Optimal Teacher Compensation and Teacher Preferences

ACKOFF FELLOWSHIP APPLICATION FORM

Deadline: March 3, 2013 (midnight)

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How did you learn about the Ackoff Fellowship:

_____Ad in DP _____Ad in Almanac _____E-mail_____Other (specify) Adviser, Olivia Mitchell

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Project Title:
Optimal Teacher Compensation and Teacher Preferences

Amount of Request: $ 4,000

Other sources of Support for your research: NBER Fellowship

Travel $ 0

Grants $ 0 Other (Specify) $_____

Optimal Teacher Compensation and Teacher Preferences

Background and Research Goals:

The United States spends over $304 billion per year in public-school teacher compensation, yet we know remarkably little about how compensation generosity and structure influence education outcomes. Traditional approaches to the question have yielded inconclusive results (Aaronson, Barrow, and Sander 2003; Hanushek 1997; Murnane 1975; Murnane and Phillips 1981, Hanushek et al., 2005; Johnston, 2013). There are three primary identification problems. First, most variation in teacher compensation is confounded with local priorities, resources, and compensating differentials, as well as student ability and motivation. Second, researchers disagree how to measure teacher quality (Hanushek et al., 2005). Third, all forms of compensation are highly correlated, and, in some instances, collinear. Accordingly, separating the effect of a generous pension from that of a generous salary is difficult since pension benefits are a linear function of salary within most states.

Notwithstanding these difficulties, teacher compensation remains a critically important public policy issue. For instance, 79 percent of teachers leaving the profession cite low salary as their primary reason for departing (Ingersoll, 2003). Over the past 40 years, teacher quality has steadily declined (Murnane et al., 1991; Corcoran et al., 2002; Bacolod, 2007). At the same time, teacher quality is the most important factor in student growth (Mansfield, 2013) and a high-quality teacher increases the future income, citizenship, and health of his or her students (Chetty et al., 2011a, 2011b). The central role of quality teachers implies that teacher personnel policies are the primary lever by which education quality can be changed.

Rather than estimate the effect of various historical compensation programs, I propose to use an online survey to elicit teacher preferences over various compensation elements and school characteristics. Using conjoint analysis, the implied utility functions can then be used to calculate an optimal compensation structure to attract and retain great teachers given fixed resources. Potentially the most effective teachers may have different preferences than the least effective teachers. If that is the case, compensation can be structured to be differentially attractive to excellent teachers, yielding a useful separating equilibrium. Additionally, the study allows policy makers to calculate compensating differentials necessary to fill teacher vacancies at hard-to-serve schools.

Research Methodology:

I have obtained permission to invite a sample of teachers (~800 teachers) in the Granite School District in Salt Lake City to respond to my online conjoint survey. The full-factorial, hybrid conjoint design allows me to include the primary variables that are expected to be important to a teacher's expected utility (Green, Carroll, &Goldberg, 1981). Each question asks the teacher to indicate which of two hypothetical schools a teacher prefers. The compensation profiles include starting salary, salary growth, health insurance coverage, retirement plan, whether bonuses for effective teachers are offered, and when tenure is offered; the profiles of the teaching environment include, class size, student poverty rate, student race make-up, home-to-work distance, whether grading assistance is provided, and principal support with difficult students.

There are a number of considerations relevant to the hypothetical choice sets that I intend to test directly. First, conjoint analysis confronts the researcher with a tradeoff between respondent attention and profile completeness. On the one hand, a large number of attributes may realistically represent real-world choices but overwhelm the respondent who cannot quickly compute his or her preference over complex option differences; in scenarios with more than five attributes, survey takers resort to a simplifying rule which likely does not represent what their natural choices would be (Green & Srinivasan, 1990). On the other hand, if the conjoint includes a smaller number of focused attributes, respondents might infer unspecified school characteristics from specified attributes (Cattin & Wittink, 1982). Therefore, I include full-profile as well as partial-profile questions to compare the estimates of the two approaches.

Second, in order to assess the possibility that respondents may infer other choice-relevant characteristics, I will use an experiment. Respondents will be randomly assigned to two groups. In one, I ask the respondents "If two schools that were identical in all other ways made the following offers, which would you prefer?" In the other, I will ask, "If a school offered you a job and allowed you to pick your compensation package from the following options, which would you prefer?" If choices do not depend on the framing of the question, we can conclude that teachers can reliably ignore unspecified school qualities. Third, some researchers are concerned that smaller attribute levels push respondents to weight factors that they would not otherwise value. In order to test this concern, I will include in the small-conjoint questions an irrelevant attribute, the color of the school bus, to test whether teacher's value irrelevant factors in the unnatural survey environment.

The survey data will be analyzed by applying a binary logit model where the decision outcome is the dependent variable and the various school attributes and compensation characteristics will each constitute an independent variable. The estimated equation resulting from this analysis represents the average sample teacher's utility function over the stated attributes. By maximizing this function subject to the current total compensation level, we can learn about the optimal structure of teacher compensation. The analysis will be segmented by teacher experience and teacher effectiveness, as measured by unexpected student growth. If the school district permits and additional funding can be obtained, I will survey the same teachers the following year. This will allow me to analyze to what extent different preferences between new and more experienced teachers are due to (1) selective attrition and (2) experience and aging. This decomposition is helpful in assessing the source of massive teacher attrition common in public schools.

Reason for Requesting Funding

I am requesting funding from the Russell Ackoff Doctoral Student Fellowship in order to travel to the survey site and compensate survey participants. At least one visit will be necessary to present the final survey, coordinate data logistics, and build rapport; the district's support for the project will determine how much latitude they allow in data collecting including whether I can supplement the survey data with the district's administrative teacher and student data. The survey requires a good deal of focus and attention on the part of respondents so a reward to encourage completion will be useful. I will offer a $10 Amazon e-gift card to each respondent who completes the survey which will be emailed directly.

Main References:

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Chetty, Raj, John N. Friedman, Nathaniel Hilger, Emmanuel Saez, Diane Whitmore Schanzenbach, and Danny Yagan. "How does your kindergarten classroom affect your earnings? Evidence from Project STAR." The Quarterly Journal of Economics 126.4 (2011): 1593-1660.

Green, Paul E., J. Douglas Carroll, and Stephen M. Goldberg. "A general approach to product design optimization via conjoint analysis." *The Journal of Marketing* (1981): 17-37.

Green, Paul E., and Venkat Srinivasan. "Conjoint analysis in marketing: new developments with implications for research and practice." *The Journal of Marketing* (1990): 3-19.

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