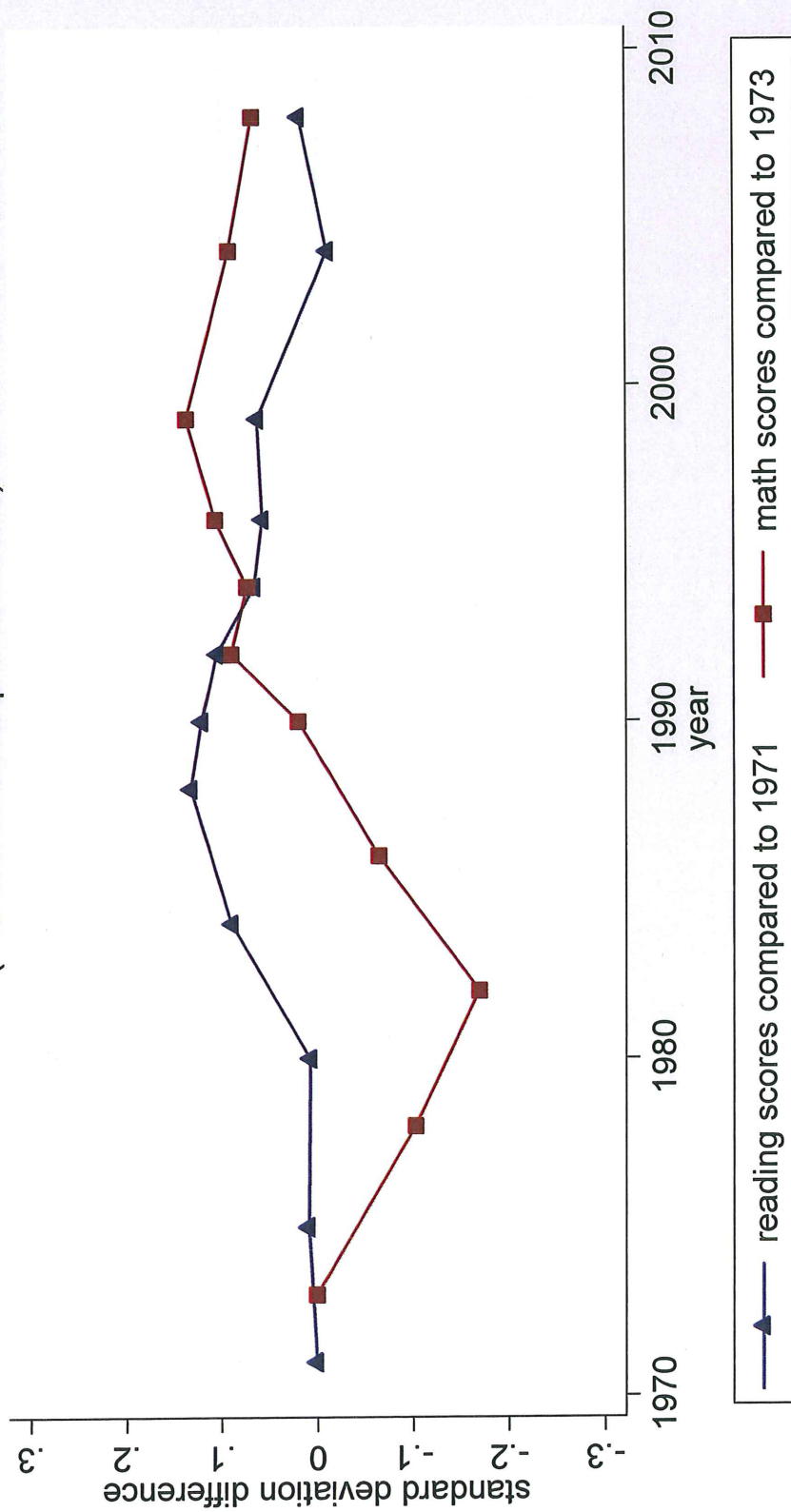
n.a. not available; Source: U.S. Department of Education, *Digest of Education Statistics* Gannott et al. vs. Kansas

NAEP Scores, 17 year olds 1971-2008



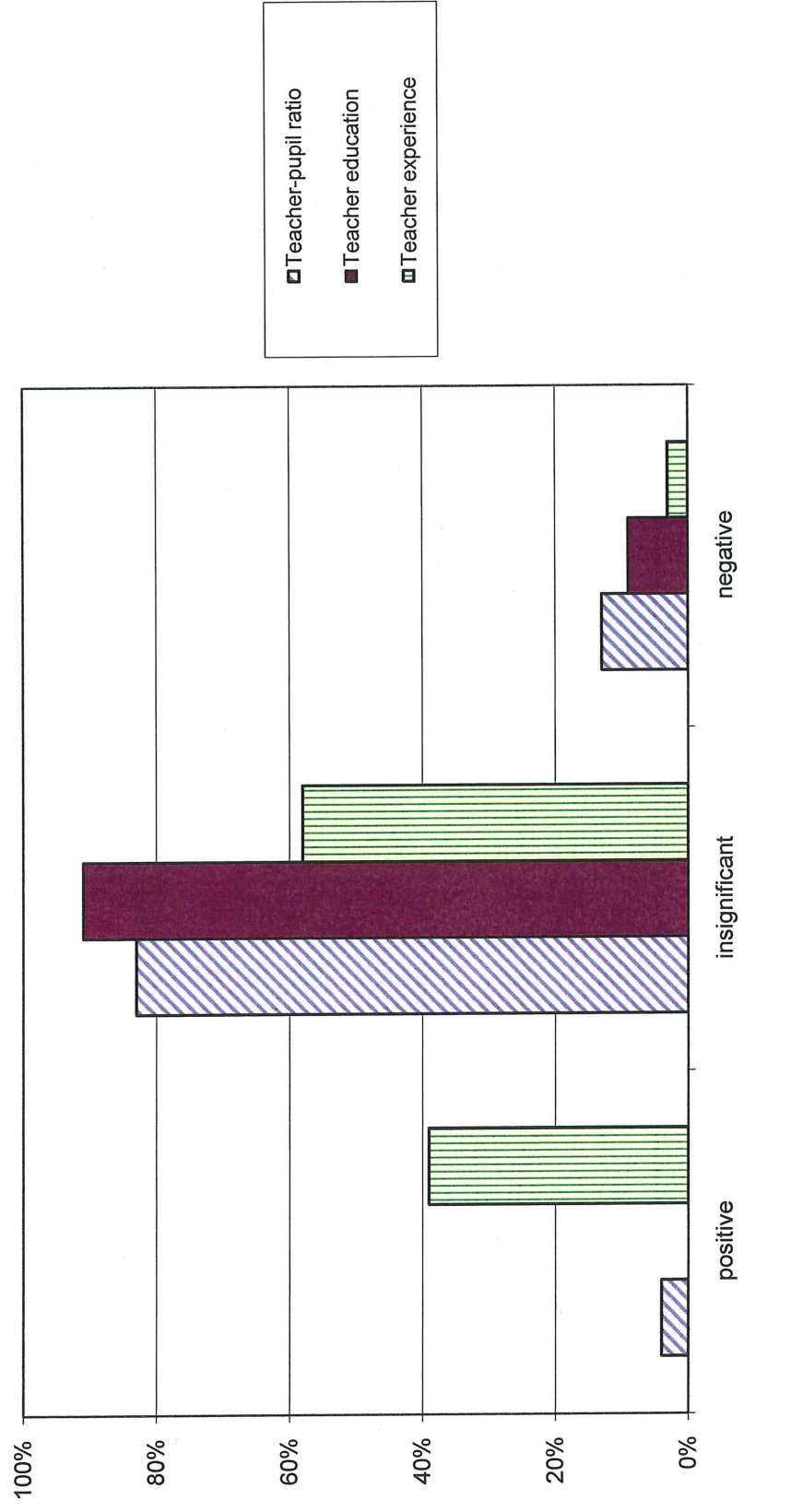
Source: author calculations using data from <http://nationsreportcard.gov/>

NAEP Scores, 17 year olds 1971-2008
(relative to initial performance)



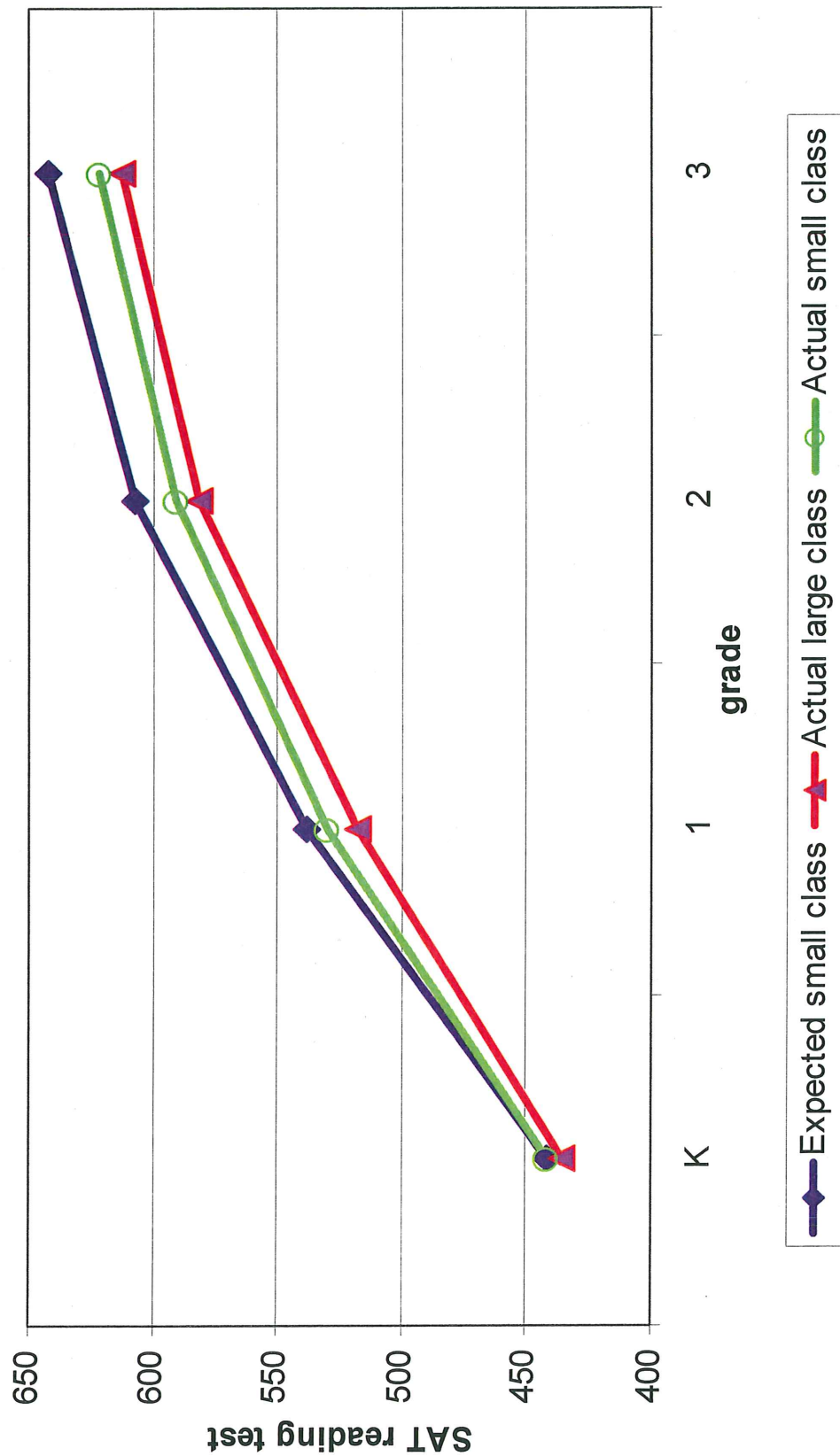
Source: author calculations using data from <http://nationsreportcard.gov/>

Best Econometric Evidence for Real Resources



Source: Hanushek, Eric A. 2003. "The failure of input-based schooling policies." *Economic Journal* 113, no. 485

Actual v Expected STAR results SAT reading test



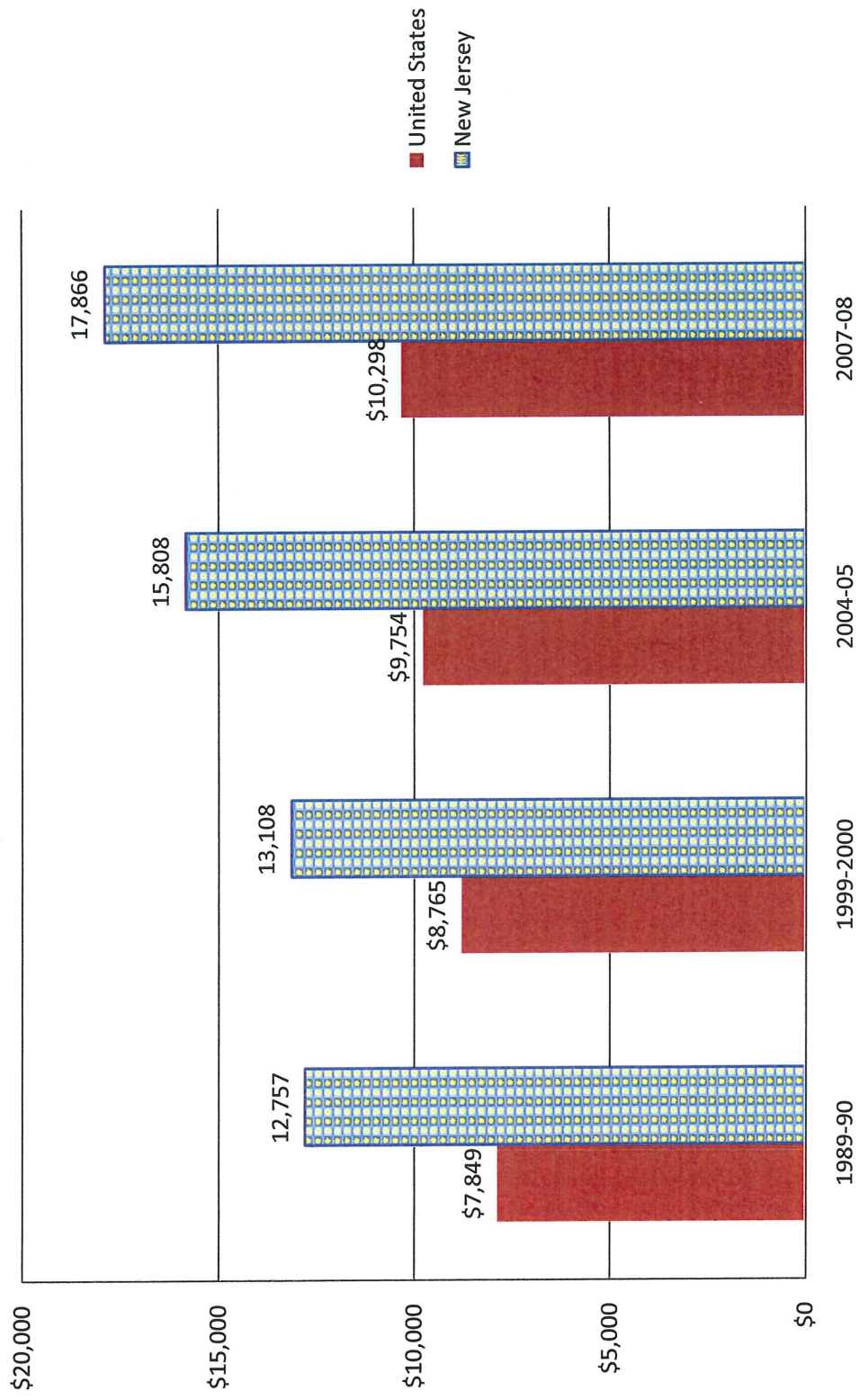
Source: Author calculations from Hanushek, Eric A. 1999. "Some findings from an independent investigation of the Tennessee STAR experiment and from other investigations of class size effects." *Educational Evaluation and Policy Analysis* 21, no. 2

Court Ordered Spending

New Jersey

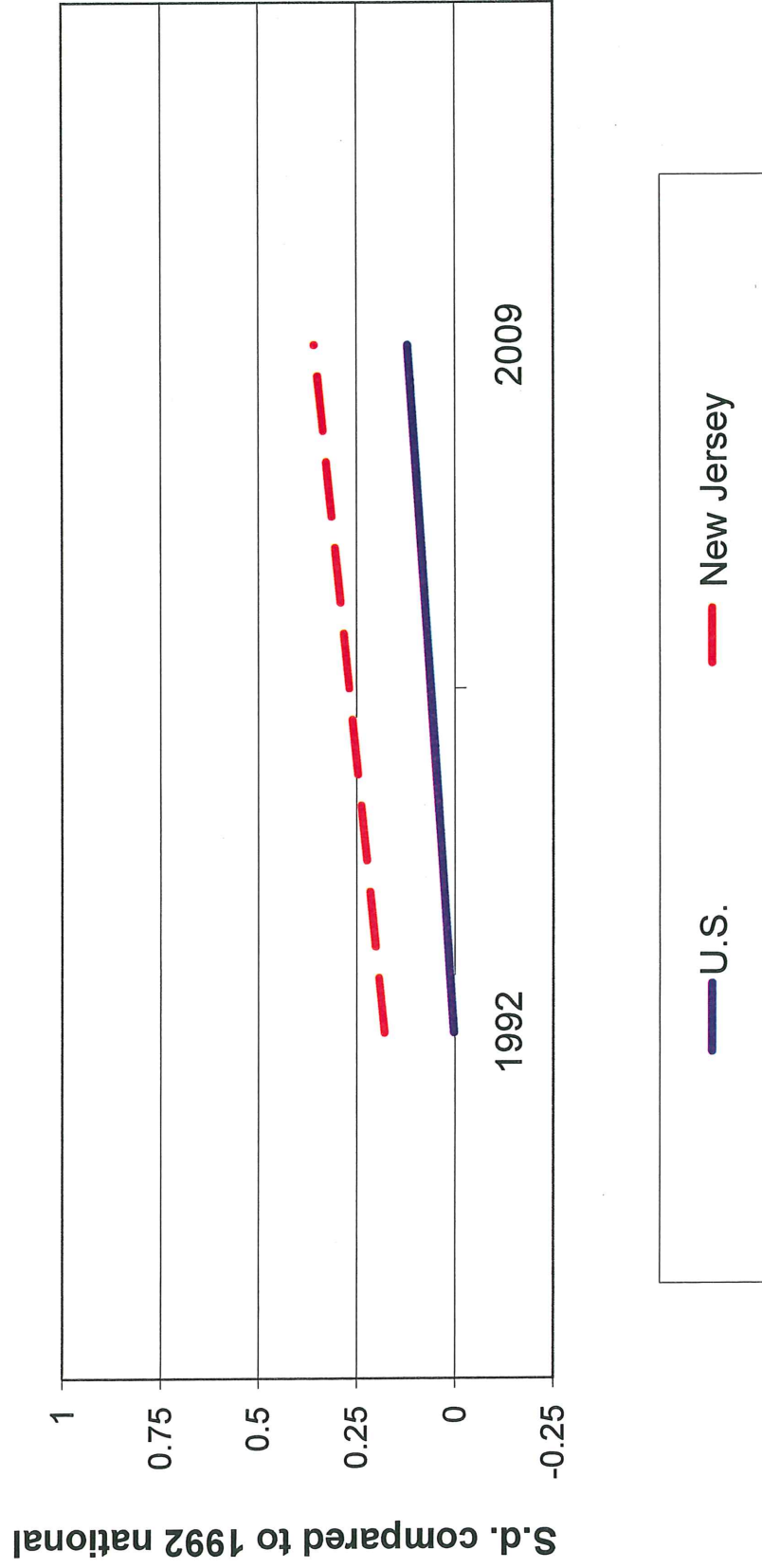
- New Jersey provides longest and clearest evidence about the ineffectiveness of judicial intervention on spending
- New Jersey spending has increased dramatically compared to national spending
- New Jersey performance has not significantly increased compared to national performance

Current Expenditure per Pupil U.S. versus New Jersey (Inflation adjusted -- 2009 \$'s)



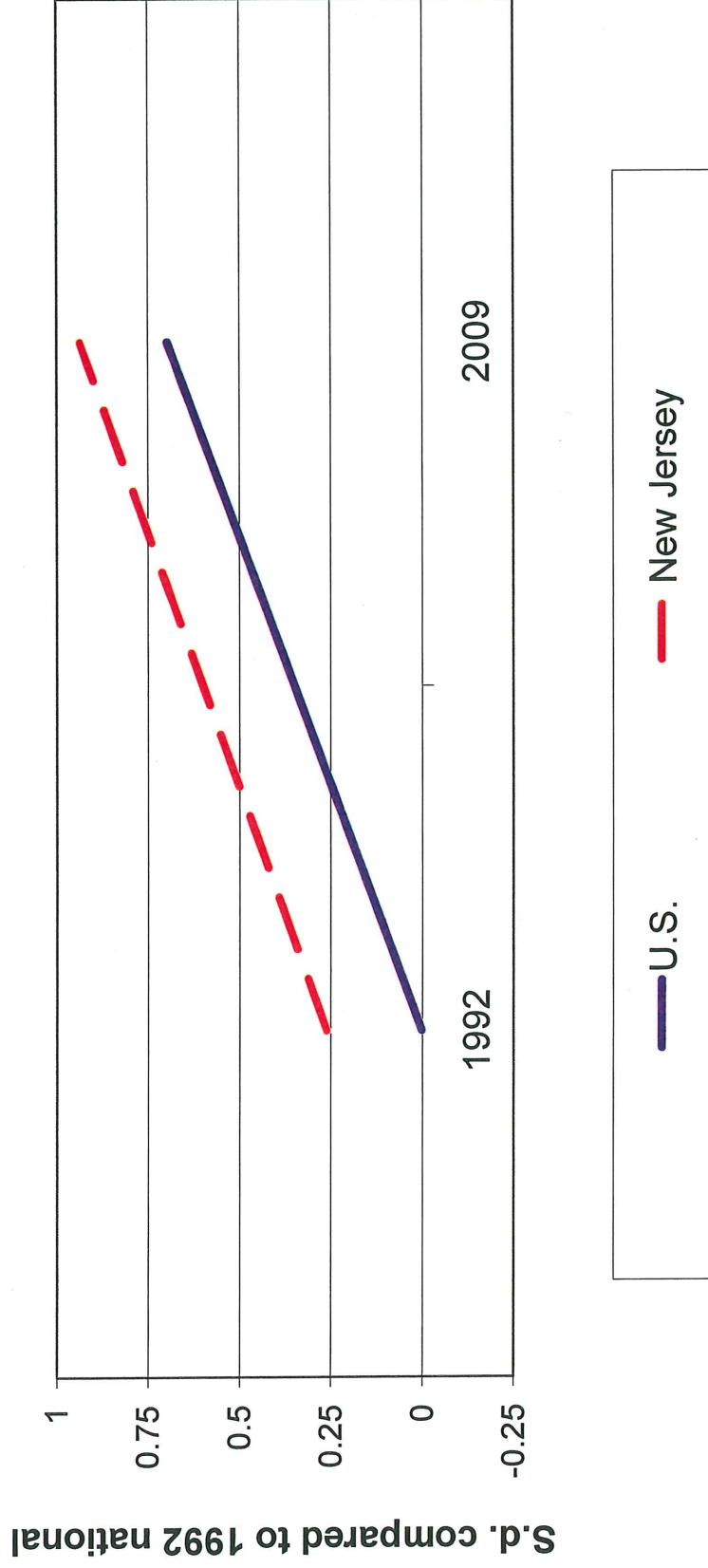
Source: U.S. Department of Education, *Digest of Education Statistics*
Gannon et al. vs. Kansas

NAEP Reading 4th Grade All Students



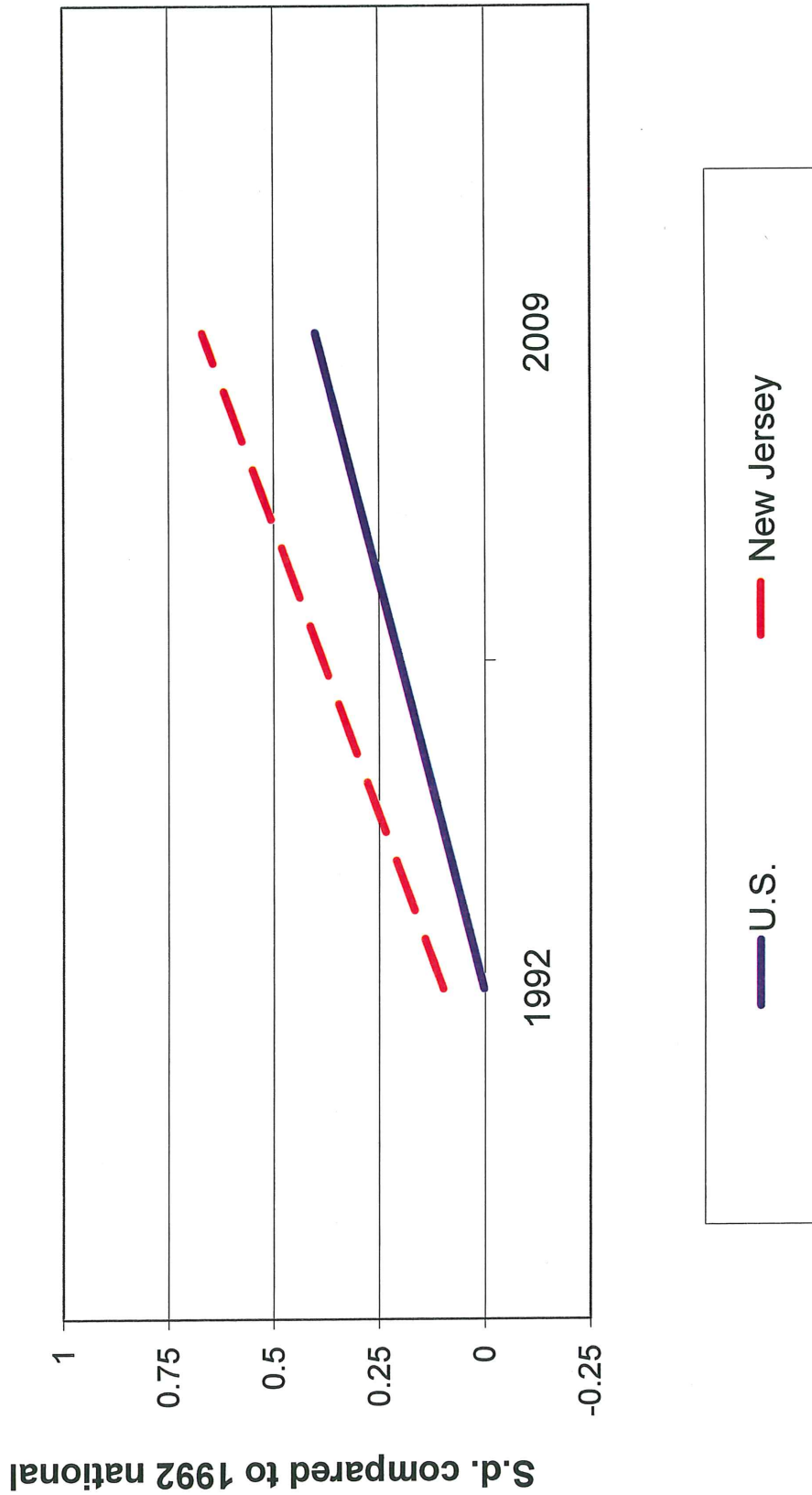
Source: Author update from Hanushek, Eric A., and Alfred A. Lindseth. 2009. *Schoolhouses, courthouses, and statehouses: Solving the funding-achievement puzzle in America's public schools*. Princeton, NJ: Princeton University Press.

NAEP Mathematics 4th Grade All Students



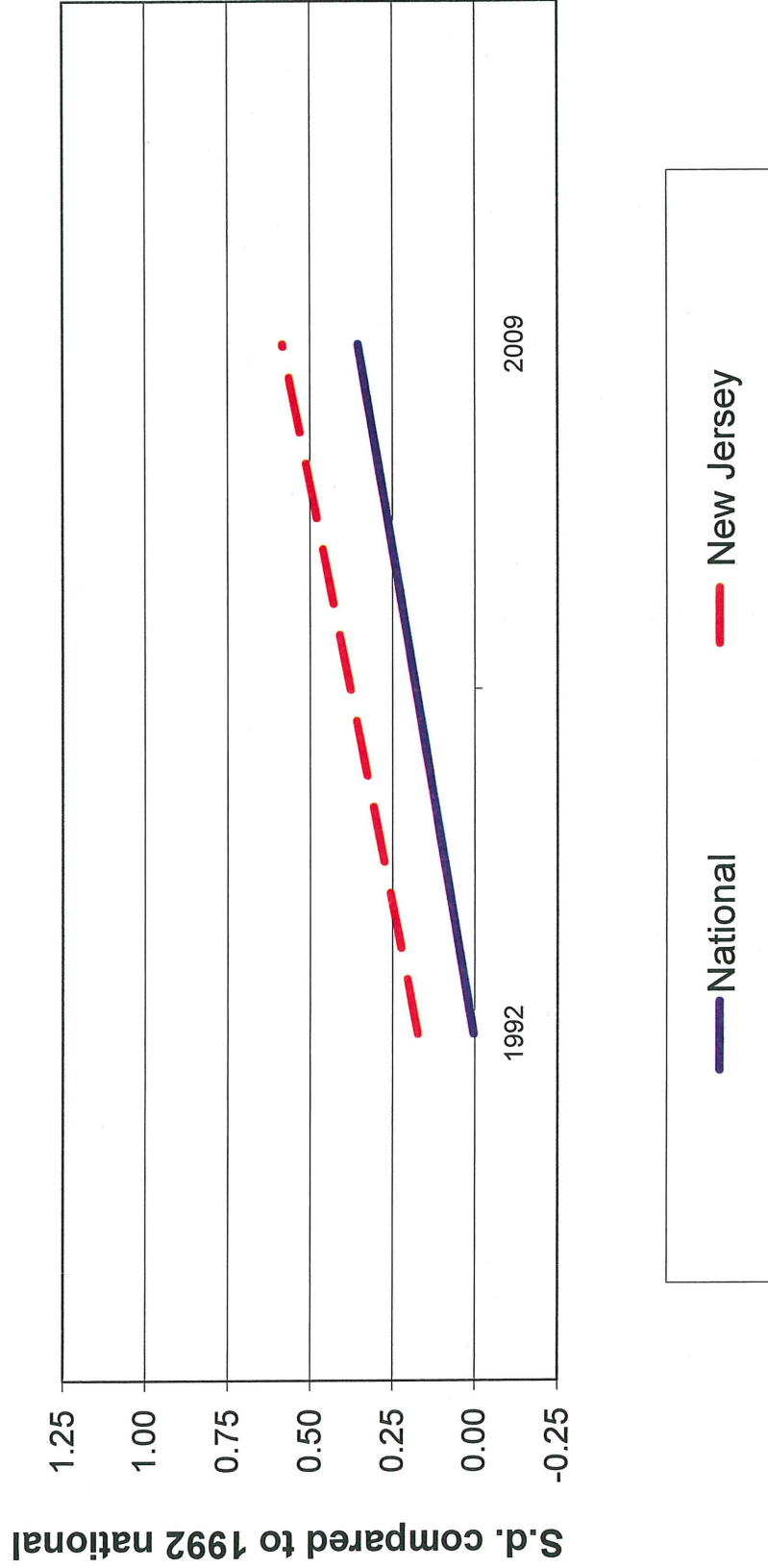
Source: Author update from Hanushek, Eric A., and Alfred A. Lindseth. 2009. *Schoolhouses, courthouses, and statehouses: Solving the funding-achievement puzzle in America's public schools*. Princeton, NJ: Princeton University Press.

NAEP Mathematics 8th Grade All Students



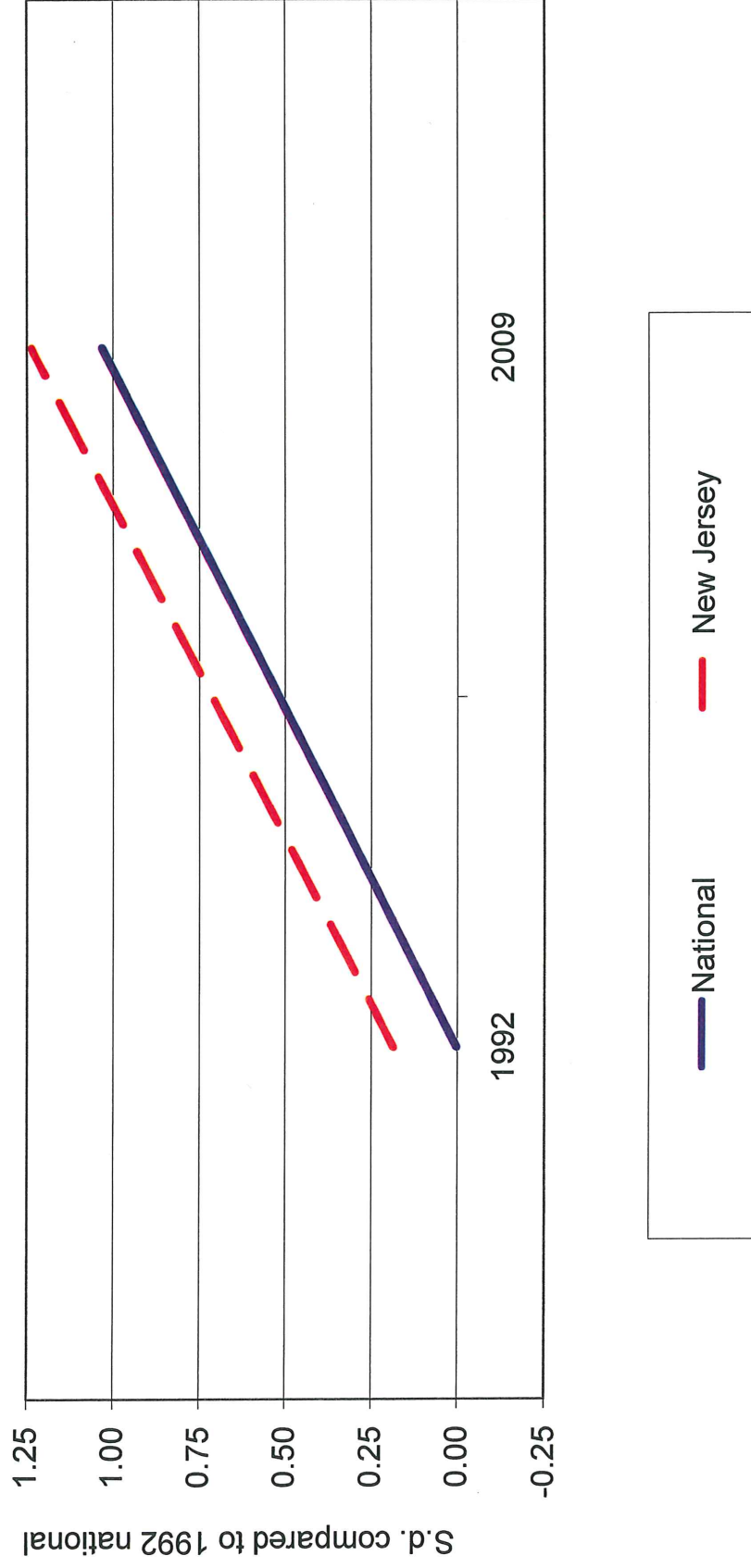
Source: Author update from Hanushek, Eric A., and Alfred A. Lindseth. 2009. *Schoolhouses, courthouses, and statehouses: Solving the funding-achievement puzzle in America's public schools*. Princeton, NJ: Princeton University Press.

NAEP Reading 4th Grade Black Students



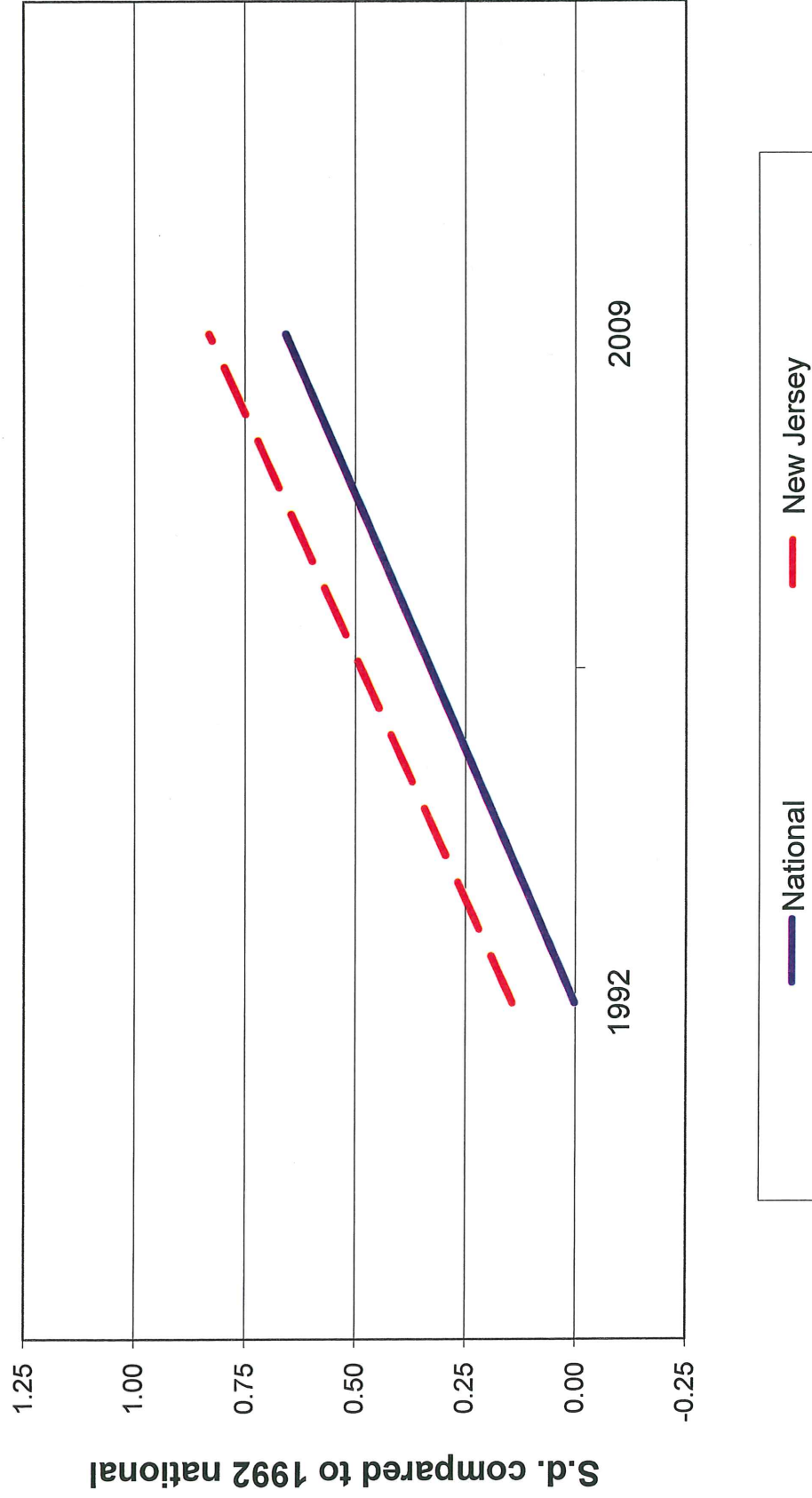
Source: Author update from Hanushek, Eric A., and Alfred A. Lindseth. 2009. *Schoolhouses, courthouses, and statehouses: Solving the funding-achievement puzzle in America's public schools*. Princeton, NJ: Princeton University Press.
Gannon et al. vs. Kansas

NAEP Mathematics 4th Grade Black Students



Source: Author update from Hanushek, Eric A., and Alfred A. Lindseth. 2009. *Schoolhouses, courthouses, and statehouses: Solving the funding-achievement puzzle in America's public schools*. Princeton, NJ: Princeton University Press.

NAEP Mathematics 8th Grade Black Students



Source: Author update from Hanushek, Eric A., and Alfred A. Lindseth. 2009. *Schoolhouses, courthouses, and statehouses: Solving the funding-achievement puzzle in America's public schools*. Princeton, NJ: Princeton University Press.
Gannon et al. vs. Kansas

Court Ordered Spending

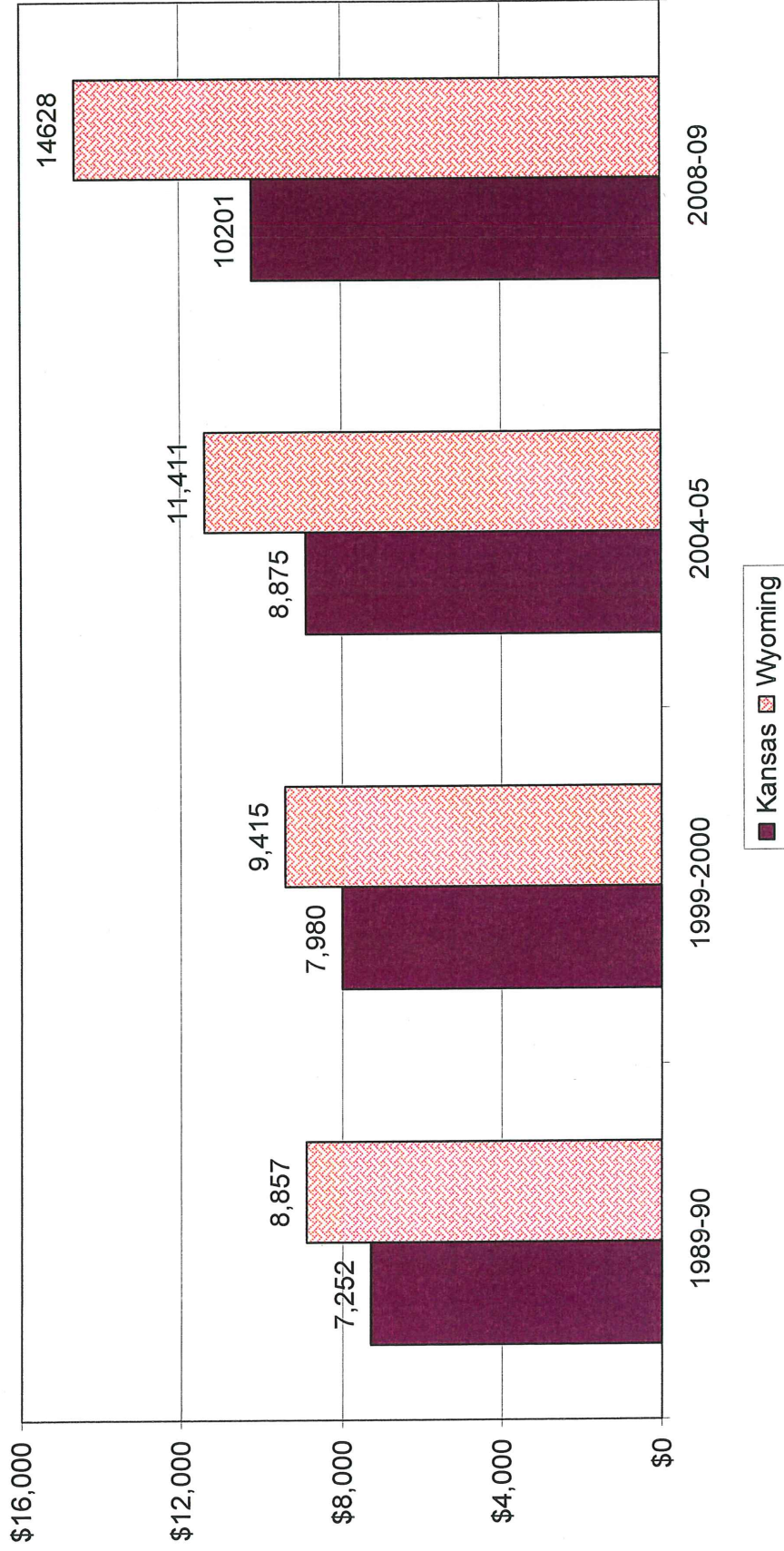
Wyoming

- Wyoming constitution requires it to establish a “complete and uniform” and a “thorough and efficient system” of public schools
- Wyoming has had court ordered policy to spend whatever is necessary to provide the “best” education, one that is “visionary and unsurpassed”

BUT

- Wyoming is very similar to Kansas in population and schools and offers a direct contrast of approaches and results
- Wyoming students do not consistently outperform Kansas students even with greatly larger spending and better family inputs
- Kansas students are better prepared for college than Wyoming students

**Current Expenditure per Pupil
Kansas versus Wyoming
(Inflation adjusted -- 2009 \$'s)**



Source: Johnson, Frank, Lei Zhou, and Nanae Nakamoto. 2011. "Revenues and Expenditures for Public Elementary and Secondary Education: School Year 2008-09 (Fiscal Year 2009)." Washington, DC: National Center for Education Statistics
Gannon et al. vs. Kansas

Kansas versus Wyoming

Population Characteristics (2008)

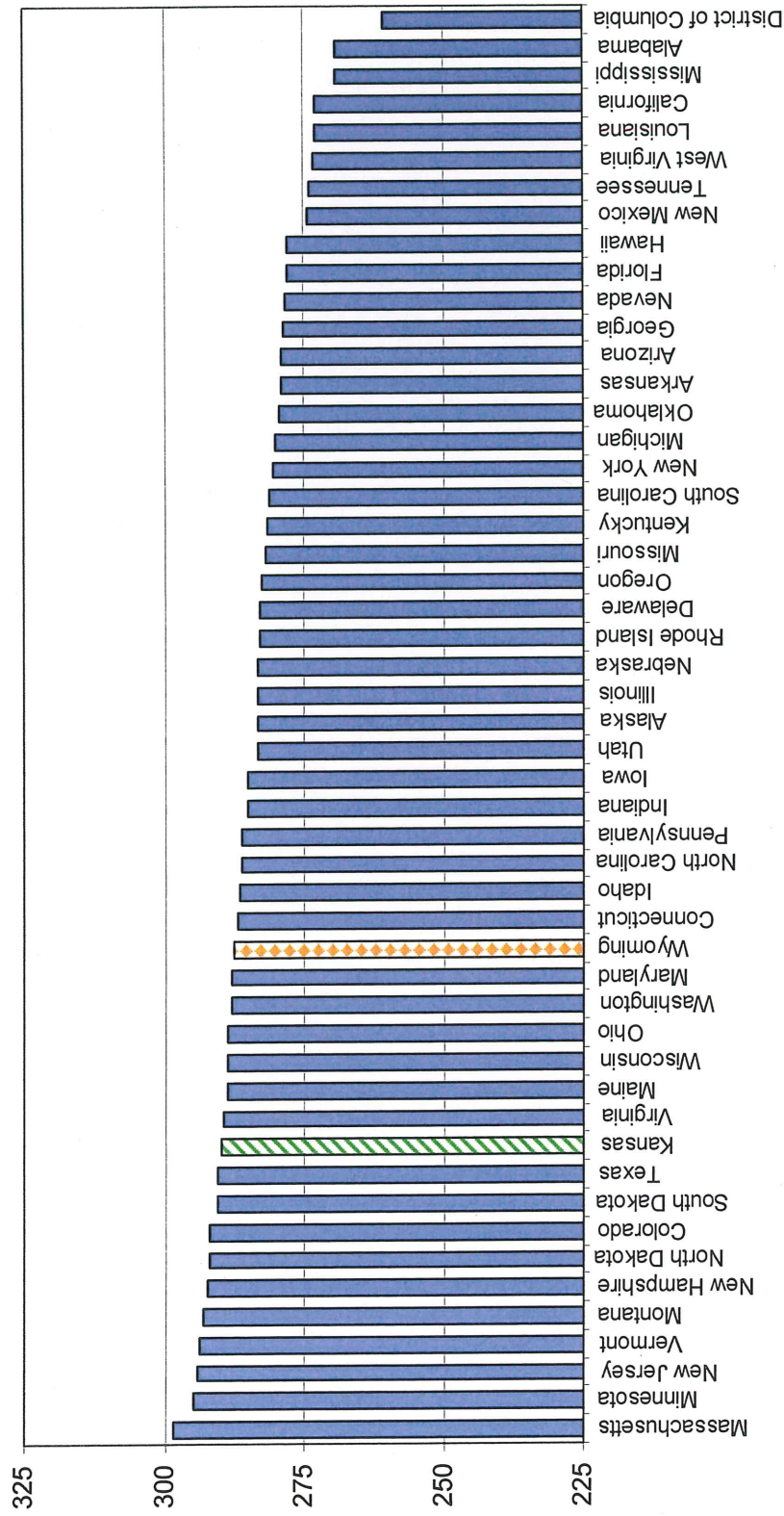
	United States	Kansas	Wyoming
Racial Distribution			
White	54.9	72.8	83.3
Black	17.0	8.8	1.6
Hispanic	21.5	14.0	10.4
Education			
(High school or more for population 25 or older)			
Total	84.6	89.0	91.0
White	89.5	92.0	92.4
Black	80.2	85.4	91.0
Hispanic	60.6	57.9	71.2

Free or Reduced

Price Lunch
 Source: U.S. Department of Education, *Digest of Education Statistics*
 Gannon et al. vs. Kansas

44.6
 43.0
 31.0

NAEP 8th Grade Mathematics, 2011



Source: Authors calculations from data at <http://nationsreportcard.gov/>

State Rankings on NAEP

	Kansas	Wyoming
Mathematics, grade 4	7	16
Mathematics, grade 8	11	18
Reading, grade 4	16	14
Reading, grade 8	20	11

Preparation for College

	College chances ^a (2008)	state rank	High ACT or SAT per 1000 ^b (2007)	state rank	HS Graduation ^c (2008)	state rank
Kansas	49.72	12	244	6	78.2	14
Wyoming	44.35	24	226.8	13	74.7	22
United States	43.99		188.5		70.0	

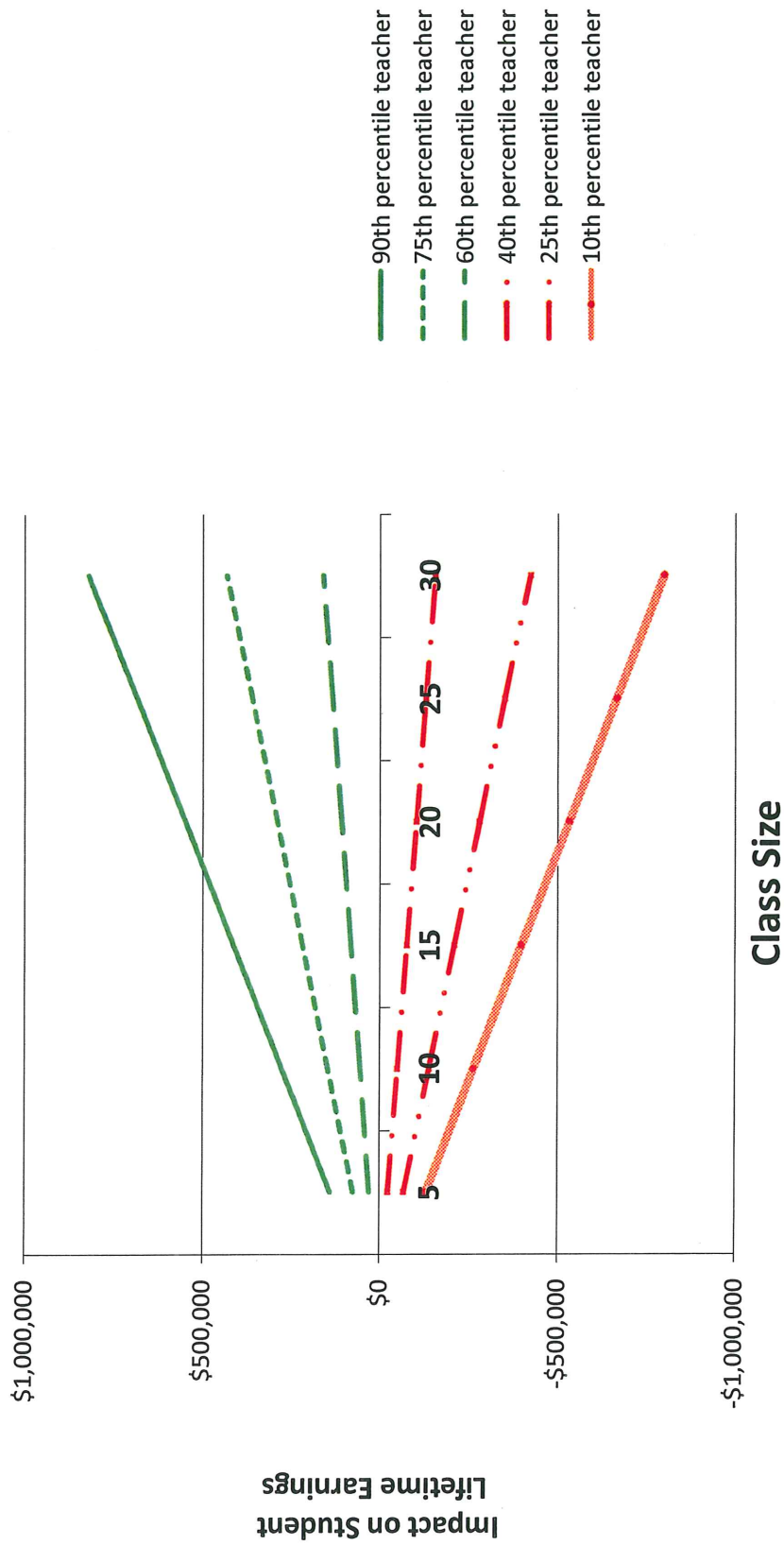
Notes:

- a. 9th Graders Chance for College by Age 19 (%)
- b. Number of ACT Scores 25 and Higher and SAT Scores 1780 and Higher - Per 1,000 High School Graduates
- c. Percent graduation rate from public high schools

Teacher Effectiveness

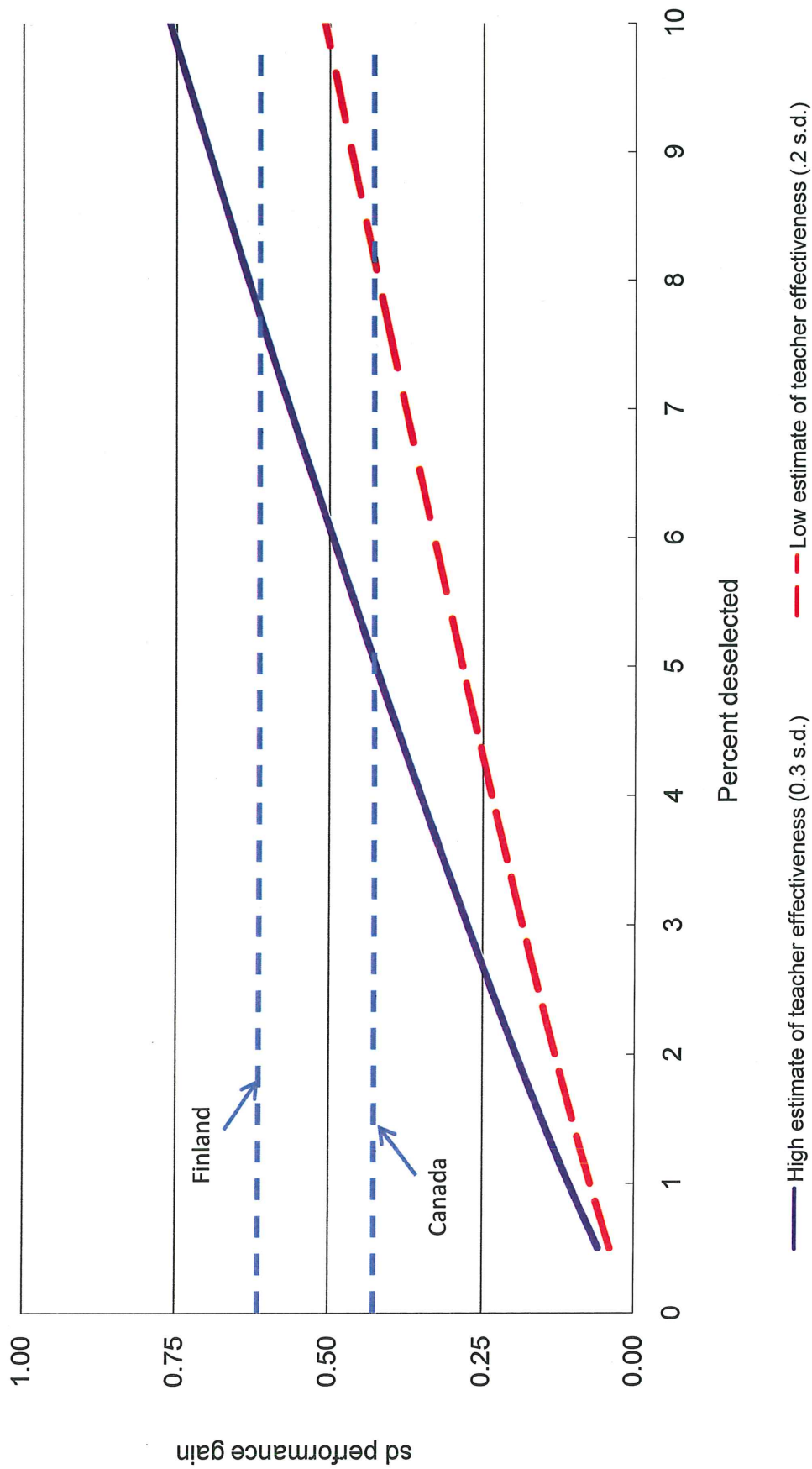
- Research shows that teacher effectiveness is the most important aspect of schools
- Economic value is seen from individual student outcomes and from impact on national growth
 - By class size
 - International

Impact on Student Lifetime Incomes by Class Size and Teacher Effectiveness (compared to average teacher)



Source: Hanushek, Eric A. 2011. "The Economic Value of Higher Teacher Quality." *Economics of Education Review* 30, no. 3

Alternative Estimates of How Removing Ineffective Teachers Affects Student Achievement



Source: Hanushek, Eric A. 2011. "The Economic Value of Higher Teacher Quality." *Economics of Education Review* 30, no. 3

Gannon et al. vs. Kansas

Eric A. Hanushek
Paul and Jean Hanna Senior Fellow
Stanford University

Contact

Hoover Institution
Stanford University
Stanford, CA 94305-6010
(650) 736-0942

fax: (650) 723-1687
e-mail: hanushek@stanford.edu
home page: <http://www.hanushek.net>

Education

1965 B.S. (Distinguished Graduate) U.S. Air Force Academy

1968 Ph.D. (Economics) Massachusetts Institute of Technology
 Thesis: "The Education of Negroes and Whites"

Learned Societies

American Economic Association
American Education Finance Association
 (Board of Directors, 2006-2009)
Association for Public Policy Analysis and Management
 (Policy Council, 1981-85; vice president, 1986-87; president, 1988-89)
Econometric Society
Society of Labor Economists
 (Fellow, 2006-)
American Educational Research Association
 (Fellow, 2008-)
International Institute of Public Finance

Honors

Fellow, International Academy of Education, 1997
 (Board of Directors, 2002- 2008)
Fellow, Society of Labor Economists, 2006
Member, National Academy of Education, 2006
Fellow, American Educational Research Association, 2008
Fordham Prize for Excellence in Education (distinguished scholarship), 2004

Military Service

U.S. Air Force, 1965-74

Academic Experience

2000- Paul and Jean Hanna Senior Fellow, Hoover Institution, Stanford University

Professor (by courtesy) of Education (2001-)
Senior Fellow (by courtesy), Stanford Center for International Development [SCID], Stanford Institute for Economic Policy Research [SIEPR], (2003-)
Professor (by courtesy) of Economics (2004-)

2003- Chairman, Executive Board, Texas Schools Project, University of Texas at Dallas

2000- Senior Research Fellow, Cecil and Ida Green Center for the Study of Science and Society, University of Texas at Dallas

1999- Member, Koret Task Force on K-12 Education, Hoover Institution, Stanford University

1995- Research Associate, National Bureau of Economic Research

2006- Research Professor, Ifo Institute for Economic Research (University of Munich)

2008- Member, Management Team, Center for Analysis of Longitudinal Data in Education Research (CALDER)

2006- Area coordinator, Economics of Education, CESifo Research Network

2006-2008 Member, Scientific Advisory Council, Ifo Institute for Economic Research

1978-2000 Professor of Economics and Political Science, University of Rochester

Director, W. Allen Wallis Institute of Political Economy (1991-99)
Professor of Public Policy (1992-2000)
Senior Research Associate, Rochester Center for Economic Research (1984- ; Director, 1994-99)
Chairman, Department of Economics (1982-87; 1988-90; 1991-93)

1999-2000 Distinguished Visiting Fellow, Hoover Institution, Stanford University

1994 Visiting Fellow, Australian National University

1975-78 Associate Professor, Department of Economics and Institution for Social and Policy Studies, Yale University

1974 Lecturer, Virginia Polytechnic Institute (Reston Campus)

1968-73 Associate Professor of Economics, U.S. Air Force Academy (Assistant Professor, 1969-71; Instructor, 1968-69)

1970-71 Research Associate, J.F. Kennedy School of Government, Harvard

University

Government Experience

2011-	Commissioner, Equity and Excellence Commission, U.S. Department of Education
2004-2010	Member, Board of Directors, National Board for Education Sciences Chair, 2008- 2010
2008-2010	Member, Council of Economic Advisors, California
2007	Member, Governor's Commission for a College Ready Texas, Texas
2006	Chair, NCLB Growth Model Pilot Peer Review, U.S. Department of Education
2005-2008	Member, Governor's Committee on Education Excellence, California
2002-2006	Member, Independent Review Panel, National Assessment of Title I, U.S. Department of Education
2001-05	Member, NCES Finance Technical Review Committee, U.S. Department of Education
2002	Member, Advisory Council on Education Statistics, U.S. Department of Education
1994-98	Member, Board of Economic Advisors, New York State Assembly
1994-95	Member, Technical Panel on Trends and Issues in Retirement Savings, Advisory Council on Social Security
1987-95	Consultant, U.S. Department of Education
1986-89	Consultant, U.S. Commission on Civil Rights
1987-89	Chairman, Technical Advisory Panel, Congressional Budget Office
1985-87	Member, Panel of Economic Advisers, Congressional Budget Office
1983-85	Deputy Director, Congressional Budget Office
1974	Systems Analyst, Military Airlift Command, U.S. Air Force
1973-74	Senior Economist, Cost of Living Council
1971-72	Senior Staff Economist, Council of Economic Advisers

Other Experience

2011-	Director, CollegeSpring (formerly SEE College Prep)
2010-	Member, Education Reform Advisory Group, George W. Bush Institute
2010-	Director, GreatSchools
2007-	Member, Review Board for Broad Prize for Urban Education
2000-01	Member, Committee on Scientific Principles of Education Research, National Academy of Sciences/National Research Council
2000	Member, Historic Preservation Commission, Town of Brighton, NY
1998-2001	Member, Panel on Data and Methods for Measuring the Effects of Changes in Social Welfare Programs, National Academy of Sciences/National Research Council
1992-98	Member, Committee on National Statistics, National Academy of Sciences/National Research Council
1993-97	Chairman, Panel on Retirement Income Modeling, National Academy of Sciences/National Research Council
1990-94	Chairman, Panel on the Economics of Educational Reform (PEER)
1984-95	Consultant, The World Bank
1992	Chairman, Blue Ribbon Commission on Monroe County Finances, Monroe County, NY
1988-91	Chairman, Panel to Evaluate Microsimulation Models for Social Welfare Programs, National Academy of Sciences/National Research Council
1977-83	Consultant, Mathematica Policy Research
1976-78	Member, Mayor's Task Force on Education, New Haven, CT
1975-77	Senior Research Associate, Institute for Demographic and Economic Studies
1975-77	Consultant, Abt Associates
1972-74	Member, RFF-Academy for Contemporary Problems, Metropolitan Governance Research Committee
1969-73	Consultant, The Rand Corporation

Invited Lectures

Distinguished Scholar Lecture, Martin School of Public Policy, University of Kentucky, 2010

Giblin Lecture, University of Tasmania, 2009

Hannah Lecture, Michigan State University, 2009

Gilbert Memorial Lecture, University of Rochester, 2008

Spencer Foundation Distinguished Lecture, Association for Public Policy Analysis and Management, 2005

Sweat Lecture, Georgia State University, 2005

Birger Lecture, Tufts University, 2005

Lee Hysan Lecture, Chinese University of Hong Kong, 2004

Askwith Lecture, Harvard University, 2003

Reilly Lecture, Louisiana State University, 2002

Mullen Lecture, University of Maryland, Baltimore County, 1999

Saks Memorial Lecture, Vanderbilt University, 1996

Editorial Activities

- | | |
|------------|---|
| 2007- | Associate Editor, <i>Journal of Human Capital</i> |
| 2005- | Editorial Board, <i>Education Finance and Policy</i> |
| 2004- | Co-editor, <i>Education Policy Series</i> , International Academy of Education/International Institute for Educational Planning, UNESCO |
| 2000- | Editorial Board, <i>Education Next</i> |
| 1982- | Editorial Board, <i>Economics of Education Review</i> |
| 1978- | Advisory Editor, <i>Social Science Research</i> |
| 2002-2008 | Editorial Board, <i>Fundamentals of Educational Planning</i> , UNESCO |
| 2003-2007 | Associate Editor, <i>Economic Bulletin</i> |
| 1995-2002 | Associate Editor, <i>Review of Economics and Statistics</i> |
| 1997- 2001 | Editorial Board, <i>Educational Evaluation and Policy Analysis</i> |
| 1994-2001 | Editorial Board, <i>Journal of Policy Analysis and Management</i> |
| 1994-96 | Editorial Board, <i>Socio-Economic Planning Sciences</i> |
| 1991-97 | Associate Editor, <i>Regional Science and Urban Economics</i> |
| 1990-95 | Editorial Board, <i>Journal of Economic Education</i> |
| 1992-95 | Advisory Board, <i>American Journal of Education</i> |
| 1990-94 | Co-editor, <i>Journal of Human Resources</i> |
| 1987-1989 | Associate Editor, <i>Evaluation Review</i> |

PUBLICATIONS

Books

Handbook of the Economics of Education, Volume 4 (co-editor with Stephen J. Machin and Ludger Woessmann). *Handbook of the Economics of Education, Vol. 4, Amsterdam: North Holland, 2011, 708 pages.*

Handbook of the Economics of Education, Volume 3 (co-editor with Stephen J. Machin and Ludger Woessmann). *Handbook of the Economics of Education, Vol. 3, Amsterdam: North Holland, 2010, 616 pages.*

Schoolhouses, Courthouses, and Statehouses: Solving the Funding-Achievement Puzzle in America's Public Schools (with Alfred A. Lindseth). *Princeton University Press, 2009, 432 pages.*

Handbook of the Economics of Education, Volume 2 (co-editor with Finis Welch). *Handbook of the Economics of Education, Vol. 2, Amsterdam: North Holland, 2006, 742 pages.*

Handbook of the Economics of Education, Volume 1 (co-editor with Finis Welch). *Handbook of the Economics of Education, Vol. 1, Amsterdam: North Holland, 2006, 700 pages.*

Courting Failure: How School Finance Lawsuits Exploit Judges' Good Intentions and Harm our Children (editor). *Stanford: Education Next Books, 2006, 366 pages.*

Institutional Models in Education: Legal Framework and Methodological Aspects for a New Approach to the Problem of School Governance (co-editor with Enrico Gori, Daniele Vidoni and Charles Glenn). *Nijmegen, Netherlands: Wolf Legal Publishers, 2006, 243 pages.*

The Economics of Schooling and School Quality - Volume II: Efficiency, Competition, and Policy (editor). *London: Edward Elgar Publishing Ltd., 2003.*

The Economics of Schooling and School Quality - Volume I: Labor Markets, Distribution, and Growth (editor). *London: Edward Elgar Publishing Ltd., 2003, 976 pages.*

Assessing Policies for Retirement Income: Needs for Data, Research, and Models (co-editor with Constance F. Citro). *Washington, DC: National Academy Press, 1997, 256 pages.*

Improving America's Schools: The Role of Incentives (co-editor with Dale W. Jorgenson). *Washington, DC: National Academy Press, 1996, 280 pages.*

Assessing Knowledge of Retirement Behavior (co-editor with Nancy L. Maritato).

Washington, DC: National Academy Press, 1996, 288 pages.

Modern Political Economy: Old Topics, New Directions (co-editor with Jeffrey S. Banks). *New York: Cambridge University Press, 1995, 283 pages.*

Making Schools Work: Improving Performance and Controlling Costs. *Washington, DC: The Brookings Institution, 1994, 200 pages.*

Educação Rural: Lições do Edurural (with João Batista F. Gomes Neto, Ralph W. Harbison, and Raimundo Hélio Leite). *São Paulo: Editora da Universidade de São Paulo, 1994, 236 pages.*

Educational Performance of the Poor: Lessons from Rural Northeast Brazil (with Ralph W. Harbison). *New York: Oxford University Press, 1992, 362 pages.*

Improving Information for Social Policy Decisions: The Uses of Microsimulation Modeling - Volume II: Technical Papers (co-editor with Constance F. Citro). *Washington, DC: National Academy Press, 1991, 368 pages.*

Improving Information for Social Policy Decisions: The Uses of Microsimulation Modeling - Volume I: Review and Recommendations (co-editor with Constance F. Citro). *Washington, DC: National Academy Press, 1991, 360 pages.*

Statistical Methods for Social Scientists (with John E. Jackson). *New York: Academic Press, 1977, 374 pages.*

Education and Race: An Analysis of the Educational Production Process. *Lexington, MA: D.C. Heath, 1972, 176 pages.*

Articles

Grinding the Antitesting Ax: More bias than evidence behind NRC panel's conclusions. *Education Next, Spring 2012, pp. 2-8.*

The Economic Benefit of Educational Reform in the European Union (with Ludger Woessmann). *CESifo Economic Studies, Forthcoming.*

Household location and schools in metropolitan areas with heterogeneous suburbs: Tiebout, Alonso, and government policy (with Kuzey Yilmaz). *Journal of Public Economic Theory, Forthcoming.*

Urban education, location, and opportunity in the United States (with Kuzey Yilmaz). In Nancy Brooks, Kieran Donaghy, and Gerrit-Jan Knaap (ed.). *Oxford Handbook of Urban Economics and Planning* (Oxford: Oxford University Press), 2011, pp. 583-615.

Are U.S. Students Ready to Compete? (with Paul E. Peterson, Ludger Woessmann, and

Carlos Xabel Lastra-Anadón). *Education Next*, 11(4), Fall 2011, pp. 51-59.

Globally Challenged: Are U.S. Students Ready to Compete? (with Paul E. Peterson, Ludger Woessmann, and Carlos Xabel Lastra-Anadón). *PEPG Report No. 11-03*, Cambridge, MA: Program on Education Policy and Governance, Harvard University, August 2011.

Private Schools and Residential Choices: Accessibility, Mobility, and Welfare (with Sinan Sarpça and Kuzey Yilmaz). *B.E. Journal of Economic Analysis & Policy (Contributions)*, 11(1) article 44, 2011, pp. 1-32.

How Much Do Educational Outcomes Matter in OECD Countries? (with Ludger Woessmann). *Economic Policy*, 26(67), July 2011, pp. 427-491.

Valuing Teachers: How Much is a Good Teacher Worth? *Education Next*, 11(3), Summer 2011, pp. 40-45.

The Economic Value of Higher Teacher Quality. *Economics of Education Review*, 30(2), June 2011, pp. 466-479.

Teaching Math to the Talented: Which Countries - and States - are Producing High-Achieving Students? (with Paul E. Peterson and Ludger Woessmann) *Education Next*, Winter 2011, pp. 10-18.

Paying Teachers Appropriately. *The American Public School Teacher: Past, Present, and Future*, (Cambridge, MA: Harvard Education Press), 2011, pp. 109-118.

Sample Selectivity and the Validity of International Student Achievement Tests in Economic Research (with Ludger Woessmann). *Economics Letters*, 110(2), February 2011, pp. 79-82.

The Economics of International Differences in Educational Achievement (with Ludger Woessmann) in Eric A. Hanushek, Stephen Machin and Ludger Woessmann (ed.). *Handbook of the Economics of Education, Vol. 3*, Amsterdam: North Holland, 2011, pp. 89-200.

How well do we understand achievement gaps? *Focus*, 27(2), Winter 2010, pp. 5-12.

U.S. Math Performance in Global Perspective: How Well Does Each State Do at Producing High-Achieving Students? (with Paul E. Peterson and Ludger Woessmann) *PEPG Report No. 10-19*, Cambridge, MA: Program on Education Policy and Governance, Harvard University, November 2010.

The Difference is Teacher Quality in Karl Weber (ed.). *Waiting for "Superman": How We Can Save America's Failing Public Schools*. New York: Public Affairs, 2010, pp. 81-100.

An Effective Teacher in Every Classroom: A lofty goal, but how to do it (with Kati Haycock). *Education Next*, 10(3), Summer 2010, pp. 46-52.

The Quality and Distribution of Teachers under the No Child Left Behind Act (with Steven G. Rivkin). *Journal of Economic Perspectives*, 24(3), Summer 2010, pp. 133-150.

Generalizations about Using Value-Added Measures of Teacher Quality (with Steven G. Rivkin). *American Economic Review*, 100(2), May 2010, pp. 267-271.

Education and Economic Growth (with Ludger Woessmann) in Dominic J. Brewer and Patrick J. McEwan (ed.). *Economics of Education* (Amsterdam: Elsevier, 2010), 2010, pp. 60-67.

Education Production Functions: Developed Countries Evidence in Dominic J. Brewer and Patrick J. McEwan (ed.). *Economics of Education* (Amsterdam: Elsevier, 2010), 2010, pp. 132-136.

The High Cost of Low Educational Performance: The Long-Run Impact of Improving PISA Outcomes (with Ludger Woessmann). *Paris: Organization for Economic Cooperation and Development*, 2010, pp. 1-55.

Teacher Deselection in Dan Goldhaber and Jane Hannaway (ed.). *Creating a New Teaching Profession* (Washington, DC: Urban Institute Press, 2009), 2009, pp. 165-180.

Does Pollution Increase School Absences? (with Janet Currie, E. Megan Kahn, Matthew Neidell, and Steve G. Rivkin). *Review of Economics and Statistics*, 91(4), November 2009, pp. 683-694.

Many Schools Are Still Inadequate: Now what? (with Alfred A. Lindseth and Michael A. Rebel). *Education Next*, 9(4), Fall 2009, pp. 49-56.

School Policy: Implications of Recent Research for Human Capital Investments in South Asia and Other Developing Countries. *Education Economics*, 17(3), September 2009, pp. 291-313.

New Evidence about Brown v. Board of Education: The Complex Effects of School Racial Composition on Achievement (with John F. Kain and Steven G. Rivkin). *Journal of Labor Economics*, 27(3), July 2009, pp. 349-383.

Harming the Best: How Schools Affect the Black-White Achievement Gap (with Steven G. Rivkin). *Journal of Policy Analysis and Management*, 29(3), Summer 2009, pp. 366-393.

The Economic Value of Education and Cognitive Skills. *Handbook of Education Policy Research*, New York: Routledge, 2009, pp. 39-56.

Quality-Consistent Estimates of International Schooling and Skill Gradients (with Lei Zhang). *Journal of Human Capital*, 3(2), Summer 2009, pp. 107-143.

Getting Down to Facts: School Finance and Governance in California (with Susanna Loeb and Anthony Bryk). *Education Finance and Policy*, 3(1), Winter 2008, pp. 1-19.

The Role of Cognitive Skills in Economic Development (with Ludger Woessmann). *Journal of Economic Literature* 2008, 46(3), 2008, pp. 607-668.

Do Students Care about School Quality? Determinants of Dropout Behavior in Developing Countries (with Victor Lavy and Kohtaro Hitomi). *Journal of Human Capital*, 2(1), 2008, pp. 69-105.

Education Production Functions In Steven N. Durlauf and Lawrence E. Blume (eds.). *The New Palgrave Dictionary of Economics*, Basingstoke: Palgrave Macmillan, 2008.

What Do Cost Functions Tell Us About the Cost of an Adequate Education? (with Robert Costrell and Susanna Loeb). *Peabody Journal of Education*, 83(2), 2008, pp. 198-223.

Incentives for Efficiency and Equity in the School System. *Perspektiven der Wirtschaftspolitik*, 9 (Special Issue), 2008, pp. 5-27.

Education and Economic Growth: It's not Just Going to School but Learning That Matters (with Dean T. Jamison, Elliot A. Jamison and Ludger Woessmann). *Education Next*, 8(2), Spring 2008, pp. 62-70.

The Effects of Education Quality on Mortality Decline and Income Growth (with Eliot A. Jamison and Dean T. Jamison). *Economics of Education Review*, 26(2), December 2007, pp. 772-789.

The Single Salary Schedule and Other Issues of Teacher Pay. *Peabody Journal of Education*, 82(4), October 2007, pp. 574-586.

The Alchemy of 'Costing Out' an Adequate Education In Martin R. West and Paul E. Peterson (eds.). *School Money Trials: The Legal Pursuit of Educational Adequacy*, Washington, D.C.: Brookings Institution Press, 2007, pp. 77-101.

Education Quality and Economic Growth (with Ludger Woessmann). *World Bank*, July 2007, pp 1-27.

Some U.S. Evidence on how the Distribution of Educational Outcomes can be Changed In Ludger Woessmann and Paul E. Peterson (ed.). *Schools and the Equal Opportunity Problem*, Cambridge, MA: MIT Press, 2007, pp. 159-190.

The Confidence Men: Selling Adequacy, Making Millions. *Education Next*, 7(3), Summer 2007, pp. 73-78.

Charter School Quality and Parental Decision Making with School Choice (with John F. Kain, Steven G. Rivkin, and Gregory F. Branch). *Journal of Public Economics*, 91(5-6), June 2007, pp. 823-848.

Pay, Working Conditions, and Teacher Quality (with Steven G. Rivkin). *Future of Children*, 17(1), Spring 2007, pp. 69-96.

The Economic Benefits of Improved Teacher Quality In Nils C. Soquel and Pierre Jaccard (ed.). *Governance and Performance of Education Systems*, Dordrecht, Netherlands: Springer, 2007, pp. 107-135.

Teacher Quality (with Steven G. Rivkin) in Eric A. Hanushek and Finis Welch (ed.). *Handbook of the Economics of Education, Volume 2*, Amsterdam: North Holland, 2006, pp. 1052-1078.

School Resources In Eric A. Hanushek and Finis Welch (Ed.). *Handbook of the Economics of Education, Volume 2*, Amsterdam: North Holland, 2006, pp. 865-908.

Is There Hope for Expanded School Choice? In Robert C. Enlow and Lenore T. Ealy *Liberty and Learning: Milton Friedman's Voucher Idea at Fifty*, Washington, DC: Cato Institute, 2006, pp. 67-79.

Alternative School Policies and the Benefits of General Cognitive Skills. *Economics of Education Review*, 25(4), August 2006, pp. 447-462.

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