

Relationships Between Class Size Reduction, New Teachers, and Student Achievement

In response to widespread dissatisfaction with its public schools, California has implemented a number of educational reforms over the past decade. Perhaps the most dramatic, and certainly the most costly, was the passage of the class size reduction (CSR) law in the summer of 1996. This legislation aimed to reduce average class size by roughly one-third, from 30 students to 20, in grades kindergarten through third grade, at an annual cost of over \$1 billion.

Educators and policymakers were expecting CSR to lead to large gains in student achievement. However, CSR created thousands of additional teaching positions but not, of course, thousands of additional teachers. Much of the increase in the teacher workforce consisted of individuals who might not have been hired as teachers in the absence of CSR. The hiring of large numbers of inexperienced people had the potential to offset the direct benefits of smaller classes, particularly for schools in economically disadvantaged communities that had extreme staffing difficulties even before class size reduction.

The program's full effect on student achievement can never be known because there are no statewide test scores in the years immediately preceding the implementation of the program. Statewide tests began in 1997–1998, the second year of CSR. Nonetheless, much can be learned over time about the costs and benefits of CSR. In their report, *Class Size Reduction, Teacher Quality, and Academic Achievement in California Public Elementary Schools*, Christopher Jepsen and Steven Rivkin provide some limited but very important answers to the following questions:

- What were the effects of CSR on overall teacher experience, certification, and education? Were some schools affected more than others?
- How did CSR affect student achievement? What were the benefits of smaller classes? What were the effects of new teachers?

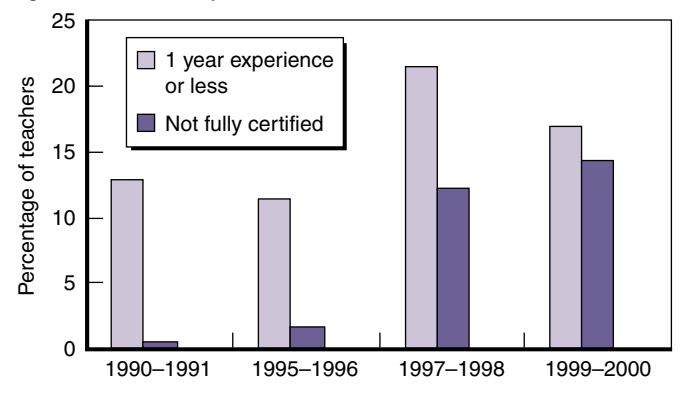
- Are the benefits of smaller classes concentrated among a subset of students, or did all schools benefit equally from CSR?

The analysis examined changes within schools in average class size in third grade between 1997–1998 and 1999–2000. The authors measured the effects of these changes, along with changes in teacher characteristics, on third-grade mathematics and reading achievement in California. Their approach allowed them to consider two effects of class size reduction on student achievement: the effects from the reduction in class size and the effects from the change in the teaching force.

Effects of CSR on Teacher Characteristics

CSR led to a dramatic increase in the percentages of inexperienced and uncertified teachers (see Figure 1). In 1990, there were few differences in these characteristics by racial/ethnic and income groups. Even as late as 1995–1996, the year before CSR, schools with high percentages of nonwhite and low-income students were only slightly more likely than other schools to have inexperienced teachers who lacked full certification and postgraduate schooling. By 1999, large gaps in teacher qualifications had emerged between schools attended by nonwhite and low-income students and other schools. For black students in schools with more than 75 percent of the students enrolled in subsidized lunch programs, nearly 25 percent had a first- or second-year teacher; almost 30 percent had a teacher who was not fully certified. At the other extreme, for white students attending schools with 25 percent or fewer of the students enrolled in subsidized lunch programs, only 12 percent had a first- or second-year teacher, and only 5 percent had a teacher who was not fully credentialed. These differences reflect the varying levels of difficulty that many schools experienced in attempting to attract and retain teachers following the implementation of CSR.

Figure 1—Teacher Experience and Certification, Grades K–5, 1990–2000



In 1996, California passed the largest class size reduction law in the nation, which led to the hiring of many new teachers with little experience or lacking full certification.

Effects of CSR and Teacher Characteristics on Student Achievement

The analysis indicated that a ten-student reduction in class size (the average under CSR) raises the percentage of third-grade students who exceed national median tests score by roughly 4 percentage points in mathematics and 3 percentage points in reading. The analysis also revealed substantial variation by school. When the authors looked strictly at income, they found that schools with more low-income students are likely to receive larger benefits. When they looked strictly at race/ethnicity, they found that schools in which a high proportion of the students are black appear to benefit little if at all from smaller classes.

The relationship between the measures of teacher quality used in this study and student achievement is much weaker. The only indicator that is systematically linked to student achievement in third grade is teacher experience. Having a new teacher reduces the percentage of students who exceed national median test scores by roughly 3 percentage points in both mathematics and reading. There is little or no evidence that teacher education or certification is significantly related to student achievement in third grade. However, the finding for certification could be influenced by the lower quality of the certification data.

Concerns About Teacher Quality

The decline in third-grade teacher quality estimated in this study probably understates the actual decline that accompanied the implementation of CSR statewide in two ways. First, the effects of class size reduction on teacher qual-

ity extend beyond the grades where class sizes were reduced. An analysis of fifth-grade achievement showed that class size reduction in third grade led to lower achievement in fifth grade for schools with a high percentage of black students. Such a finding is consistent with the notion that the movement of many fourth- and fifth-grade teachers into the earlier grades with fewer students meant that schools had to rapidly expand hiring in all grades, not just K–3. Second, it is widely believed that CSR led many teachers to switch schools, so that many schools had to fill not only the additional positions created by their own efforts to reduce class size but also positions vacated by the departure of teachers for newly created opportunities at other schools. The schools that do not appear to benefit from CSR are the same schools that had trouble hiring experienced, certified teachers before CSR.

Policy Implications

Because it is difficult to calculate the magnitude of the benefits of CSR in terms of higher student achievement, the question of whether money would have been better spent on other aspects of schools such as higher teacher salaries, expanded and improved preschool, greater use of technology, or other programs is very hard to answer. Nevertheless, there is clear evidence that, controlling for changes in teacher quality, smaller classes raised student achievement, and the effects were larger in schools serving predominantly lower-income students. Unfortunately, these schools tended to suffer the largest deterioration in teacher quality as measured by experience and certification. A better approach to class size reduction would have been to reduce class sizes in a subset of schools each year, starting with low-performing schools serving high-poverty populations. This would have limited the departure of teachers for newly created jobs in suburban schools, lessened the overall competition for new teachers, and reduced inequality in academic performance.

The entrance of so many new teachers into the schools highlights the importance of policies targeting these teachers, such as the Beginning Teacher Support Act. These types of programs have two potential benefits. First, they can minimize the adverse effects of new teachers by helping them adapt to the classroom more quickly. Second, making these teachers more productive and effective reduces the stress of the job, thereby reducing teacher turnover. Effective programs that assist new teachers will become even more essential in the near future, as enrollment and teacher retirements both increase. Future research should analyze the effect of such programs on teacher quality and student achievement.

This research brief summarizes a report by Christopher Jepsen and Steven Rivkin, Class Size Reduction, Teacher Quality, and Academic Achievement in California Public Elementary Schools (2002, 134 pp., \$12, ISBN 1-58213-058-2). The report may be ordered by phone at (800) 232-5343 [U.S. mainland] or (415) 291-4400 [Canada, Hawaii, overseas] or through the Internet at www.ppic.org. The Public Policy Institute of California is a private, nonprofit organization dedicated to independent, objective, nonpartisan research on economic, social, and political issues affecting California.