

Information Friction and the Labor Market for Public School Teachers

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Abstract

Extensive research has suggested that effective teachers play an instrumental role in student success as measured by student academic achievement and future labor market outcomes.¹ Therefore, it is crucial for economic growth and intergenerational mobility to improve the effectiveness of all teachers and to equalize the allocation of effective teachers to schools regardless of the student bodies they serve. One of the major obstacles to achieving this goal is information friction: Teacher effectiveness is not strongly correlated with observable characteristics (e.g., education and experience), which makes it hard to identify effective teachers upon hire. Moreover, to the extent that a school can learn about a teacher’s effectiveness by observing her performance, a teacher’s current employer has information advantages about her quality over other schools.²

It is well known that asymmetric information between current and prospective employers may obstruct optimal allocation on the labor market in general (e.g., Waldman 1984; Greenwald 1986; Chang and Wang 1996; Waldman and Zax 2016). Information asymmetry on the labor market for public school teachers is accompanied with two distinct features of this market. First, in most public school districts, teacher salaries follow a rigid schedule imposed on all schools within a district, leaving little variation in compensation across schools for the same teacher. As a result, the relative attractiveness of a school largely lies in non-pecuniary factors, such as the body of students it serves. Second, in a typical labor market, optimality is largely equivalent to efficiency, i.e., labor allocation that maximizes the total output is optimal. However, in the case of teacher-school sorting, equity—providing students with equal access to effective teachers—is at least as important as efficiency in defining optimality.³

¹See, for example, Chetty, Friedman, and Rocko (2014); Hanushek and Rivkin (2010); Hanushek (2011); and Jackson (2018).

²For studies on the difficulty in predicting teacher effectiveness, see, e.g., Staiger and Rockoff (2010) and Rivkin et al. (2005); for evidence that schools learn about the quality of their teachers, see, e.g., Jacob and Lefgren (2008), Chingos and West (2011) and Rockoff et al. (2012). Bates (2020) provides evidence on asymmetric information on the teachers’ labor market.

³The issue related to the distribution of worker welfare exists in all labor markets, including teachers’ labor market; the optimality mentioned here focuses on outputs.

These features complicate the implication of information asymmetry on the teachers' labor market. On the one hand, as is the case in a typical labor market, breaking information asymmetry would make it easier for productive workers to move to more desirable jobs, and in this case, for effective teachers to move to schools with more attractive characteristics (given the lack of pay variation). If most teachers prefer teaching high-achieving students, such teacher-school re-sorting will hurt schools serving more low-achieving students and enlarge achievement gaps, holding fixed the supply of teachers. On the other hand, the easier upward job mobility may pull effective teachers into and push ineffective teachers out of the market, thereby improving the overall quality of teachers in the market. As a result, the equity-efficiency implication of breaking information asymmetry becomes an empirical question, which we answer in this paper.

Our empirical setting is Houston Independent School District (HISD), the 7th largest school district in the U.S. HISD introduced a merit pay program (ASPIRE) in 2006-07 to reward teachers and administrators for raising student achievement; and the Effective Teachers Initiative (ETI) in 2011, the cornerstone of which is a rigorous teacher evaluation system.⁴ Our data analysis suggests that the introduction of ETI, which reduced the information friction in the labor market for teachers, is associated with a higher concentration of effective teachers in advantaged schools. This may lead to concerns over education inequality and highlight a potential need for policy intervention. Using HISD as a platform, our paper aims at shedding light on the design of such policies.

To this end, we develop and estimate an equilibrium model of the labor market for public school teachers, accounting for the role of asymmetric information. In the model, there is a distribution of teachers, including both market incumbents and potential entrants, characterized by attributes x and effectiveness v . A teacher cares about her salary and the characteristics of the school she teaches in, including the student composition. There are S schools on the market that value a teacher for her x and v . Without a transparent teacher evaluation program (e.g., ETI), teacher effectiveness v is known to the teacher and her employer, but unknown to other schools (asymmetric information). A school aims at filling its capacity with its most preferred teachers by extending job offers to teachers it wishes to hire, given its belief about the probabilities of acceptance by different teachers and the expected effectiveness of a teacher *conditional on her acceptance*. A teacher chooses her most preferred school among those offering her a job or the outside option, taking into account the cost of changing jobs. An equilibrium requires schools' beliefs be consistent with decisions by all schools and teachers.

The model highlights how a transparent teacher evaluation program can affect the equilibrium teacher-school sorting. When the incumbent employer is the only informed school about its teachers' effectiveness, schools may be apprehensive about hiring a teacher from another school in fear of the winner's curse: Given the cost involved in changing jobs, if a teacher originally working in another school nevertheless accepts an offer from school s , a possible explanation is that she has been found to be ineffective and fired by her original employer.⁵ Depending on how pessimistic

⁴See Cullen, Koedel and Parsons (2017) for a detail description of the program.

⁵In this model, the market cannot observe whether a teacher is laid off or quits voluntarily. This is in contrast to the setup in, e.g., Gibbons and Katz (1991), where layoff is public information and serves as a signal of the worker's

schools' beliefs are in the equilibrium, teachers may get few offers from and therefore rarely move to other schools. Programs such as ETI evaluate the effectiveness of market incumbent teachers and give schools credible information about teachers working in other schools. This breaks the information asymmetry and affects both teacher-school sorting within the market and teachers' entry into and exit from the market.

We estimate our model using the post-ETI data and use the pre-ETI data to validate the estimated model. We first use the estimated model to quantify the role of information friction. We conduct a counterfactual simulation of the market equilibrium, where we *hold all the other initial conditions fixed* at the post-ETI level but revert to the pre-ETI information environment. We find that removing information asymmetry between current and prospective employers improves the overall quality of teachers on the market by encouraging higher-quality teachers to enter the market. However, it also exacerbates the inequality of teacher quality across schools, leaving schools with more low-performing students further behind.

Next, we use the model to study the effect of bonus programs that incentivize high-quality teachers to teach in low-performing schools. To explore the possibility for improvement at no additional monetary cost, we impose a budget-neutral condition for these bonus programs by reducing all teachers' base wages proportionally. To quantify how the effectiveness of such programs may differ by market information structures, we introduce this program to a market with and without information asymmetry between employers. We find that, qualitatively, the program has similar effects under both information structures: it increases overall teacher quality on the market and reduces the teacher-quality gap between high- and low-performing schools. However, quantitatively, the program is more effective when implemented in a market with symmetric information between employers.

(low) ability.