

Chapter 4

The Changing Distribution of Educational Opportunities: 1993–2012

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Abstract Over the past several decades, many states have pursued substantive changes to their state school finance systems. Some reforms have been stimulated by judicial pressure resulting from state constitutional challenges and others have been initiated by legislatures. But despite gains in school funding equity and adequacy made over the past few decades, in recent years we have witnessed a substantial retreat from equity and adequacy. This chapter builds on the national school funding fairness report annually published by the Education Law Center. We track school funding fairness (the relative targeting of funding to districts serving economically disadvantaged children) for all states from 1993 to 2012. This chapter explores in greater depth the consequences of school funding levels, distributions, and changes in specific classroom resources provided in schools. We find that states and districts applying more effort—spending a greater share of their fiscal capacity on schools—generally spend more on schools, and that these higher spending levels translate into higher staffing levels and lower class sizes as well as more competitive teacher wages.

Keywords School funding • School finance • Funding equity • Funding fairness • Class size • Teacher compensation • School quality • Pay for performance • School poverty

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Introduction

Over the past several decades, many states have pursued substantive changes to their state school finance systems. Some reforms have been stimulated by judicial pressure resulting from state constitutional challenges and others have been initiated by legislatures. But despite gains in school funding equity and adequacy made over the past few decades, in recent years we have witnessed a substantial retreat from equity and adequacy, and retrenchment among state legislatures, governors, and federal officials across the political aisle, with many contending that the level and distribution of school funding are not primary factors in quality of education.

This chapter builds on the national school funding fairness report annually published by the Education Law Center, in which we apply regression-based methods to national data on all local public school districts to characterize state school finance systems (Baker et al. 2014). Specifically, we evaluate whether those systems lead to consistent targeting of resources to districts serving higher concentrations of children from economically disadvantaged backgrounds.

In this chapter we expand our analysis in two directions. First, our past three national reports have each been based on the most recent three available years of district level data on state and local revenues. In this chapter, we track school funding fairness (the relative targeting of funding to districts serving economically disadvantaged children) for all states from 1993 to 2012. This time period includes substantive changes to state school finance systems in several states, whether as a function of ongoing litigation or proactive legislative change. Further, this period runs through the recent economic downturn, in which several state school finance systems lost significant ground, both in level of overall funding and in fairness of distribution (Baker 2014). Thus we are able to evaluate the extent of backsliding and the partial rebound that has occurred.

Second, this chapter explores in greater depth the consequences of school funding levels, distributions, and changes in specific classroom resources provided in schools. The majority of school spending is dedicated to staffing, with the primary spending tradeoff being the balance between employee salaries and the numbers of employees assigned. Competitive teacher wages and appropriate class sizes are important to the provision of equitable and adequate educational programs and services. The third edition of *Is School Funding Fair* included additional indicators related to (a) pupil-to-teacher ratios across higher and lower poverty districts and (b) the relative competitiveness of teacher wages statewide when compared with nonteachers at similar education level and age. In that report, we provided preliminary evidence that more equitable funding distributions with respect to poverty concentrations did indeed translate to more equitable distributions of pupil-to-teacher ratios. Further, states with higher funding levels tended to have, on average, more competitive teacher wages relative to other professions.

In this chapter, we explore both of these additional measures during a 20-year time period, and we add measures of class size and variation in teacher wages across schools and districts using data from the National Center for Education Statistics

(NCES) Schools and Staffing Survey. Specifically, we explore whether targeting of funding to higher poverty districts translates to reduction of class sizes and the number of students per teacher in higher poverty settings relative to lower poverty ones. We also explore whether targeting of funding to higher poverty settings leads to more competitive wages in those settings. A substantial body of research points to the need not merely for comparable wages, but substantial added compensation to support recruiting and retaining teachers in high-need settings.

Conceptions of Equity, Equal Opportunity, and Adequacy

Reforms across the nation to state school finance systems have been focused on simultaneously achieving equal educational opportunity and adequacy. While achieving and maintaining educational adequacy requires a school finance system that consistently and equitably meets a certain level of educational outcomes, it is important to maintain equal educational opportunity in those cases where funding falls below adequacy thresholds. That is, whatever the level of outcomes attained across a school system, it should be equally attainable regardless of where a child lives or attends school or his or her background.

Conceptions of school finance equity and adequacy have evolved over the years. Presently, the central assumption is that state finance systems should be designed to provide children, regardless of where they live and attend school, with equal opportunity to achieve some constitutionally adequate level of outcomes (Baker and Green 2009a). Much is embedded in this statement and it is helpful to unpack it, one layer at a time.

The main concerns of advocates, policy makers, academics, and state courts from the 1960s through the 1980s were to (a) reduce the overall variation in per-pupil spending across local public school districts; and (b) disrupt the extent to which that spending variation was related to differences in taxable property wealth across districts. That is, the goal was to achieve more equal dollar inputs—or *nominal spending equity*—coupled with *fiscal neutrality*—or reducing the correlation between local school resources and local property wealth. While modern goals of providing equal opportunity and achieving educational adequacy are more complex and loftier than mere spending equity or fiscal neutrality, achieving the more basic goals remains relevant and still elusive in many states.

An alternative to nominal spending equity is to look at the *real resources* provided across children and school districts: the programs and services, staffing, materials, supplies and equipment, and educational facilities provided (Still, the emphasis is on equal provision of these inputs) (Baker and Green (2009b)). Providing real resource equity may, in fact, require that per-pupil spending not be perfectly equal if, for example, resources such as similarly qualified teachers come at a higher price (competitive wage) in one region than in another. *Real resource* parity is more meaningful than mere dollar equity. Further, if one knows how the prices of real

resources differ, one can better compare the value of the school dollar from one location to the next.

Modern conceptions of equal educational opportunity and educational adequacy shift emphasis away from schooling inputs and onto schooling outcomes—and more specifically equal opportunity—to achieve some level of educational outcomes. References to broad outcome standards in the school finance context often emanate from the seven standards articulated in *Rose v. Council for Better Education*,¹ a school funding adequacy case in 1989 in Kentucky that scholars consider the turning point in shifting the focus from equity to adequacy in school finance legal theory (Clune 1994). There are two separable but often integrated goals here—equal opportunity and educational adequacy.

The first goal is achieved when all students are provided the real resources to have equal opportunities to achieve some common level of educational outcomes. Because children come to school with varied backgrounds and needs, striving for common goals requires moving beyond mere equitable provision of *real resources*. For example, children with disabilities and children with limited English language proficiency may require specialized resources (personnel), programs, materials, supplies, and equipment. Schools and districts serving larger shares of these children may require substantively more funding to provide these resources. Further, where poverty is highly concentrated, smaller class sizes and other resource-intensive interventions may be required to strive for those outcomes achieved by the state's average child.

Meanwhile, conceptions of educational adequacy require that policy makers determine the desired level of outcome to be achieved. Essentially, adequacy conceptions attach a “level” of outcome expectation to the equal educational opportunity concept. Broad adequacy goals are often framed by judicial interpretation of state constitutions. It may well be that the outcomes achieved by the average child are deemed sufficient. But it may also be that the preferences of policy makers or a specific legal mandate are somewhat higher (or lower) than the outcomes achieved by the average child. The current buzz phrase is that schools should ensure that children are “college ready”²

¹ As per the court's declaration: “An efficient system of education must have as its goal to provide each and every child with at least the seven following capacities: (i) sufficient oral and written communication skills to enable students to function in a complex and rapidly changing civilization; (ii) sufficient knowledge of economic, social, and political systems to enable the student to make informed choices; (iii) sufficient understanding of governmental processes to enable the student to understand the issues that affect his or her community, state, and nation; (iv) sufficient self-knowledge and knowledge of his or her mental and physical wellness; (v) sufficient grounding in the arts to enable each student to appreciate his or her cultural and historical heritage; (vi) sufficient training or preparation for advanced training in either academic or vocational fields so as to enable each child to choose and pursue life work intelligently; and (vii) sufficient levels of academic or vocational skills to enable public school students to compete favorably with their counterparts in surrounding states, in academics or in the job market. *Rose v. Council for Better Education, Inc.*, 790 S.W.2d 186, 212 (Ky. 1989). <https://casetext.com/#!/case/rose-v-council-for-better-educ-inc>.

² See PARCC website at <http://www.parcconline.org>.

One final distinction, pertaining to both equal educational opportunity and adequacy goals, is the distinction between striving to achieve equal or adequate outcomes versus providing the resources that yield equal opportunity for children, regardless of their backgrounds or where they live. Achieving equal outcomes is statistically unlikely at best, and of suspect policy relevance, given that perfect equality of outcomes requires leveling down (actual outcomes) as much as leveling up. A goal of school finance policy is to provide the resources to offset pre-existing inequalities that otherwise give one child a greater chance than another of achieving the desired outcome levels.

Money and School Finance Reforms

There is an increasing body of evidence that substantive and sustained state school finance reforms matter for improving both the level and distribution of short-term and long-run student outcomes. A few studies have attempted to tackle school finance reforms broadly, applying multistate analyses over time. Card and Payne (2002) found “evidence that equalization of spending levels leads to a narrowing of test score outcomes across family background groups” (Card and Payne 2002, 49). Most recently, Jackson et al. evaluated long-term outcomes of children exposed to court-ordered school finance reforms, finding that “a 10 % increase in per-pupil spending each year for all 12 years of public school leads to 0.27 more completed years of education, 7.25 % higher wages, and a 3.67 percentage-point reduction in the annual incidence of adult poverty; effects are much more pronounced for children from low-income families” (2015, 1).

Numerous other researchers have explored the effects of specific state school finance reforms over time, applying a variety of statistical methods to evaluate how changes in the level and targeting of funding affect changes in outcomes achieved by students directly affected by those funding changes. Figlio (2004) says that the influence of state school finance reforms on student outcomes is perhaps better measured within states over time, explaining that national studies of the type attempted by Card and Payne confront problems of (a) the enormous diversity in the nature of state aid reform plans, and (b) the paucity of national level student performance data.

Several such studies provide compelling evidence of the potential positive effects of school finance reforms. Studies of Michigan school finance reforms in the 1990s have shown positive effects on student performance in both the previously lowest

spending districts³ and previously lower performing districts.⁴ Similarly, a study of Kansas school finance reforms in the 1990s, which also primarily involved a leveling up of low-spending districts, found that a 20 % increase in spending was associated with a 5 % increase in the likelihood of students going on to postsecondary education (Deke 2003).

Three studies of Massachusetts school finance reforms from the 1990s find similar results. The first, by Thomas Downes and colleagues, found that the combination of funding and accountability reforms “has been successful in raising the achievement of students in the previously low-spending districts.” (2009, 5) The second found that “increases in per-pupil spending led to significant increases in math, reading, science, and social studies test scores for 4th- and 8th-grade students.”⁵ The most recent of the three, published in 2014 in the *Journal of Education Finance*, found that “changes in the state education aid following the education reform resulted in significantly higher student performance” (Nguyen-Hoang and Yinger 2014, 297). Such findings have been replicated in other states, including Vermont.⁶

Indeed, the role of money in improving student outcomes is often contested. Baker (2012) explains the evolution of assertions regarding the unimportance of money for improving student outcomes, pointing out that these assertions emanate in part from misrepresentations of the work of Coleman and colleagues in the 1960s, which found that school factors seemed less associated with student outcome differences than did family factors. This was not to suggest, however, that school factors

³Roy (2011) published an analysis of the effects of Michigan’s 1990s school finance reforms that led to a significant leveling up for previously low-spending districts. Roy, whose analyses measure both whether the policy resulted in changes in funding and who was affected, found that the proposal “was quite successful in reducing interdistrict spending disparities. There was also a significant positive effect on student performance in the lowest-spending districts as measured in state tests.” (p. 137).

⁴Papke (2005), also evaluating Michigan school finance reforms from the 1990s, found that “increases in spending have nontrivial, statistically significant effects on math test pass rates, and the effects are largest for schools with initially poor performance.” (p. 821).

Most recently, Hyman (2013) also found positive effects of Michigan school finance reforms in the 1990s but raised some concerns regarding the distribution of those effects. Hyman found that much of the increase was targeted to schools serving fewer low-income children. But the study did find that students exposed to an additional “12 %, more spending per year during grades four through seven experienced a 3.9 % point increase in the probability of enrolling in college, and a 2.5 % point increase in the probability of earning a degree.” (p. 1).

⁵“The magnitudes imply a \$1000 increase in per-pupil spending leads to about a third to a half of a standard-deviation increase in average test scores. It is noted that the state aid driving the estimates is targeted to under-funded school districts, which may have atypical returns to additional expenditures.” (Guryan 2001, 1).

⁶Downes had conducted earlier studies of Vermont school finance reforms in the late 1990s (Act 60). In a 2004 book chapter, Downes noted, “All of the evidence cited in this paper supports the conclusion that Act 60 has dramatically reduced dispersion in education spending and has done this by weakening the link between spending and property wealth. Further, the regressions presented in this paper offer some evidence that student performance has become more equal in the post-Act 60 period. And no results support the conclusion that Act 60 has contributed to increased dispersion in performance.” (2004, 312).

were entirely unimportant, and more recent reanalyses of the Coleman data using more advanced statistical techniques than available at the time clarify the relevance of schooling resources (Konstantopoulos and Borman 2011; Borman and Dowling 2010).

Eric Hanushek ushered in the modern-era “money doesn’t matter” argument in a study in which he tallied studies reporting positive and negative correlations between spending measures and student outcome measures, proclaiming as his major finding: “There appears to be no strong or systematic relationship between school expenditures and student performance” (1986, 1162).⁷

Baker (2012) summarized reanalyses of the studies tallied by Hanushek, applying quality standards to determine study inclusion, and finding that more of the higher quality studies yielded positive findings with respect to the relationship between schooling resources and student outcomes (Baker 2012). While Hanushek’s above characterization continues to permeate policy discourse over school funding—and is often used as evidence that “money doesn’t matter”—it is critically important to understand that this statement is merely one of uncertainty about the direct correlation between spending measures and outcome measures based on studies prior to 1986. Neither this statement, nor the crude tally behind it, ever provided any basis for assuming with certainty that money doesn’t matter.

A separate body of literature challenges the assertion of the positive influence of state school finance reforms in general and court-ordered reforms in particular. Baker and Welner (2011) explain that much of this literature relies on anecdotal characterizations of lagging student outcome growth following court-ordered infusions of new funding. Hanushek (2009) provide one example of this anecdote-driven approach in a book chapter that seeks to prove that court-ordered school funding reforms in New Jersey, Wyoming, Kentucky, and Massachusetts resulted in few or no measurable improvements. However, these conclusions are based on little more than a series of descriptive graphs of student achievement on the National Assessment of Educational Progress (NAEP) in 1992 and 2007 and an undocumented assertion that, during that period, each of the four states infused substantial additional funds into public education, focused on low-income and minority students, in response to judicial orders. They assume that, in all other states that serve as a comparison, similar changes did not occur. Yet they validate neither assertion.

Baker and Welner (2011) explain that Hanushek and Lindseth failed to measure whether substantive changes had occurred to the level or distribution of school

⁷A few years later, Hanushek paraphrased this conclusion in another widely cited article as “Variations in school expenditures are not systematically related to variations in student performance” (Hanushek 1989). Hanushek describes the collection of studies relating spending and outcomes as follows: “The studies are almost evenly divided between studies of individual student performance and aggregate performance in schools or districts. Ninety-six of the 147 studies measure output by score on some standardized test. Approximately 40 % are based upon variations in performance within single districts while the remainder looks across districts. Three-fifths look at secondary performance (grades 7–12) with the rest concentrating on elementary student performance” (Fig. 25).

funding as well as when and for how long. For example, Kentucky reforms had largely faded by the mid- to late 1990s, yet Hanushek and Lindseth measure postreform effects in 2007. Similarly, in New Jersey, infusions of funding occurred from 1998 to 2003 (or, arguably, 2005). But Hanushek and Lindseth's window includes 6 years on the front end where little change occurred. Further, funding was infused into approximately 30 specific New Jersey districts, but Hanushek and Lindseth (2009) explore overall changes to outcomes among low-income children and minorities using NAEP data, where some of the children tested attended the districts receiving additional support but many did not.⁸ Finally, Hanushek and Lindseth concede that Massachusetts did, in fact experience substantive achievement gains, but attribute those gains to changes in accountability policies rather than funding.

In an equally problematic analysis, Neymotin (2010) set out to show that court-ordered infusions of funding in Kansas following *Montoy v. Kansas* led to no substantive improvements in student outcomes. However, Neymotin evaluated changes in school funding from 1997 to 2006 even though the key Supreme Court decision occurred in January 2005 and impacted funding starting in the 2005–2006 school year, the end point of Neymotin's outcome data (Baker and Welner 2011). Finally, Greene and Trivitt (2008) present a study in which they claim to show that court-ordered school finance reforms led to no substantive improvements in student outcomes. However, while those authors offer the conclusion that court-ordered funding increases had no effect, they test only whether the presence of a court order is associated with changes in outcomes; they never once measure whether substantive school finance reforms followed the court order (also see Neymotin 2010).

To summarize, there exists no methodologically competent analyses yielding convincing evidence that significant and sustained funding increases provide no educational benefits, and relatively few do not show decisively positive effects (Baker and Welner 2011). On balance, it is safe to say that a sizable and growing body of rigorous empirical literature validates that state school finance reforms can have substantive, positive effects on student outcomes, including reductions in outcome disparities or increases in overall outcome levels (Baker and Welner 2011).

⁸Hanushek (2006) goes so far as to title a concurrently produced volume on the same topic "How School Finance Lawsuits Exploit Judges' Good Intentions and Harm Our Children" [emphasis ours]. The premise that additional funding for schools often leveraged toward class size reduction, additional course offerings or increased teacher salaries, causes harm to children is, on its face, absurd. The book, which implies as much in its title, never once validates that such reforms ever cause observable harm. Rather, the title is little more than a manipulative attempt to instill fear of pending harm in the mind of the uncritical spectator. The book also includes two examples of a type of analysis that occurred with some frequency in the mid-2000s and that also had the intent of showing that school funding doesn't matter. These studies would cherry pick anecdotal information on either or both of the following: (a) poorly funded schools that have high outcomes, and (b) well-funded schools that have low outcomes (see Evers and Clopto 2006; Walberg 2006).

Resources That Matter

The premise that money matters for improving school quality is grounded in the assumption that having more money provides schools and districts the opportunity to improve the qualities and quantities of real resources. The primary resources involved in the production of schooling outcomes are human resources—the quantity and quality of teachers, administrators, support, and other staff in schools. Quantities of school staff are reflected in pupil-to-teacher ratios and average class sizes. Reduction of class sizes or reductions of overall pupil-to-staff ratios require additional staff, and thus additional money, assuming wages and benefits for additional staff remain constant. Quality of school staff depend in part on the compensation available to recruit and retain them—specifically salaries and benefits, in addition to working conditions. Notably, working conditions may be reflected in part through measures of workload, like average class sizes, as well as the composition of the student population.

A substantial body of literature has accumulated to validate the conclusion that both teachers' overall and relative wages affect the quality of those who choose to enter the teaching profession, and whether they stay once they get in. For example, Murnane and Olsen (1989) found that salaries affect the decision to enter teaching and the duration of the teaching career, while Figlio (1997, 2002) and Ferguson (1991) concluded that higher salaries are associated with more qualified teachers. Loeb and Page (2000) tackled the specific issues of relative pay noted above. They showed that:

Once we adjust for labor market factors, we estimate that raising teacher wages by 10 % reduces high school dropout rates by 3–4 %. Our findings suggest that previous studies have failed to produce robust estimates because they lack adequate controls for non-wage aspects of teaching and market differences in alternative occupational opportunities.

In short, while salaries are not the only factor involved, they do affect the quality of the teaching workforce, which in turn affects student outcomes.

Research on the flip side of this issue—evaluating spending constraints or reductions—reveals the potential harm to teaching quality that flows from leveling down or reducing spending. For example, Figlio and Rueben (2001) note that, “Using data from the National Center for Education Statistics we find that tax limits systematically reduce the average quality of education majors, as well as new public school teachers in states that have passed these limits.”

Salaries also play a potentially important role in improving the *equity* of student outcomes. While several studies show that higher salaries relative to labor market norms can draw higher quality candidates into teaching, the evidence also indicates that relative teacher salaries across schools and districts may influence the distribution of teaching quality. For example, Ondrich et al. (2008) “find that teachers in districts with higher salaries relative to non-teaching salaries in the same county are less likely to leave teaching and that a teacher is less likely to change districts when

he or she teaches in a district near the top of the teacher salary distribution in that county.”

Others have argued that the dominant structure of teacher compensation, which ties salary growth to years of experience and degrees obtained, is problematic because of weak correlations with student achievement gains, creating inefficiencies that negate the relationship between school spending and quality (Hanushek 2011). Existing funds, they argue, instead could be used to compensate teachers according to (measures of) their effectiveness while dismissing high-cost “ineffective” teachers and replacing them with better ones, thus achieving better outcomes with the same or less money (Hanushek 2009).

This argument depends on four large assumptions. First, adopting a pay-for-performance model, rather than a step-and-lane salary model, would dramatically improve performance at the same or less expense. Second, shedding the “bottom 5 % of teachers” according to statistical estimates of their “effectiveness” can lead to dramatic improvements at equal or lower expense. Third, it assumes there are sufficiently accurate measures of teaching effectiveness across settings and children. Finally, this argument ignores the initial sorting of teachers into schools where more marketable teachers head for more desirable settings.

Existing studies of pay-for-performance compensation models fail to provide empirical support for this argument—either that these alternatives can substantially boost outcomes, or that they can do so at equal or lower total salary expense (Springer et al. 2011). Simulations purporting to validate the long-run benefits of deselecting “bad” teachers depend on the average pool of replacements lining up to take those jobs being substantively better than those who were let go (average replacing “bad”). Simulations promoting the benefits of “bad teacher” deselection assume this to be true, without empirical basis, and without consideration for potential labor market consequences of the deselection policy itself (Baker et al. 2013a). Finally, existing measures of teacher “effectiveness” fall well short of these demands (Ibid.).

Most importantly, arguments about the structure of teacher compensation miss the bigger point—the average level of compensation matters with respect to the average quality of the teacher labor force. To whatever degree teacher pay matters in attracting good people into the profession and keeping them around, it’s less about how they are paid than how much. Furthermore, the average salaries of the teaching profession, with respect to other labor market opportunities, can substantively affect the quality of entrants to the teaching profession, applicants to preparation programs, and student outcomes. Diminishing resources for schools can constrain salaries and reduce the quality of the labor supply. Further, salary differentials between schools and districts might help to recruit or retain teachers in high-need settings. So, too, does investment in improved working conditions, from infrastructure to smaller class sizes and total student loads. In other words, resources for teacher quality matter.

Ample research indicates that children in smaller classes achieve better outcomes, both academic and otherwise, and that class-size reduction can be an effective strategy for closing racial or socioeconomic achievement gaps (U.S. Department

of Education et al. 2003). While it's certainly plausible that other uses of the same money might be equally or even more effective, there is little evidence to support this. For example, while we are quite confident that higher teacher salaries may lead to increases in the quality of applicants to the teaching profession and increases in student outcomes, we do not know whether the same money spent toward salary increases would achieve better or worse outcomes if it were spent toward class size reduction. Some have raised concerns that large-scale class-size reductions can lead to unintended labor market consequences that offset some of the gains attributable to class-size reduction (such as the inability to recruit enough fully qualified teachers). For example, studies of California's statewide class-size reduction initiative suggest that as districts across the socioeconomic spectrum reduced class sizes, fewer high-quality teachers were available in high-poverty settings (Jepsen and Rivkin 2002).⁹

While it would be useful to have more precise cost-benefit analyses regarding the tradeoffs between applying funding to class-size reduction versus increased compensation (Ehrenberg et al. 2001), the preponderance of existing evidence suggests that the additional resources expended on class-size reductions do produce positive effects. Both reductions to class sizes and improvements to competitive wages can yield improved outcomes, but the gains in efficiency of choosing one strategy over the other are unclear, and local public school districts rarely have complete flexibility to make tradeoffs because class-size reduction may be constrained by available classrooms (Baker and Welner 2012). Smaller class sizes and reduced total student loads are a relevant working condition simultaneously influencing teacher recruitment and retention (Loeb et al. 2005; Isenberg 2010). That is, providing smaller classes may partly offset the need for higher wages for recruiting or retaining teachers. High-poverty schools require both strategies rather than an either-or proposition when it comes to smaller classes and competitive wages.

As discussed above, achieving equal educational opportunity requires leveraging additional real resources—lower class sizes and more intensive support services—in high-need settings. Merely achieving equal-quality real resources, including equally qualified teachers, likely requires higher competitive wages, not merely equal pay in a given labor market. As such, higher-need settings may require substantially greater financial inputs than lower-need settings. Lacking sufficient financial inputs to do both, districts must choose one or the other. In some cases, higher need districts may lack sufficient resources to reduce class sizes or provide more intensive support.

⁹“The results show that, all else equal, smaller classes raise third-grade mathematics and reading achievement, particularly for lower-income students. However, the expansion of the teaching force required to staff the additional classrooms appears to have led to a deterioration in average teacher quality in schools serving a predominantly Black student body. This deterioration partially or, in some cases, fully offset the benefits of smaller classes, demonstrating the importance of considering all implications of any policy change” (p. 1).

For further discussion of the complexities of evaluating class size reduction in a dynamic policy context, see Sims 2008, 2009; Chingos 2010.

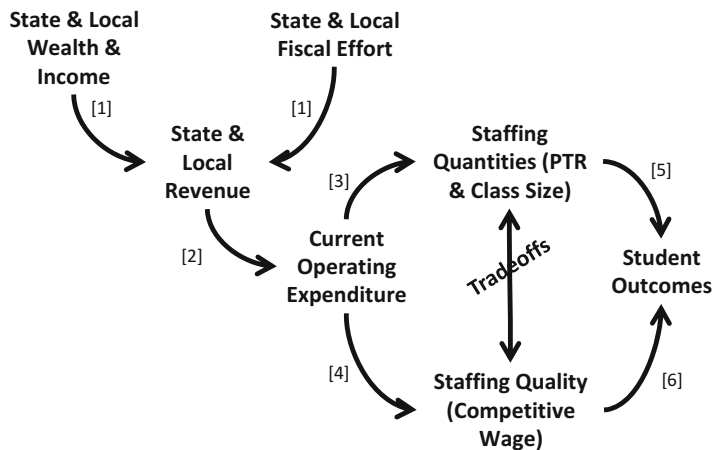


Fig. 4.1 Conceptual map of fiscal inputs & real resources

In this chapter, we explore the relationship between financial inputs and these tradeoffs, both within and across states, and over time. Specifically, we address the following questions:

- What patterns in national and state funding equity and adequacy do we see over the last two decades?
- What patterns do we find in access to important school resources, namely wage competitiveness and staffing ratios, over the same time period?
- What is the relationship between the adequacy and equity of school funding and access to real resources (teacher wages, staffing ratios, and class sizes)?

Measuring Fiscal Input as Well as Real Resource Equity and Adequacy

In this section, we draw on several national data sources to develop indicators of (a) school funding levels and distributions, (b) staffing levels and distributions and (c) relative wage levels and distributions (see Appendix (Table 4A.1) for full list of data sources, years, and measures). Ultimately, our goal is to examine the levels and distributions of fiscal input, staffing, and wages and discern their relationship. Our following analyses use national data sources over time to draw the various connections displayed in Fig. 4.1. First, the amount of effort a state puts forth, in addition to wealth and income, influences the level of resources made available to schools. Revenues available to schools translate to expenditures, and those expenditures may be leveraged to support more competitive wages, hiring and retaining more staff, or both. While we do not in this chapter include measures that connect inputs to student outcomes, we do expect staffing quantities and qualities to substantively

influence those outcomes. We also document the relationships between financial resources and the real resources purchased with those financial resources. We explore these linkages in terms of state average levels of resources and within-state distributions of those resources with respect to concentrations of child poverty across districts.

These relationships, while relatively straightforward, have not been systematically documented across all states over time in recent years.¹⁰ Specifically, there is little documentation of the relationship across states between the level of commitment made by states to their public schooling systems and the average competitiveness of teacher wages, and little documentation of the extent to which differences in and changes in spending levels translate to changes in staffing ratios and class sizes.¹¹

Evaluating Funding Levels and Fairness

We begin with our model for estimating levels and variation in school districts' state and local revenue. Our objectives are twofold: first, to compare across states the amount a school district would be expected to receive in state and local revenue (and current operating expenditure) if the district was of a given enrollment size (economies of scale) and population density, faced national average labor costs, and served a population with relatively average child poverty levels; second, to evaluate within states the amount that a school district would be expected to receive in state and local revenue (and current operating expenditure) at varied levels of child poverty, holding constant labor costs, district enrollment size, and population density.

The goal here is to make more reasonable comparisons of revenue and expenditure levels across local public school districts from one state and to another. So adjustments are made accordingly in our models. Average spending per pupil might be higher in states with higher labor costs. To compare the purchasing power of that spending, we adjust for those cost differences. Average spending per pupil might also be higher in states where more children attend school in population-sparse, small, rural districts. Thus, we compare spending for districts of otherwise similar size and population density across states—a “what if” analysis assuming a district size of 2000 or more pupils with average population density. Similarly, unified K-12

¹⁰For an earlier analysis that parallel school funding disparities and real resource disparities, see Corcoran et al. 2004.

¹¹In the absence of clear documentation of these rather obvious connections between fiscal constraints, wages, and class sizes, a body of literature has emerged that suggests that no such linkage exists, that local public school districts of all types possess more than sufficient resources to achieve competitive, restructured compensation systems, or entirely different service delivery approaches altogether with no consequences resulting from resource reallocation. During the economic downturn, much of that non-peer-reviewed, think-tank-sponsored literature found its way to a special section on the U.S. Department of Education website dedicated to improving educational productivity. Baker and Welner (2012) provide a substantive critique of the reports posted on the website.

districts might have different average spending than K-8 or high school districts; thus we base our comparisons on unified K-12 districts. Finally, we compare revenue and spending predictions for districts of similar child poverty rates, as child poverty influences the costs of achieving common outcome goals (Duncombe and Yinger 2005).

For both objectives, we use a 20-year (1993–2012) set of local public school district data to which we fit the following model:

$$\text{Funding per Pupil} = f(\text{Regional Competitive Wages, District Size} \times \\ \text{Population Density, Grade Range Served,} \\ \text{State} \times \text{Census Child Poverty Rate})$$

To account for variation in labor costs, we use the NCES Education Comparable Wage Index, updated through 2012 by the author of the original index (Extending the NCES CWI 2013). We impute additional years as necessary (see Appendix). We account for district size with a series of dummy variables indicating that a district has (a) under 100 pupils, (b) 101–300 pupils, (c) 301–600 pupils, (d) 601–1200 pupils, (e) 1201–1500 pupils, and (f) 1501–2000 pupils, where the baseline comparison group are districts with over 2000 pupils, a common reference point for scale efficiency. The district size factor is interacted with county-level population density to further correct for cost differences associated with small, sparse, rural districts, separating them from segregated enclaves in population-dense metropolitan areas. Finally, we interact state dummy indicators with district level child poverty rate to estimate the within-state, cross-district distribution of funding with respect to child poverty. The regression model is weighted by district enrollment size.

We then use this model to generate predicted values of the funding measure—total state and local revenues per pupil and current operating spending per pupil—at varied levels of child poverty for each state at national average labor costs, average population density, and efficient size. To compare levels of funding across states, we compare predicted revenue and spending at 10 % census poverty, holding other factors constant. To compare distributions, we construct what we call a “fairness ratio.” It is the ratio of the predicted funding level for a high poverty district (30 % census poverty, equivalent to about 60–80 % qualified for the National School Lunch Program), relative to that of a low poverty (0 % census poverty) district. A fairness ratio above 1 indicates that the state provides a greater level of resources to high poverty districts than low poverty districts, while a ratio below 1 indicates that high-poverty districts have fewer resources.

$$\text{Fairness Ratio} = \frac{\text{Predicted Funding at 30\% Poverty}}{\text{Predicted Funding at 0\% Poverty}}$$

Evaluating Resource Levels and Fairness

The next step is to estimate levels of real resources in otherwise comparable settings across states and to estimate variations in real resources with respect to child poverty.

Estimating Staffing Levels and Distributions Our approach to modeling staffing levels follows the one we used to model funding levels. We use annual data from 1993 to 2012 and apply the same model as above, except putting numbers of teachers per 100 pupils on the left-hand side. Again, the premises are: overall staffing ratios might be higher on average (better) in states with more children in small, low-population-density districts; staffing ratios (given spending levels) might be lower (worse) in states facing higher labor costs; and staffing ratios should vary with respect to children’s educational needs, as proxied by district poverty measures.

$$\text{Teachers per 100 Pupils} = f(\text{Regional Competitive Wages, District Size} \times \\ \text{Population Density, Grade Range Served,} \\ \text{State} \times \text{Census Child Poverty Rate})$$

We then use this model to (a) generate predicted values of teachers per 100 pupils at given levels of poverty, within each state and (b) generate a staffing fairness ratio like our funding fairness ratio.

Evaluating the Average Competitiveness of Teacher Wages As discussed above, one way in which teacher wages matter is that the average relative wage of teachers versus other professions in a given labor market may influence the quality of those entering and staying within the teaching workforce. Here, we use the U.S. Census Bureau’s American Community Survey (ACS) annual data from 2000 to 2012 to estimate, for each state, the ratio of the expected income from wages for an elementary or secondary school teacher to the expected income from wages for a non-teacher at the same age and degree level.

Of primary interest here are the differences in competitive wage ratios across states, and ultimately, whether states that allocate more resources to education generally are able to achieve more competitive teacher wages. Here, we compare *annual* wages of teachers to nonteachers, but we also note that variation across states remains similar with a comparison of weekly or monthly wages, although teacher wages do become more comparable to nonteacher wages. Recall that literature on teacher wages and teacher quality suggests that the more competitive the teacher wage (relative to other career options), the higher the expected quality of entrants to the profession.

To generate our competitive wage ratios, we begin with a regression model fit to our 13-year set of ACS data, in which we estimate the relationship between “income from wages” as the dependent variable, a series of state indicators, and an indicator that the individual is a teacher (occupation) in elementary or secondary education (industry). We include an indicator of the teacher’s age and education level, and we include measures of hours worked per week and weeks worked per year but do not equate our predicted wages by holding constant these latter two factors in the analyses. We estimate the following model:

Income from Wages = f (State Place of Work, k12 Teacher, Age, Education Level,
Hours per Week, Weeks per Year)

We use this model to generate predicted values for teacher and nonteacher wages at specific age points, for individuals with a bachelor's degree, and then take the ratio of teacher to nonteacher wages. Of particular interest are (a) the differences in the teacher/nonteacher wage ratio across states and (b) the changes over time within states in the teacher/nonteacher wage ratio. That is, are teacher wages more competitive in some states than others? And have teachers generally gained or lost ground? Are these differences in wage competitiveness and gains or losses related back to state funding levels?

Estimating Sensitivity of Resources to Funding Across Districts

For these last two analyses, we link our data on district-level finances with teacher-level data from the NCES Schools and Staffing Survey (SASS), which includes over 40,000 public school teachers, surveyed in waves on approximately 4-year cycles. We use data from the 1993–1994, 1999–2000, 2003–2004, 2007–2008, and 2011–2012 cycles.

Because personnel costs vary across labor markets within states, it is important when evaluating either teacher quantity measures or teacher wages to make direct comparisons only among districts facing similar personnel costs. Further, because livable wages similarly vary across labor markets, but income thresholds for determining whether families are in poverty do not, it also makes sense to compare poverty rates only across local public school districts sharing a labor market (Baker et al. 2013b). A convenient solution is to re-express per-pupil spending measures and child poverty rates for each school district in the nation relative to (as a ratio to) the average per-pupil spending and child poverty rates for all districts sharing that same labor market.

We use a similar strategy for evaluating variations in both class sizes and competitive teacher wages, with the latter comparisons requiring a preliminary step of determining the wage for teachers of comparable qualifications and contractual obligations. This analysis is different from the previous analyses because we are working with samples of teachers and schools where total sample sizes and the distribution of sampled teachers for many states are insufficient for characterizing cross-district equity. As a result, we ask whether nationally, across nonrural labor markets, there exists the expected relationship between the relative funding available to local public school districts, and the class sizes and wages of teachers in those school districts. That is, do schools in districts with better funding tend to have smaller class sizes, more competitive wages, or both?

Class Sizes To estimate the sensitivity of class size variation to spending variation across schools within labor markets, we estimate separate models of departmental-

ized and self-contained class sizes. We estimate class sizes as a function of (a) relative spending, (b) relative poverty, and (c) grade level taught.

$$\text{Class Size} = f(\text{Relative Spending, Relative Poverty, Grade Level})$$

Teacher Wages While the previous wage indicator compared teacher salaries to nonteachers, this dataset allows us to compare wages among similar teachers within labor markets, but in different school districts. The relative competitiveness of teacher salaries is then examined in the context of the relative poverty and relative funding levels of school districts. This analysis offers further evidence as to whether districts can leverage funding resources to provide more competitive wages to teachers in other, less resourced districts. In other words, does the distribution of funding affect districts' ability to offer competitive wages, and therefore influence the distribution of quality teachers across districts?

We begin by estimating, within each labor market in each state, the relative wage of teachers with a specific set of credentials. We focus on full-time classroom teachers, estimating their salaries (base pay from school year teaching) as a function of (a) experience and (b) degree level within (c) labor market (as defined in the Education Comparable Wage Index, aligned with metropolitan and micropolitan statistical areas). We exclude teachers outside of metropolitan and micropolitan areas because of small sample sizes within rural labor markets. We estimate separate models for each SASS wave.

$$\text{Salary} = f(\text{experience, degree, labor market})$$

Next, we generate the predicted salary for each teacher in each labor market, identifying the average wage for a teacher at given experience and degree level across all schools in each labor market. We then take the ratio of actual salary to predicted salary, which indicates for all teachers in the sample whether their salary is higher or lower than expected. Aggregated to the school or district level, we have a measure of the relative competitiveness of teacher wages in each school or district compared to other schools or districts sharing the same labor market.

The next step is to estimate the sensitivity of these wage variations to spending variations across districts sharing the same labor market. We do this with the teacher-level data, linked to a measure of the relative spending of their school district in its labor market, and the relative poverty rate of the school district in its labor market. We take the district's current operating spending per pupil as a ratio to the average of all other districts in the labor market and do the same with district poverty rate. We estimate together the relationship between relative spending and poverty and the relative competitiveness of teacher's salaries. We include additional dummy variables for grade level taught, again including only nonrural full-time teachers:

$$\text{Salary Competitiveness} = f(\text{Relative Spending, Relative Poverty, Grade Level Taught})$$

Findings

We begin by reviewing longitudinal trends in funding levels and funding fairness. We also validate the extent to which state school funding levels are associated with differences in fiscal effort—or the share of gross state product allocated to schools. Next, we summarize changes to the distribution of funding across school districts within states, specifically evaluating the funding fairness profiles of states and how those profiles have changed over the past 20 years. We then proceed to explore average competitive wage levels across states from 2000 to 2012, and pupil-to-teacher ratios across states over the full 20-year period.

We subsequently explore the connections between measures of the level and distribution of financial inputs to schooling, and the level and distribution of staffing quantities and staffing qualities. Specifically, we evaluate whether state spending levels are associated with the state average competitiveness of teacher wages and state average staffing ratios (pupil-to-teacher ratios). Then we explore whether within-state distributions of financial inputs to schooling are associated with within-state distributions of staffing ratios, class sizes, and competitive wages.

Adequacy and Equity of Fiscal Inputs Figure 4.2 presents the national averages of current spending per pupil and state and local revenues per pupil, adjusted for

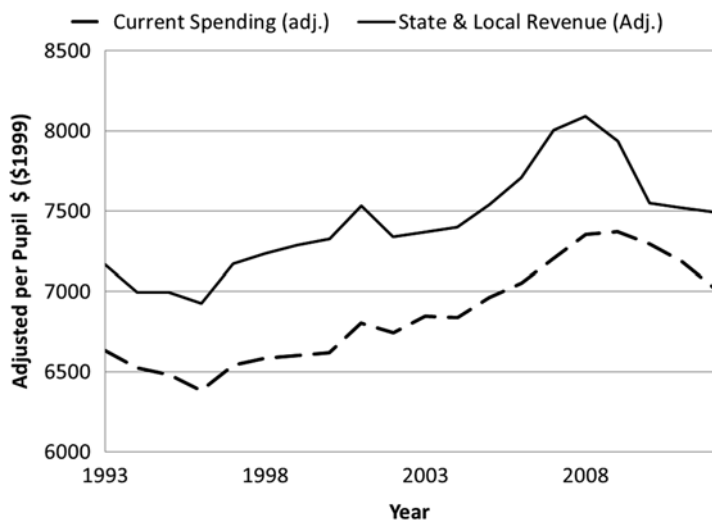


Fig. 4.2 Input price adjusted revenue and spending

changes in labor costs by dividing each district’s revenue or spending figure by the comparable wage index for that district. Both revenues and spending are included to illustrate how the two largely move together over time, as one would expect. The Education Comparable Wage Index adjusts for both regional variation in labor costs (input prices) and inflationary change in labor costs. Figure 4.2 shows that on average using district level data weighted by student enrollments, state and local revenues and per pupil spending are up approximately 4.5–5.5 % over the period, reaching a high around 2008 and returning to levels comparable to 2000 by 2012.

Figure 4.3 summarizes the trends in predicted state and local revenue levels for all states, organized by regions. These are combined state and local revenues per pupil, predicted for a district with 10 % child poverty, of 2000 or more pupils at constant labor costs (though not fully corrected for inflation). Of particular interest

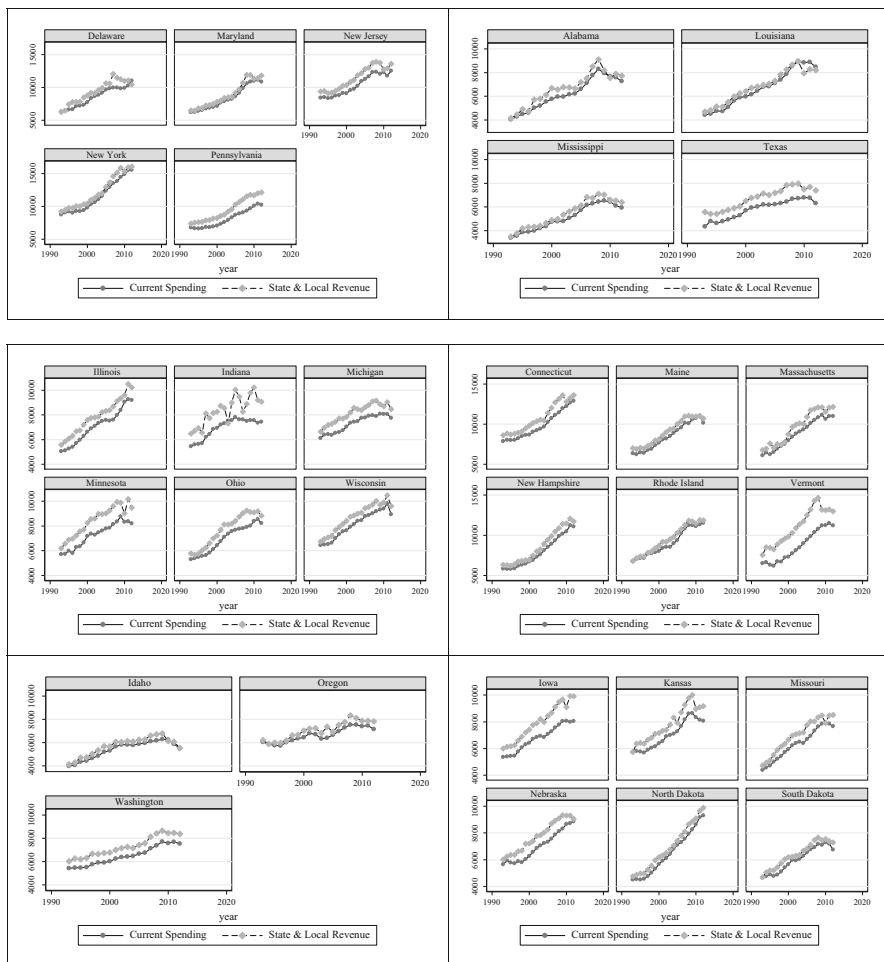


Fig. 4.3 Predicted state and local revenues over time by state

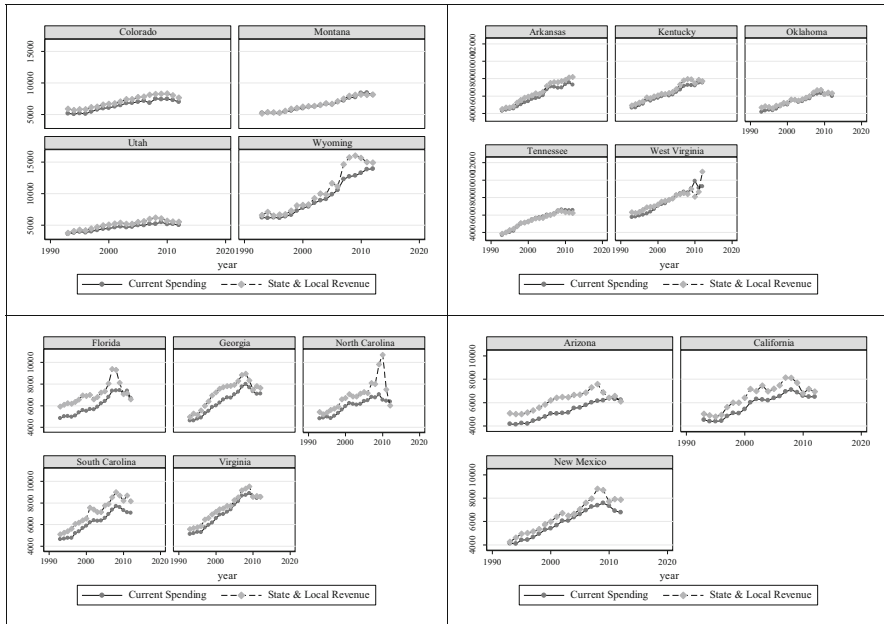


Fig. 4.3 (continued)

are the trends, divergences, and convergences among regionally contiguous states. A notable feature of these figures is the sharp shift in growth trajectories that occurs in most states around 2009 as a function of the recession. New Jersey, for example, experienced a particularly strong downturn. Delaware is the only state in this mix to show no recovery as of yet. Related work has shown that these downturns were largely a function of sharp reductions in state aid, buffered in some cases by increases to local property taxes. But those shifts in responsibility from state funding onto local property tax have potential equity consequences. Average revenue may have rebounded with offsetting property tax increase, but inequity is likely to have increased as a result.

Figure 4.4 illustrates the relationship in 2012 between the percent of gross state product expended on K-12 schools and the average level of state and local revenue. In short, higher effort states do have higher funding levels. Certainly, some relatively low fiscal capacity states like Mississippi apply average effort and still end up with low funding, while high fiscal capacity states like Wyoming or Connecticut are able to apply much lower effort and yield far greater resources. But effort matters above and beyond wealth and income. While some might assume that effort crept upward as fiscal capacity declined during the recession, this assumption is generally wrong. Political proclivity for cutting taxes has led, on average, to reductions in funding effort. Forty-one states reduced effort from 2007 to 2012. Further, 5-year changes in effort are strongly associated with 5-year changes in revenue levels, as

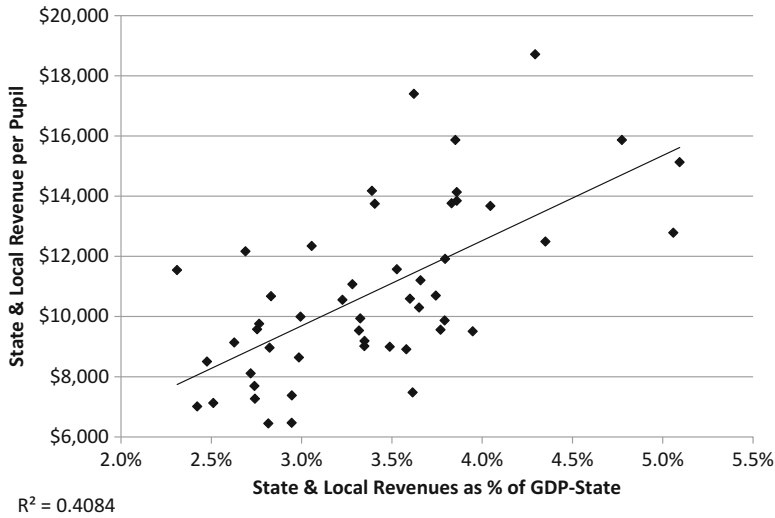


Fig. 4.4 Relationship between effort and revenue (Note: See Appendix (Table 4A.2) for full information by state)

Table 4.1 Numbers of states where funding fairness ratio has improved

Period	# States that improved fairness	Initial fairness ratio among improved states		
		<.95	.95–1.05	>1.05
1993–2012	33	4	9	20
2002–2012	23	3	3	17
2007–2012	21	2	4	15

might be expected (correlation=.7 excluding Alaska). States that reduced effort generally reduced school revenues proportionately.

Current Expenditure “Fairness” (Spending Equity) So what then have been the consequences of the economic downturn for school spending fairness across states? That is, how have higher poverty districts been differentially affected when compared with lower poverty ones? Table 4.1 summarizes numbers of states where funding fairness improved (or not) over specific time periods over the past 20 years. Again, a funding fairness ratio of .95 means that a district with 30 % of children in poverty¹² has only 95 % of the funding of a district with 0 % children in poverty. A fairness ratio of 1.05 indicates that a district with 30 % poverty has 5 % greater funding than a district with 0 % poverty.

From 1993 to 2007 in particular, 40 different states experienced increased funding levels in higher poverty districts relative to lower poverty ones (only 33 sustained the pattern over the entire period from 1993 to 2012). But in the 5 years that

¹²Census poverty rate, where a 30 % rate is equivalent to about 80 % free or reduced priced lunch.

followed, 30 states reduced funding fairness, with some of the greatest reductions coming in states that had previously experienced the greatest improvements, including New Jersey.

Table 4.2 summarizes the state-by-state current expenditure fairness ratios and changes over time. As noted in Table 4.1, most states did improve their fairness ratios over the entire period, but many reduced fairness over the past 5 years. Massachusetts improved fairness at the outset of the period, as did New Jersey, but both states taper off in recent years. Other states like Pennsylvania started the period with relatively flat distributions (similar funding in higher and lower poverty districts) and then slid into more regressive distributions over time.

Notably, these findings present a more positive light on funding progressiveness than those in the report *Is School Funding Fair*, because these figures are based on current operating spending per pupil, which includes the expenditure of federal funds. Those federal funds tend to lift (by around 5 %) the levels of funding in the highest poverty districts, thus improving the funding fairness index.

Resource Models

Relative Annual Wage of Teachers Table 4.3 summarizes changes to the state average competitiveness of teacher wages over the past 12 years, and then for the most recent 5 years. Wage competitiveness is expressed as a ratio of teacher wages to nonteacher wages. A ratio less than 1 means teachers earn less than comparable nonteachers. It's important to understand in this case that there are two moving parts—teacher wages and nonteacher wages. Teacher wages can become more competitive if they remain relatively constant but wages of others (at the same age and education level) decline. Teacher wages can become less competitive even if they appear to grow but do so more slowly than wages in other sectors. Put simply, it's all relative, but it is the relative wage that matters. From 2000 to 2012, teacher wages in every state became less competitive, based on our model, a finding that is consistent with similar work by Mishel et al. (2011). It would appear that over the last 5 years, only in Iowa did teacher wages become marginally more competitive. Over the 12-year period, the state average (unweighted) reduction in wage competitiveness was 12 %. Over the period from 2007 to 2012, the state average reduction in wage competitiveness was 8 %.

But, as can be seen in Table 4.4, these estimates tend to jump around, especially in low population states like Alaska. States with persistently noncompetitive teacher wages include Colorado and Arizona. Teacher wages have tended over time to be more competitive in rural states (where nonteacher wages aren't as high), including Montana and Wyoming. Average teacher wages in New York and Rhode Island have also tended to be more competitive, though data are inconsistent across years.

Teachers per 100 Pupils Table 4.5 summarizes changes to the numbers of teachers per 100 pupils over time. Over the entire 20-year period, nearly all states increased

Table 4.2 Spending fairness indices for select years

State	Fairness ratio current operating expenditures per pupil				Change over time			
	1993	2002	2007	2012	1993–2007	20-year change	10-year change	5-year change
Alabama	1.02	1.06	1.04	1.08	0.02	0.06	0.02	0.04
Alaska	2.14	2.44	2.30	1.87	0.17	–0.27	–0.58	–0.44
Arizona	1.20	1.18	1.33	1.05	0.13	–0.15	–0.13	–0.27
Arkansas	1.13	1.11	1.19	1.23	0.06	0.09	0.11	0.03
California	1.17	1.12	1.32	1.20	0.14	0.03	0.08	–0.12
Colorado	1.09	1.05	1.15	1.16	0.06	0.07	0.11	0.01
Connecticut	1.07	1.30	1.21	1.07	0.15	0.00	–0.23	–0.14
Delaware	1.04	1.19	1.64	1.23	0.60	0.19	0.04	–0.41
Dist. of Columbia	1.02	1.06	1.04	1.08	0.02	0.06	0.02	0.04
Florida	1.33	1.28	1.37	1.19	0.04	–0.14	–0.09	–0.18
Georgia	1.22	1.29	1.23	1.20	0.02	–0.01	–0.08	–0.03
Hawaii	1.02	1.06	1.04	1.08	0.02	0.06	0.02	0.04
Idaho	1.25	1.26	1.16	1.18	–0.09	–0.07	–0.08	0.02
Illinois	1.08	0.96	1.07	1.05	–0.01	–0.03	0.08	–0.02
Indiana	1.26	1.53	1.62	1.45	0.36	0.19	–0.08	–0.17
Iowa	1.19	1.33	1.32	1.20	0.13	0.01	–0.13	–0.12
Kansas	1.15	1.33	1.34	1.22	0.19	0.07	–0.11	–0.11
Kentucky	1.17	1.17	1.26	1.22	0.09	0.05	0.05	–0.04
Louisiana	1.03	1.00	1.08	1.33	0.05	0.30	0.32	0.25
Maine	1.12	1.15	1.11	0.99	–0.01	–0.13	–0.16	–0.12
Maryland	0.89	1.17	1.12	1.14	0.23	0.24	–0.04	0.02
Massachusetts	0.95	1.37	1.39	1.25	0.44	0.30	–0.12	–0.14
Michigan	1.04	1.21	1.23	1.20	0.19	0.16	–0.01	–0.02
Minnesota	1.39	1.82	1.71	1.60	0.32	0.21	–0.22	–0.11
Mississippi	1.19	1.26	1.22	1.30	0.03	0.11	0.04	0.08
Missouri	1.25	1.17	1.10	1.05	–0.15	–0.20	–0.11	–0.05
Montana	1.18	1.30	1.54	1.18	0.36	0.00	–0.11	–0.36
Nebraska	1.14	1.09	1.35	1.36	0.21	0.22	0.27	0.01
Nevada	0.61	0.60	0.61	0.57	0.01	–0.03	–0.02	–0.04
New Hampshire	0.80	0.95	0.85	1.07	0.05	0.27	0.12	0.22
New Jersey	1.05	1.42	1.51	1.26	0.46	0.21	–0.16	–0.25
New Mexico	1.11	1.23	1.27	1.29	0.16	0.17	0.06	0.01
New York	0.79	0.91	0.96	0.99	0.17	0.20	0.08	0.02
North Carolina	1.09	1.13	1.26	1.25	0.17	0.17	0.12	0.00
North Dakota	1.34	1.33	1.40	1.43	0.06	0.09	0.10	0.03
Ohio	1.19	1.29	1.25	1.16	0.05	–0.03	–0.12	–0.08
Oklahoma	1.26	1.31	1.30	1.20	0.04	–0.06	–0.11	–0.10
Oregon	1.17	1.35	1.46	1.22	0.29	0.06	–0.13	–0.24
Pennsylvania	1.01	0.90	0.90	0.92	–0.10	–0.08	0.02	0.02

(continued)

Table 4.2 (continued)

State	Fairness ratio current operating expenditures per pupil				Change over time			
	1993	2002	2007	2012	1993–2007	20-year change	10-year change	5-year change
Rhode Island	0.93	1.08	1.11	1.03	0.18	0.10	–0.05	–0.08
South Carolina	1.04	1.28	1.20	1.26	0.16	0.22	–0.01	0.07
South Dakota	1.27	1.50	1.50	1.61	0.23	0.35	0.11	0.12
Tennessee	1.23	1.15	1.21	1.22	–0.02	–0.01	0.07	0.01
Texas	1.13	1.16	1.21	1.19	0.08	0.06	0.03	–0.02
Utah	1.89	1.68	1.78	1.49	–0.11	–0.40	–0.19	–0.29
Vermont	0.90	0.92	1.00	0.86	0.09	–0.04	–0.06	–0.13
Virginia	1.13	1.08	1.07	1.07	–0.06	–0.06	–0.01	0.00
Washington	1.30	1.28	1.29	1.21	–0.01	–0.10	–0.08	–0.09
West Virginia	1.06	1.16	1.14	1.19	0.08	0.13	0.03	0.06
Wisconsin	1.10	1.19	1.21	1.23	0.11	0.13	0.04	0.03
Wyoming	1.37	1.57	1.35	1.04	–0.02	–0.33	–0.52	–0.31

Table 4.3 Summary of changes in wage competitiveness

Period	# States that increased wage competitiveness	State mean change (%)
2000–2012	1	–12
2000–2007	3	–9
2007–2012	1	–8

numbers of staff per 100 pupils. The state average (unweighted) increase was approximately 1 additional teacher per 100 pupils, moving from about 5.5 to about 6.5 total teachers per 100 pupils. Most of those gains occurred prior to 2002. Over the past 10 years, state average staffing increases have been much more modest, and over the past 5 years, nonexistent.

Table 4.6 displays state-by-state ratios of teachers per 100 pupils and changes in those ratios. States including Alabama and Virginia appear to have reduced teachers per 100 pupils by over 1.0 (or around 13–16 %). About half of states continued to increase numbers of teaching staff per 100 pupils. Notably, these figures change over time both as a function of changing numbers of staff and of changing numbers of pupils. States with constant staffing but declining enrollments will show increasing staffing ratios. States with increasing enrollment but no additional staff will show decreasing staffing ratios.

Table 4.4 Teacher/nonteacher wage ratios for select years

State	Wage competitiveness ratio (Teacher/Nonteacher) (%)				Change over time (%)		
	2000	2002	2007	2012	12-year change	10-year change	5-year change
Alabama	83	83	77	71	-12	-12	-6
Alaska	89	104	118	85	-4	-19	-33
Arizona	79	74	70	62	-18	-13	-9
Arkansas	82	84	82	74	-7	-10	-8
California	79	82	82	75	-5	-7	-7
Colorado	81	75	70	68	-13	-6	-2
Connecticut	78	82	76	71	-7	-11	-5
Delaware	82	87	83	75	-7	-13	-9
District of Columbia	74	85	74	68	-7	-18	-6
Florida	85	82	80	73	-11	-8	-6
Georgia	76	76	74	68	-8	-8	-5
Hawaii	95	83	81	77	-17	-6	-4
Idaho	93	92	86	72	-21	-20	-13
Illinois	77	78	79	73	-4	-5	-6
Indiana	87	85	80	70	-17	-15	-10
Iowa	86	87	83	85	-1	-2	3
Kansas	87	80	77	70	-17	-10	-7
Kentucky	84	80	78	71	-13	-9	-7
Louisiana	78	78	79	75	-4	-3	-5
Maine	90	79	90	81	-9	2	-9
Maryland	80	77	78	75	-4	-2	-3
Massachusetts	77	72	77	69	-8	-3	-8
Michigan	93	88	94	78	-15	-10	-16
Minnesota	84	80	75	71	-13	-10	-5
Mississippi	86	81	78	72	-13	-9	-6
Missouri	83	76	78	68	-16	-9	-11
Montana	100	98	93	74	-26	-24	-19
Nebraska	86	82	78	77	-10	-6	-2
Nevada	93	85	84	82	-11	-3	-3
New Hampshire	78	82	75	73	-5	-9	-2
New Jersey	86	81	82	76	-10	-5	-6
New Mexico	77	82	85	78	1	-4	-7
New York	83	80	82	81	-2	1	-1
North Carolina	80	79	75	67	-13	-12	-8
North Dakota	87	86	77	70	-17	-17	-7
Ohio	80	79	82	75	-5	-4	-7
Oklahoma	80	78	76	67	-13	-11	-9
Oregon	93	82	86	75	-17	-7	-11

(continued)

Table 4.4 (continued)

State	Wage competitiveness ratio (Teacher/Nonteacher) (%)				Change over time (%)		
	2000	2002	2007	2012	12-year change	10-year change	5-year change
Pennsylvania	94	92	85	80	-13	-12	-5
Rhode Island	92	87	94	78	-13	-8	-16
South Carolina	86	89	77	73	-13	-16	-4
South Dakota	82	88	78	68	-15	-21	-10
Tennessee	86	74	76	66	-20	-9	-10
Texas	77	78	73	69	-8	-9	-4
Utah	99	93	79	71	-28	-22	-8
Vermont	90	91	95	75	-15	-16	-20
Virginia	76	75	72	63	-14	-12	-10
Washington	79	78	74	69	-11	-9	-5
West Virginia	89	79	79	77	-12	-3	-2
Wisconsin	94	88	84	76	-18	-12	-8
Wyoming	106	91	99	94	-12	3	-5

Table 4.5 Summary of staffing level changes over time

Period	# States that improved staffing ratios	State average change
1993–2012	49	1.06
2002–2012	34	0.21
2007–2012	25	0.03
1993–2007	48	1.03

Relationships Across Adequacy (Level) Measures

Here we explore the relationships among these indicators. Figure 4.5 conveys that states with higher per pupil spending tend to have more teachers per 100 pupils on average. This suggests that, on balance and across states, higher spending on schools is leveraged to increase staffing quantities. The next question is the extent to which these increased overall staffing quantities translate to decreased class sizes, where research literature tends to point to more positive effects on student outcomes.

Figure 4.6 shows that these differences in overall staffing ratios do translate to smaller class sizes, both for self-contained elementary classes and for secondary departmentalized settings. That is, while some may contest the direct relevance of pupil-to-teacher ratios as having influence on schooling quality, the availability of more staff certainly provides the opportunity for, and eventual reality of, smaller classes.

Table 4.6 Predicted staffing ratios for select years

State	Teachers per 100 pupils				Change over time			
	1993	2002	2007	2012	1993–2007	20-year change	10-year change	5-year change
Alabama	5.58	6.41	7.76	6.68	2.18	1.09	0.27	–1.09
Alaska	5.60	5.76	5.77	6.06	0.18	0.46	0.30	0.29
Arizona	4.99	5.26	5.43	5.50	0.44	0.51	0.24	0.07
Arkansas	5.57	6.66	6.55	6.56	0.98	0.99	–0.10	0.01
California	4.03	4.89	4.85	4.40	0.83	0.37	–0.50	–0.46
Colorado	5.12	5.89	5.93	5.67	0.81	0.55	–0.22	–0.26
Connecticut	6.71	7.37	6.92	8.02	0.21	1.31	0.65	1.10
Delaware	5.77	6.54	6.60	6.95	0.83	1.18	0.41	0.35
District of Columbia	5.57	7.78	7.74	8.46	2.17	2.90	0.68	0.72
Florida	5.59	5.49	6.25	7.01	0.66	1.42	1.52	0.77
Georgia	5.30	6.48	7.16	6.79	1.87	1.49	0.31	–0.38
Hawaii	4.90	6.08	6.42	6.57	1.52	1.67	0.49	0.15
Idaho	4.81	5.34	5.39	5.54	0.58	0.73	0.20	0.15
Illinois	5.42	6.14	5.84	6.39	0.43	0.98	0.25	0.55
Indiana	5.33	5.83	5.62	5.85	0.29	0.52	0.02	0.23
Iowa	5.66	6.71	6.92	6.66	1.27	1.00	–0.05	–0.27
Kansas	6.06	6.68	6.89	7.39	0.84	1.33	0.70	0.49
Kentucky	5.45	6.00	6.50	6.17	1.05	0.72	0.17	–0.33
Louisiana	5.81	7.04	7.21	7.10	1.40	1.29	0.06	–0.11
Maine	6.49	7.43	8.04	7.64	1.55	1.15	0.21	–0.40
Maryland	5.90	6.45	7.22	7.13	1.32	1.24	0.68	–0.08
Massachusetts	6.28	8.24	7.61	7.35	1.33	1.07	–0.90	–0.26
Michigan	4.86	5.54	5.56	5.36	0.69	0.50	–0.17	–0.19
Minnesota	5.38	6.20	6.08	6.09	0.70	0.71	–0.12	0.01
Mississippi	5.24	6.10	6.56	6.56	1.32	1.32	0.45	0.00
Missouri	5.44	6.62	6.77	6.84	1.33	1.40	0.23	0.07
Montana	4.91	5.63	5.86	5.98	0.95	1.07	0.35	0.12
Nebraska	5.91	6.65	6.88	6.94	0.97	1.04	0.30	0.07
Nevada	5.47	5.90	5.87	5.81	0.40	0.34	–0.08	–0.05
New Hampshire	5.96	6.84	7.48	7.29	1.52	1.33	0.45	–0.19
New Jersey	7.04	7.78	8.26	8.22	1.22	1.19	0.44	–0.04
New Mexico	5.24	6.66	6.68	6.45	1.44	1.21	–0.22	–0.23
New York	6.52	7.45	7.97	8.10	1.45	1.58	0.65	0.12
North Carolina	5.72	6.56	7.45	6.60	1.73	0.88	0.04	–0.85
North Dakota	5.17	6.26	6.99	7.40	1.82	2.22	1.14	0.41
Ohio	5.41	6.38	5.67	5.76	0.26	0.35	–0.62	0.09
Oklahoma	5.53	6.06	6.05	5.84	0.52	0.31	–0.22	–0.21
Oregon	4.90	4.96	4.18	4.72	–0.71	–0.18	–0.24	0.54
Pennsylvania	5.43	6.25	6.59	7.10	1.16	1.67	0.86	0.51

(continued)

Table 4.6 (continued)

State	Teachers per 100 pupils				Change over time			
	1993	2002	2007	2012	1993–2007	20-year change	10-year change	5-year change
Rhode Island	6.96	7.23	7.70	8.57	0.74	1.62	1.34	0.87
South Carolina	5.56	6.68	7.02	6.50	1.46	0.93	-0.18	-0.53
South Dakota	5.52	6.30	6.52	6.45	1.00	0.93	0.15	-0.07
Tennessee	4.80	6.45	6.47	6.75	1.67	1.96	0.30	0.29
Texas	5.75	6.91	6.95	6.73	1.19	0.98	-0.18	-0.22
Utah	4.17	4.67	4.61	4.38	0.44	0.21	-0.30	-0.23
Vermont	5.48	7.00	7.59	7.49	2.11	2.01	0.50	-0.10
Virginia	6.24	7.45	8.92	7.54	2.68	1.30	0.09	-1.38
Washington	5.56	5.20	5.30	5.13	-0.26	-0.43	-0.07	-0.17
West Virginia	6.19	6.79	5.70	7.08	-0.50	0.89	0.29	1.38
Wisconsin	5.73	6.79	6.70	6.58	0.97	0.85	-0.21	-0.12
Wyoming	6.03	7.51	7.66	7.94	1.63	1.91	0.43	0.28

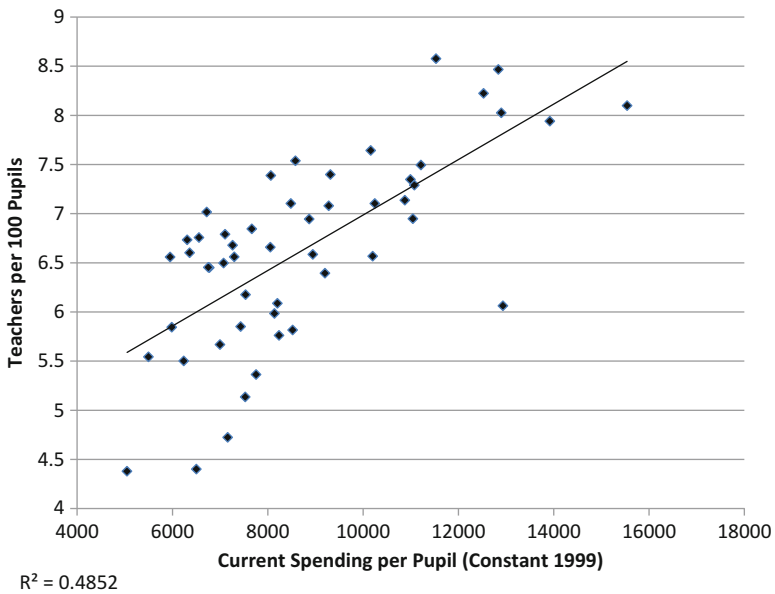


Fig. 4.5 Spending levels and staffing levels 2011–2012 (Note: See Appendix (Table 4A.2) for full information by state)

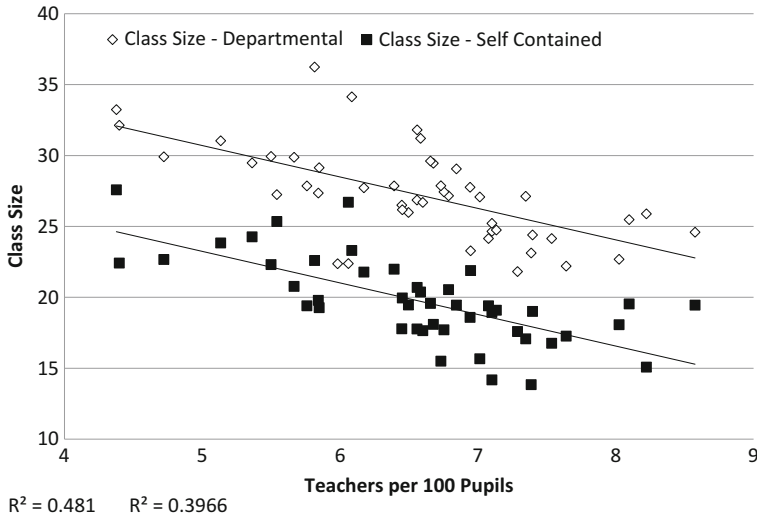


Fig. 4.6 Relating total staffing and class size (Note: See Appendix (Table 4A.2) for full information by state)

Figure 4.7 shows that variation across states in current spending levels also translates to variation in the competitiveness of teacher wages. We have already seen that states where spending is higher tend to have more teachers per pupil and smaller class sizes, consuming a share of the funds that might also be used for providing more competitive wages.

Figure 4.7 shows that states where school districts spend more also tend to have teacher wages more comparable to nonteachers at the same age and degree level. In other words, combining Figs. 4.5 through 4.7, it would appear that much of the cross-state variation in school spending, which is driven by cross-state variation in fiscal effort, translates into real resource differences likely to matter—more competitive wages, lower pupil-to-teacher ratios, and smaller classes.

Figure 4.8 explores the within-state distribution of resources, asking whether there exists a relationship between current spending fairness across states’ school districts and staffing fairness. That is, if current spending per pupil is higher in higher poverty districts within a given state, are staffing concentrations also higher—and vice versa? Do states that provide for fairer distribution of funding yield, on average, fairer distribution of staffing ratios? The answer to that question as seen in Fig. 4.8 is, setting aside outliers (North Dakota and Alaska), yes. See Appendix (Table 4A.2) for full information by state.

Each of the above graphs and related correlations expresses only the relationship across states within the most recent year of data. These graphs do not speak to the question of whether increases or decreases in funding translate to increases or decreases in real resource levels or fairness. Unfortunately, our only real resource measure collected annually from 1993 to 2012 at the district level—thus useful for

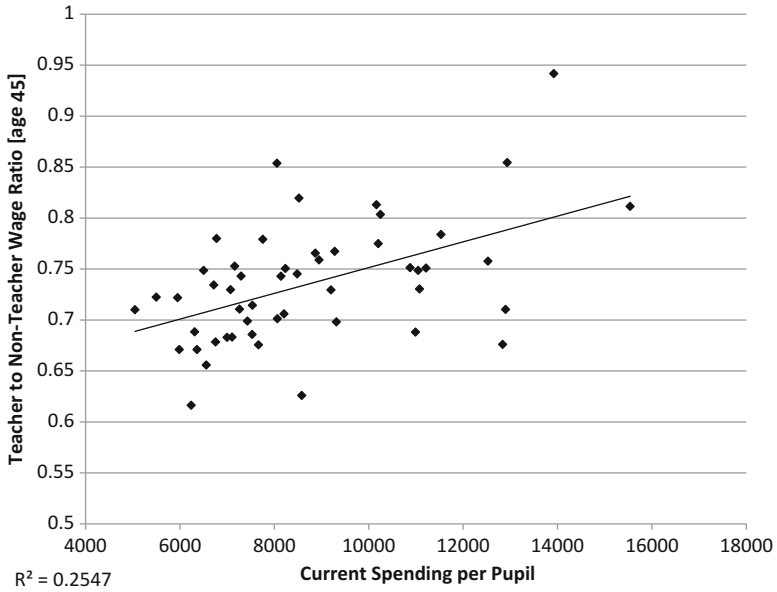


Fig. 4.7 Spending levels and competitive wages (Note: See Appendix (Table 4A.2) for full information by state)

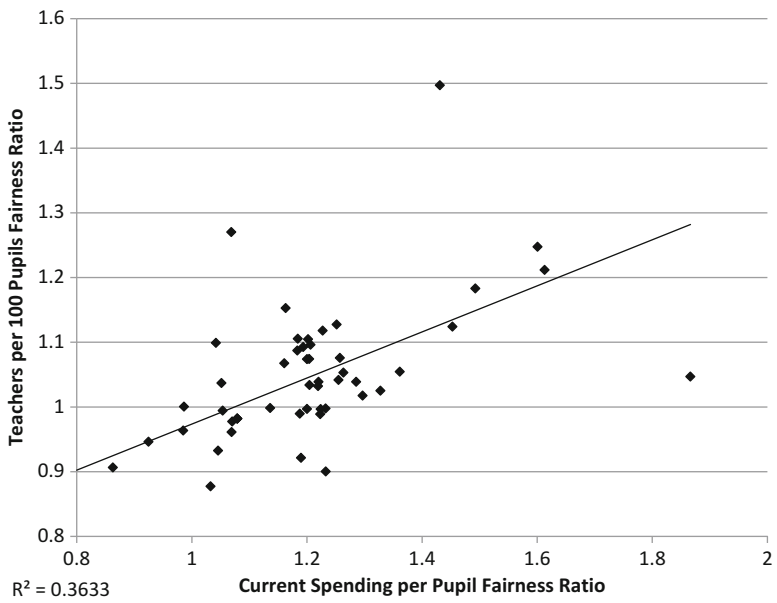


Fig. 4.8 Spending fairness and staffing fairness 2011–2012 (Note: See Appendix (Table 4A.2) for full information by state)

Table 4.7 Fixed effects model of pupil-to-teacher ratio fairness

DV = Teachers per 100 pupils fairness	Fixed effects			Random effects		
	N = 50×20 years			N = 50×20 years		
	Coef.	Std. err.	P>t	Coef.	Std. err.	P>t
Spending measures						
Spending fairness	0.417	0.022	^a	0.432	0.020	^a
Constant	0.564	0.026	^a	0.546	0.026	^a
R-Squared						
Within		0.278			0.278	
Between		0.694			0.694	
Overall		0.572			0.572	

^ap < .01

evaluating both predicted state levels and within-state variation over time—is our pupil-to-teacher ratio measure.

Table 4.7 shows the results of a 20-year fixed effects model (also random effects) of the relationship between annual changes in spending levels and fairness, and pupil-to-teacher ratio fairness. The fixed effects model evaluates year-over-year changes within states. That is, to what extent do within-state changes in spending result in within-state changes in pupil-to-teacher ratio distributions? The random effects model combines evaluation of within-state differences over time with across-state differences. Cross-state differences evaluate the extent that states with fairer (or less fair) distributions of spending have fairer (or less fair) distributions of pupil-to-teacher ratios. R-squared values display the extent of variance that is explained by the models *within* states over time (averaged across states) and *between states* at each point in time (averaged over time). The more substantial variations across states than within any state over time yield more predictable variation (r-squared = .694).

In short, the model shows that when spending fairness improves, so too do staffing ratios in higher poverty districts. Each unit increase in funding fairness (increase in relative spending of higher poverty districts compared to lower poverty districts) translates to an additional 0.4 units of staffing per 100 pupils. Put into more realistic terms, an increase in fairness ratio from 1.0 (flat funding) to 1.25 (modestly progressive funding) leads to an increase in 0.1 of a teacher per 100 pupils in high poverty, relative to low poverty districts.

These differences exist across states but also occur within states over time. The magnitude of the change over time effect is only slightly smaller than the combined change over time and cross sectional effect. In other words, whether across states at all time periods, or within states over time, the responsiveness of pupil-to-teacher ratio fairness to spending fairness is relatively consistent.

To summarize, if we target additional funding to higher poverty settings, that funding translates to increased numbers of teachers and a fairer statewide distribution of staffing ratios in those districts. Of course, the inverse also follows.

Fig. 4.9 Change in class size for 1 unit change in relative spending and relative poverty (Note: Solid colored bars indicate statistically significant class size differences)

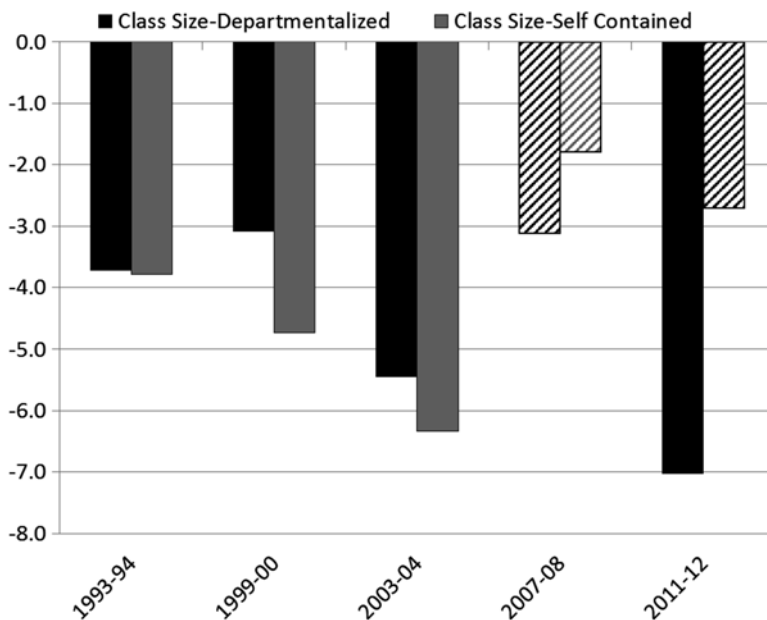
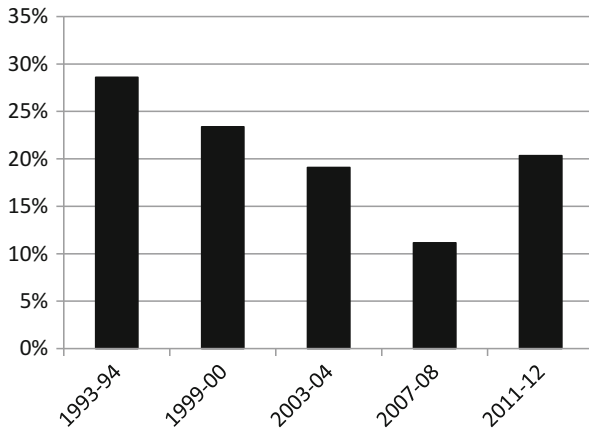


Fig. 4.10 Change in salary competitiveness for 1 unit change in relative spending (Note: Solid colored bars indicate statistically significant salary differences)

Figures 4.9 and 4.10 explore within year, over time, relationships between within-state variation in current spending and within-state (within-labor market) variation in (a) class sizes and (b) teacher wages (conditioned on age, experience, teaching assignment, grade level). Both figures are based on within-year (within SASS wave) models. Figure 4.9 shows that within-year (except for 2007–2008) class sizes across districts within metropolitan areas are sensitive to relative spend-

ing differences across districts within metropolitan areas. For example, as we move from average to double the average current spending, in 2011–2012, departmentalized class sizes are reduced by over seven pupils. More realistically, as a district moves from average spending for its labor market to 20 % above average, class sizes are reduced by about 1.4 students (20 % of 7). Such reductions are sufficient to be policy relevant. Recall that these estimates are conditioned on grade level taught and relative district poverty rate and include only nonrural schools.

Figure 4.10 displays the relationship between the competitiveness of teacher salaries to other teachers with similar credentials in similar jobs on the same labor market. Teachers in districts in a given labor market where per-pupil spending is double the labor market average have 20 % higher wages than similar teachers in average spending districts on average in 2011–12. Taken together, Figs. 4.9 and 4.10 support the conclusion that spending variation translates to meaningful real resource variation across children and across districts within the same labor market. These differences are significant, and the resources in question are meaningful.

Conclusions and Implications

The analyses presented validate the conclusion that variations in available revenues and expenditures are associated with variations in children’s access to real resources—as measured by the competitiveness of the wages paid to their teachers and by pupil-to-teacher ratios and class sizes. Put simply:

- States that apply more effort—spending a greater share of their fiscal capacity on schools—generally spend more on schools.
- These higher spending levels translate into higher statewide staffing levels—more certified teaching staff per pupil.
- These higher staffing levels translate to smaller statewide class sizes.
- These higher spending levels translate to more competitive statewide teacher wages.
- Districts that have higher spending levels within states tend to provide smaller class sizes than surrounding districts with lower spending levels.
- Districts that have higher spending levels within states tend to provide more competitive teacher salaries than surrounding districts with lower spending levels.

These relationships hold (a) across states, (b) within states over time as resource levels change and (c) across districts within states and labor markets. The connections identified here between school funding and real resource access speak to both equity and adequacy concerns. Equity and adequacy of financial inputs to schooling across states are required if we ever expect to achieve more equitable access to a highly qualified teacher workforce (as dictated in part by the competitiveness of their compensation) and reasonable class sizes.

The loftier goal of equal educational opportunity—or equal opportunity across children to strive for common outcome goals—requires not merely equal real resources, but appropriately differentiated resources, including smaller classes and additional support services with at least equally qualified teachers and other school staff. While the press is on to nationalize those outcome expectations through Common Core Standards and the assessments by which we measure them, our current system for financing schools is in full retreat from the equity and adequacy gains made between 1993 and 2007.

The recent recession yielded an unprecedented decline in public school funding fairness. Thirty-six states had a 3-year average reduction in current spending fairness between 2008–2009 and 2010–2011, and 32 states had a 3-year average reduction in state and local revenue fairness over that same time period. Even after the partial rebound of 2012, 30 states remained less fair in current spending than in 2007. Nearly every state has experienced a long-term (10-year) decline in the competitiveness of teacher wages. Between 2007 and 2012, 33 states saw increases in pupil-to-teacher ratios.

Notably, while equity overall took a hit between 2007 and 2012, the initial state of funding equity varied widely at the outset of the period, with Massachusetts and New Jersey being among the most progressively funded states in 2007. Thus, they arguably had further to fall. Funding equity for many states has barely budged over time and remained persistently regressive, for example, in Illinois, New York, and Pennsylvania. Potential influences on these patterns are also elusive and widely varied. In Missouri, we see the 1990s influence of desegregation orders, which capitalized on the state's matching aid program to generate additional revenue in Kansas City and St. Louis driving spending progressiveness, but when the state adopted a need-weighted foundation aid formula in 2006, spending continued to become more regressive.

We see the more logical influence of school finance reforms in Massachusetts in the early 1990s and in New Jersey in the late 1990s after court orders targeting additional funds to needy districts, yielding an overall pattern of progressiveness. Court orders in New York state (2006) appears to have had little or no influence on equity, and the influence of court orders over time in Kansas have moved the needle only slightly. A better understanding of the role of judicial involvement requires significant additional exploration of these data linked to information on both judicial activity and legislative reforms.

Finally, the coming years will tell us both whether state school finance systems can rebound from the effects of the downturn or whether these effects have become permanent, and they will inform us about the consequences for short- and long-term student outcomes. A significant body of literature has now shown the positive effects of equity and adequacy improvements of the prior 40-plus years of school finance reform. Similar methods applied years from now may reveal the deleterious influences of these dark ages of American public school finance.

Appendix

Table 4A.1 Data sources, years, and measures

Data element	Unit of analysis	Data source	Years available	Years imputed
District level fiscal measures				
Per pupil spending	District	U.S. Census F-33 Public Elementary–Secondary Education Finance Survey (F-33) ^a	1993–2012	
State revenue	District	F-33	1993–2012	
Local revenue	District	F-33	1993–2012	
Federal revenue	District	F-33	1993–2012	
District characteristics				
Enrollment	District	National Center for Education Statistics (NCES), Common Core of Data (CCD) ^b	1993–2012	
Grade ranges	District	CCD	1993–2012	
Pupil/teacher ratios	District	CCD	1993–2012	
Regional cost variation				
Education comparable wage index	District	Taylor’s Extended NCES Comparable Wage Index	1997–2012	1993–1996, 2012
Population needs/characteristics				
Child poverty ^c	District	U.S. Census Small Area Income and Poverty Estimates ^d	1995, 1997, 1999, 2000–2012	1993–1994, 1996, 1998
Teacher characteristics				
Teacher/nonteacher wages	Individual worker	IPUMS Census & American Community Survey	2000–2012	
Wages/compensation	Teacher linked to school/district (sample)	NCES Schools and Staffing Survey ^e	1993–1994, 1999–2000, 2003–2004, 2007–2008, 2011–2012	
Class size	School (sample)	NCES Schools and Staffing Survey	1993–1994, 1999–2000, 2003–2004, 2007–2008, 2011–2012	

^aU.S. Census. Public Elementary–Secondary Education Finance Data

^bU.S. Department of Education, National Center for Education Statistics. Common Core of Data

^cSee Baker et al. (2013b)

^dU.S. Census. Small Area Income and Poverty Estimates, School District Data Files

^eU.S. Department of Education, National Center for Education Statistics. Schools and Staffing Survey

Table 4A.2 Summary data by state

State	Effort & revenue		Spending & staffing				Fairness		
	Effort index (%)	State & local revenue (\$)	Spending level (\$)	Staffing level	Class size – departmental	Class size – Self contained	Wage ratio (%)	Spending Fairness	Staffing Fairness
Alabama	3.3	9013	7263	6.68	29.45	18.09	71.0	1.08	0.98
Alaska	3.4	13,745	12,934	6.06	22.38	26.70	85.4	1.87	1.05
Arizona	2.5	7122	6239	5.50	29.93	22.30	61.6	1.05	0.99
Arkansas	3.8	9554	7296	6.56	31.80	20.69	74.3	1.23	1.12
California	2.7	8104	6503	4.40	32.12	22.41	74.9	1.20	1.00
Colorado	2.8	8959	7000	5.67	29.87	20.77	68.3	1.16	1.07
Connecticut	3.9	15,863	12,901	8.02	22.68	18.07	71.0	1.07	0.96
Delaware	2.7	12,160	11,046	6.95	23.28	21.88	74.8	1.23	1.00
Florida	2.7	7684	6718	7.01	27.08	15.66	73.4	1.19	0.92
Georgia	3.6	8905	7104	6.79	27.16	20.54	68.3	1.20	1.03
Hawaii	3.1	12,339	10,203	6.57			77.5	1.08	0.98
Idaho	2.9	6462	5498	5.54	27.24	25.34	72.2	1.18	1.09
Illinois	3.8	11,911	9202	6.39	27.85	21.98	72.9	1.05	0.93
Indiana	3.6	10,587	7431	5.85	29.14	19.27	69.9	1.45	1.12
Iowa	3.5	11,565	8055	6.66	29.61	19.57	85.4	1.20	1.07
Kansas	3.7	10,693	8065	7.39	23.12	13.83	70.1	1.22	1.00
Kentucky	3.5	8992	7536	6.17	27.72	21.77	71.4	1.22	1.04
Louisiana	2.8	9568	8483	7.10	24.65	14.18	74.5	1.33	1.02
Maine	4.4	12,486	10,162	7.64	22.19	17.26	81.3	0.99	0.96
Maryland	3.8	13,759	10,877	7.13	24.75	19.08	75.1	1.14	1.00
Massachusetts	3.4	14,171	10,993	7.35	27.12	17.07	68.8	1.25	1.13
Michigan	3.8	9862	7756	5.36	29.47	24.26	77.9	1.20	1.10

Minnesota	3.3	11,067	8204	6.09	34.13	23.30	70.6	1.60	1.25
Mississippi	3.6	7471	5951	6.56	26.86	17.77	72.2	1.30	1.02
Missouri	3.3	9932	7666	6.84	29.05	19.44	67.5	1.05	1.04
Montana	3.3	9527	8141	5.98	22.36		74.3	1.18	1.11
Nebraska	3.2	10,550	8870	6.94	27.76	18.58	76.6	1.36	1.05
Nevada	2.8	10,668	8523	5.81	36.23	22.59	81.9	0.57	0.69
New Hampshire	4.0	13,668	11,077	7.29	21.81	17.58	73.0	1.07	1.27
New Jersey	4.8	15,862	12,528	8.22	25.89	15.08	75.8	1.26	1.08
New Mexico	3.3	9185	6775	6.45	26.49	17.78	78.0	1.29	1.04
New York	4.3	18,708	15,540	8.10	25.47	19.53	81.1	0.99	1.00
North Carolina	2.4	7004	6363	6.60	26.69	17.64	67.1	1.25	1.04
North Dakota	2.3	11,538	9316	7.40	24.40	19.01	69.8	1.43	1.50
Ohio	3.7	10,295	8236	5.76	27.86	19.40	75.0	1.16	1.15
Oklahoma	2.9	7371	5987	5.84	27.34	19.78	67.1	1.20	1.07
Oregon	2.6	9133	7159	4.72	29.90	22.66	75.3	1.22	0.99
Pennsylvania	3.9	14,127	10,248	7.10	25.20	18.93	80.3	0.92	0.95
Rhode Island	3.9	13,843	11,532	8.57	24.59	19.44	78.4	1.03	0.88
South Carolina	3.9	9505	7072	6.50	25.98	19.46	73.0	1.26	1.05
South Dakota	2.5	8498	6755	6.45	26.17	19.95	67.8	1.61	1.21
Tennessee	2.7	7263	6559	6.75	27.43	17.71	65.6	1.22	1.03
Texas	3.0	8634	6311	6.73	27.87	15.50	68.8	1.19	0.99
Utah	2.8	6443	5047	4.38	33.23	27.58	71.0	1.49	1.18
Vermont	5.1	15,126	11,214	7.49			75.1	0.86	0.91
Virginia	3.0	9989	8583	7.54	24.14	16.76	62.6	1.07	0.98
Washington	2.8	9752	7529	5.13	31.04	23.82	68.6	1.21	1.10
West Virginia	5.1	12,781	9279	7.08	24.14	19.40	76.7	1.19	1.09
Wisconsin	3.7	11,199	8947	6.58	31.20	20.37	75.9	1.23	0.90
Wyoming	3.6	17,394	13,920	7.94			94.2	1.04	1.10

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