Dissertation Abstract

Previous research has established the potential for achievement gains from attending smaller classes. However, large state-wide class-size reduction (CSR) policies have not been found to consistently realize such gains. A leading explanation for the disappointing performance of CSR policies is that schools are forced to hire additional teachers of lower quality to meet the new class-size requirements. One of my papers uses administrative data from an anonymous state to explore whether there were noticeable changes in the quality, measured by value-added to mathematics achievement, of newly hired teachers around the introduction of CSR, and if so were these changes large enough to account for the disappointing performance of the policy? The results suggest that while there was a modest fall in the relative average quality of newly hired teachers and those retained beyond their first year, this drop is not nearly large enough to explain the failure of CSR to produce sizeable achievement gains. Furthermore, schools facing CSR pressure saw similar falls in quality as those that did not, likely due to labor market competition forcing all schools along the effective teacher supply curve. Therefore, between-school differences in the quality of incoming teachers cannot explain the failure of previous quasi-experimental treatment-control comparisons to find achievement effects from statewide CSR. In addition to providing insight into CSR, the results are informative for assessing any potential intervention that may drastically increase the short-run demand for teachers.

While there is substantial empirical evidence that teachers matter for determining student achievement, there is less clear evidence of how the pedagogy practices adopted by teachers affect achievement. Importantly, the data available for assessing pedagogy effects on learning tend to be non-experimental and pose a major obstacle to estimating causal effects. In another of my papers, coauthored with Cassandra Guarino, Anna Bargagliotti, and William Mason, we examine the effectiveness of a range of pedagogy practices in kindergarten and first grade using a longitudinal survey dataset, the Early Childhood Longitudinal Study- Kindergarten Cohort of 1998. In answering this question, we focus on concerns over the non-random exposure of students to different teaching strategies and develop a step-by-step procedure for selecting our preferred model and estimator given the limitations of longitudinal cohort data. Our findings indicate that various teaching modalities, such as working with counting manipulatives, using math worksheets, and completing problems on the chalkboard, have positive effects on achievement in kindergarten. In first grade, pedagogical practices relating to explaining problem-solving and working on problems from textbooks have positive effects on achievement. Through our step-by-step procedure, we find that the models and estimators previously employed to estimate teacher characteristic and practice effects using longitudinal survey data likely neglected problems arising from the non-random sorting of students and teachers into schools. Importantly, we show that the conclusions drawn depend on the estimation and modeling choices made, underscoring the importance of setting out a clear strategy for choosing among the many possibilities available.
A third paper provides necessary background information for the CSR paper discussed above. Prior evidence for the change in teacher composition associated with CSR policies focused on changes in observable teacher characteristics in California. California experienced large increases in the percentage of teachers without certification, without an advanced degree, and with fewer than three years of experience. These changes in the composition of the teacher workforce in California have been cited when looking at CSR in other states. However, there has been no study of changes in the composition of the teacher workforce for the anonymous state studied above. Unlike in California, this paper finds little evidence of large changes in teacher characteristics associated with class-size reduction. Only average experience moves in a direction consistent with California’s experience. This drop in experience is found to be slightly larger for schools serving larger minority and low income populations.