

Abstract: This paper examines empirically the effect of teachers on students' academic outcomes. Using large administrative panel data of reading and math test scores of students in public elementary schools in a municipality in Japan, we estimate the distribution of teacher fixed effects controlling for student, school, and year fixed effects. Our results show that teacher fixed effects are substantial: improvement of teacher fixed effect by one standard

deviation raises student's z-score by 0.23 standard deviation for reading and by 0.32 standard deviation for math. Our estimates show that both teacher's experience and class size matter for students' achievement of both reading and math. The magnitude of the teacher effect is equal to the class size effect with reduction of 2.8 students for reading z-score and 5.2 students for math z-score.