



Teacher labor markets and the perils of using hedonics to estimate compensating differentials in the public sector

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ABSTRACT

Some scholars and policymakers who are concerned about the inequitable distribution of quality teachers suggest offering financial incentives for working in hard-to-staff schools. Previous studies have estimated compensating differentials using hedonic modeling, an approach potentially undermined by district-wide salary schedules and the lack of labor market competitiveness. To address this problem, we build hedonic wage models for both public and private schools using data from the 1999–2000 *Schools and Staffing Survey* and the 2000 Census. Empirical estimates suggest that both public and private schools compensate teachers for some working conditions, but there also appear to be differences between public and private schools in the magnitude of the compensating differentials, particularly for teaching low-income students.

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1. Introduction: addressing the distribution of teacher quality across schools

A significant body of empirical research shows that compensation (including salary and benefits) and working conditions (such as neighborhood crime, transportation, job-related danger, or cleanliness of the workspace) both play important roles in individuals' labor market decisions. This proposition holds true for the teacher labor market: compensation and working conditions explain much about who opts to teach, where they look to teach, and how long they remain in the profession.

Among working conditions, teachers appear to care particularly about the type of students in the classroom, and evidence suggests that teachers prefer working with white, academically successful, and/or more affluent students. On average, teachers in high-need schools (e.g. those with low student achievement or high poverty levels) have lower levels of education, have attended less selective certifying institutions, and perform worse on teacher tests, characteristics thought by many to be associated with low teacher quality¹ (Lankford, Loeb, & Wyckoff, 2002). When they have the opportunity, teachers who work at schools with lower performing, poorer, or minority, students tend to

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¹ Under the No Child Left Behind Act (NCLB), policymakers are faced with increasing pressures to staff all schools with highly qualified teachers and ensure that all students are making adequate academic progress.

migrate to schools with higher achieving, more affluent, and fewer minority students (Hanushek, Kain, & Rivkin, 2004; Hanushek & Rivkin, 2004; Lankford et al., 2002). Of course, student characteristics may serve as a proxy for other job factors (such as safety, the quality of school leadership, or collegiality among teachers at the school), but nonetheless empirical evidence suggests that student characteristics are a key predictor of the type of teachers in a school and their propensity to remain there (Guarino, Santibanez, & Daley, 2006; Hanushek, Kain, & Rivkin, 2004).

In recognition of this phenomenon, there appears growing policy interest in using financial incentives to try to offset these patterns of teacher sorting (Goldhaber, 2006; Hoff, 2005; Jacobson, 2006; Prince, 2003), so that students in high-need schools have a better chance of getting an experienced, credentialed teacher. For example, states such as California, Florida, and North Carolina have all recently offered salary bonuses to qualified teachers working in low-income schools.² Some states, including Maryland and Texas, adjust funding formulas to reflect inter-district differences in working conditions beyond localities' control that make it more or less difficult to attract teachers. For years, state formulas have adjusted district-level funding to reflect differential operating costs, such as the costs for real estate and transportation (Colorado Legislative Council Staff, 2002; Florida Department of Education, 2002; Rothstein & Smith, 1997; Thompson & Silvernail, 2001; Wyoming Division of Economic Analysis, 1999); adjusting for the different prices districts must pay to attract teachers represents the next logical step in creating an equitable playing field.

But how much should be offered to entice a teacher to teach in a disadvantaged school? This question would not typically arise when assessing compensation in the private sector because private sector compensation is thought to adjust smoothly to reflect differences in employee skills and working conditions. All else equal, employees with highly sought-after skills earn higher wages, while, at the same time, these wages reflect non-pecuniary aspects of the job, such as location or safety. Basically, an employee serving under less desirable conditions receives a compensation premium, or a *compensating differential*, over otherwise identical employees. These wage adjustments happen through the competitive labor market as employees sort across different types of jobs and employers seek to hire employees that best fit their needs at the lowest possible rate.

One way to calculate compensating salary differentials is to use hedonic modeling.³ Unfortunately, using a hedonic technique to estimate the magnitude of the differentials necessary to compensate a teacher for working in a less attractive position (e.g. in a crumbling school building) is not a straightforward proposition. This is particularly true in the case of public schooling because *teacher*

salaries are set in the public domain where market forces are often distorted—the set of competitive pressures that influence compensation in the private sector may not exist. Thus, teachers may not be paid their precise 'value' in the public school system, and yet just such precision is assumed when utilizing a hedonic approach. The public school salary differentials calculated using this method may not accurately reflect compensation necessary for otherwise identical teachers in different job assignments and thus cannot precisely measure what would be required to attract a teacher from a more desirable to a less desirable teaching position.

This paper explores the issue of compensating differentials in teaching by estimating hedonic models in public and private schools and then comparing these estimates to determine whether the setting of teacher salaries in the public sector may bias hedonic estimates of the relationship between working condition factors and teacher salaries.⁴ The paper is structured as follows: first, we examine the theory behind hedonics, introduce a conceptual model and provide a detailed discussion of why hedonic modeling may not work well in public education; then, we present our data and econometric models followed by our empirical results; finally, we examine the policy implications of our findings and offer some concluding thoughts.

2. Hedonics and why they may not work in public education

The theory behind the hedonic model is that salaries reflect not only compensation for specific human capital characteristics (e.g. the specific skills of an individual), but also characteristics of a particular job that influence its attractiveness to potential candidates. For instance, it should be more expensive to hire personnel into less desirable jobs than to hire personnel of comparable quality into jobs that are more attractive, all else equal. Many factors besides salary and benefits influence the relative attractiveness of a job. For example, teachers are likely to favor jobs located in geographic areas with a low cost of living and nice amenities and those set in well-led schools with students who arrive at school ready to learn.⁵

A hedonic model can be used to determine the *factors*⁶ that influence salaries, but they may not reflect the true

² The Massachusetts wing of the American Federation of Teachers recently endorsed this strategy (Sachetti, 2006).

³ This is a statistical method that assigns dollar weights to the factors (both teacher-specific and location-specific) that determine individual teachers' salaries. For more on the hedonic theory, see Chambers (1981, 1997), Goldhaber (1999), or Hanushek (1999).

⁴ We focus on salaries (rather than total compensation) because there is little data available on the benefits that teachers receive and benefit packages tend not to vary between school systems (so it is not possible to derive good estimates of their impacts).

⁵ School districts have control over some aspects of what might make a particular teaching job more or less attractive, like class size or time for lesson planning, both of which influence teachers' workloads. But many of the non-pecuniary characteristics of a job that influence its attractiveness (housing costs, crime rates, weather patterns, and demographics of the local community, among other things) lie outside a district's direct control. Prospective teachers likely consider all of these factors when making decisions about where to work. States may wish to account those factors outside a district's control when making resource allocation decisions, so as to hold districts harmless for conditions they cannot affect and to ensure that all districts are on equal footing.

⁶ These factors are both teacher specific and location/workplace specific. The location/workplace-specific components of hedonic models are of key import since research has long recognized that prices of goods and services can vary significantly across geographic areas (Brazer & Anderson, 1974; Chambers, 1978).

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