

Teacher Labor Market Equilibrium and Student Achievement

Based on BFI Working Paper 2022-23, “[Teacher Labor Market Equilibrium and Student Achievement](#)” by Michael Bates, University of California, Riverside; Michael Dinerstein, University of Chicago; Andrew C. Johnston, University of California, Merced; and Isaac Sorkin, Stanford University

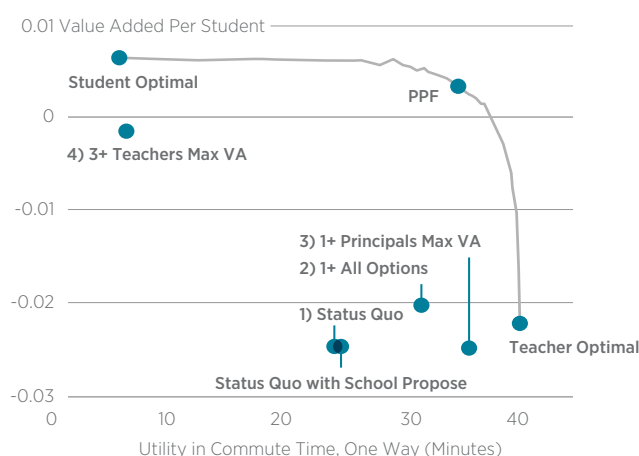
Achieving meaningful achievement gains from reallocating teachers within a district requires directly affecting teachers’ preferences over schools; in contrast, directly affecting principals’ selection of teachers can lower student achievement.

Much research in recent years has focused on potential gains to education from replacing low-performing teachers or otherwise reassigning teachers to different schools. However, reassigning teachers to achieve allocative gains is not easy because teachers care about where they teach, and they have some power in determining at which schools they are employed. Teacher preferences, in other words, may not align with optimal productivity.

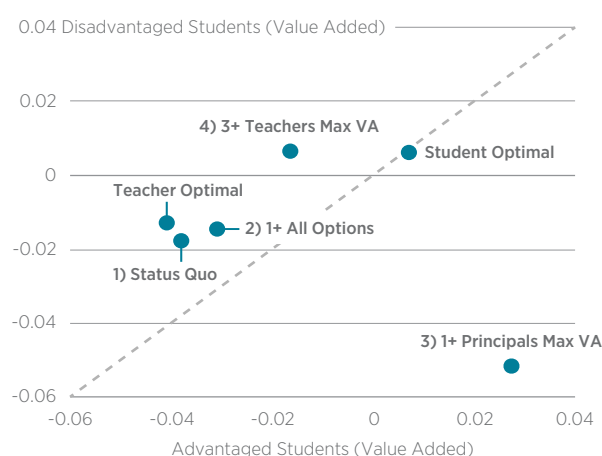
This paper explores the potential student achievement gains from within-district teacher reassignment and the effectiveness of combinations of different policy levers in achieving these gains. To conduct their analysis, the authors employ an equilibrium model of the teacher labor market combined with novel data on job vacancies and applications. These data come from the job application system of a school district in North Carolina and include the timing of all teacher applications to open vacancies and the outcome of each application (including whether

Figure 1 • Production Possibilities Frontier

a) Production Possibilities Frontier

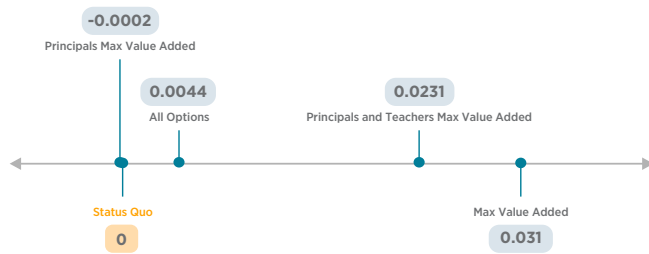


b) Distributional Consequences



Note: This figure simulates the trade-off between teacher preferences and student achievement (Panel A) and between student achievement for economically advantaged and disadvantaged students (Panel B). The “PPF” represents the solution to the social planner’s problem from placing different relative weights on teacher preferences and student achievement. The student-optimal point maximizes student achievement and is when the planner only weights students. The teacher-optimal point maximizes teacher preferences and is when the planner only weights teachers. The status quo (point 1) uses teacher and principal estimated preferences, restricted choice sets, and solves for the teacher proposing stable allocation. The status quo with school proposing allocation is the same as the status quo except it is the school-proposing solution. Point 2 takes the status quo and gives teachers and principals all options. Point 3 takes point 2 and gives principals preferences to maximize value-added. Point 4 takes point 3 and also gives teachers preferences to maximize value-added. The Figure plots averages over 200 simulations.

Figure 2 • Summary of Changes in Output Relative to Status Quo



Note: This figure summarizes the mean student achievement from allocations presented in Figure 1. The status quo output has been normalized to 0. The status quo corresponds to point 1, all options to point 2, principals maximize VA to point 3, and principals and teachers maximize VA corresponds to point 4. The "max VA" point corresponds to the "student-optimal" point in Figure 1.

the teacher was hired and whether the hiring principal rated the application positively). Importantly, the authors also link the applicant data to the classroom assignment and student achievement data in North Carolina. Finally, the data also allow the authors to characterize each teacher's value-added, and to estimate the joint distribution of preferences and value-added.

The authors find the following:

- Teachers prefer positions described by homogeneous characteristics (e.g., fraction of advantaged students) and heterogeneous characteristics (e.g., commute time), with only slight preference toward positions where they have higher value-added. Giving teachers the ability to choose their position leads to excess supply at schools with advantaged students and sorting based on non-output heterogeneity. Thus, if teachers have some degree of choice in their assignment, then the district may want to counteract the sorting by changing how teachers value positions (e.g., with bonuses).

- On the principal side, the authors find preferences for teachers who produce more student achievement, but that differences in output only explains some of the variation in preferences. Thus, the district might consider changing how principals value teachers.
- Things get complicated when these preferences are combined, as played out in the authors' model. When teachers receive bonuses for output, they sort toward positions closer to the first-best position. When principals receive bonuses for output, they seek the best teachers. However, because absolute advantage dispersion is large, a second consequence of principal bonuses is that the strongest teachers get more choice. And more choice among teachers, as we can see from the first finding, does not necessarily lead to higher achievement.

What does this mean for policymakers? In a system where everyone gets paid on the same salary scale, teacher bonuses are the primary policy tool for realizing achievement gains because they align teacher and district preferences. But the optimal form of bonuses depends on how principals value teachers. Flexible prices (or salaries), though, would produce achievement gains at a much lower cost. While authors find that district teacher value-added is relatively balanced across student types, their data and framework could be useful in designing policies that go beyond equalizing achievement gains to try to close baseline gaps.

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ABOUT OUR SCHOLAR



Michael Dinerstein

Assistant Professor, Kenneth C. Griffin
Department of Economics
[economics.uchicago.edu/directory/
michael-dinerstein](https://economics.uchicago.edu/directory/michael-dinerstein)

