



## Reevaluating the effect of non-teaching wages on teacher attrition

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### ABSTRACT

Most empirical teacher attrition research focuses on estimating the effect of either the alternate occupation opportunities or the teacher work environment on teacher attrition. In this paper, we use non-teaching wages of former teachers to estimate the determinants of teacher attrition, including the wage differential between teaching and non-teaching occupations, as well as the teacher work environment. The results suggest that the wage differential only matters for inexperienced teachers with less than 6 years of teaching experience, while the work environment affects both inexperienced and experienced teachers. The magnitude of the wage differential is small relative to the effect of the teaching work environment on teachers' exiting decisions. Furthermore, no compensating differentials of sufficient size are found. For inexperienced teachers, a teacher practicum, i.e., student teaching, is found to reduce attrition while certification and education degrees have no effect. Lastly, whether a teacher lives in households with income above \$40,000 (excluding their own) significantly increases attrition.

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### 1. Introduction

Researchers and policymakers continue to debate the causes of teacher attrition. Given that the composition of teachers is constructed through teacher recruitment and retention efforts, understanding what causes teacher mobility is important. The lack of a comprehensive understanding of the determinants of teacher mobility, and consequently the teacher labor supply, have been highlighted and discussed in Hanushek, Kain, and Rivkin (2004). While there have been several areas of growth in the literature, one aspect that deserves particular attention is the relative importance of the teaching work environment versus higher pay in alternative occupations.

The effects of the teaching work environment and non-teaching wages on teacher attrition have been mostly estimated separately in the literature. The majority of the literature that studies the non-teaching wage estimates

whether the wage differential, i.e., the difference in non-teaching to teaching wages, affects a teachers' decision to exit teaching. The results described in Baugh and Stone (1982), Murnane and Olsen (1989), Podgursky, Monroe, and Watson (2004), Imazeki (2005), Krieg (2006), and Ondrich, Pas, and Yinger (2008) generally find a modest positive relationship between the wage differential and teacher attrition. One notable exception is Scafidi, Sjoquist, and Stinebrickner (2006) who find very few teachers who leave teaching earning more than the minimum teacher salary.

The effect of the work environment on teacher attrition has received some attention in the literature as well. Two notable papers on the work environment are Boyd, Grossman, Lankford, Loeb, and Wyckoff (2008) who study how the work environment affects teacher transfers, and Hanushek et al. (2004) who study how the work environment affects teacher transfers and retention. Neither of these papers explicitly investigate to what extent outside opportunities affect attrition. Both papers find that work environment characteristics are significant determinants on teacher mobility.

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To our knowledge, only Murnane and Olsen (1989), Imazeki (2005), and Ondrich, Pas, and Yinger (2008) have jointly estimated the effect of alternate occupation opportunities and work environment characteristics, and these are limited to either community characteristics or one student body characteristic. Analyzing alternate occupation opportunities as well as the work environment eliminates omitted variable bias and permits a broad analysis into the determinants of teacher attrition. The intent of this paper is to investigate how the work environment and alternate occupation opportunities affect teacher attrition.

Direct estimation of the effect of the wage differential is not feasible because only one of the two wages (the teaching or non-teaching wage) is observable depending on the teachers' decisions to exit the profession. As a result, researchers must estimate at least one wage. One potential problem when attempting to estimate the effect of alternate occupation opportunities is selection bias, i.e., unobservable characteristics causing correlation between the decision to exit teaching and wages. The results of Rickman and Parker (1990) using CPS data on U.S. teachers from 1979 to 1985 and Dolton and van der Klaauw (1995) and Dolton and van der Klaauw (1999) indicate that the non-teaching wage and the exit decision are positively correlated due to unobservables. Without controlling for this positive correlation, the effect of the non-teaching wage on teacher attrition is upward biased.

There are two ways that the literature has addressed selection. The predominant way is to use non-teaching wages of non-teachers as proxies for teachers' non-teaching wages. The second is to control for selection through model specification. This paper uses the latter and first estimates the censored wages for current and former teachers, taking into consideration any unobservables that are correlated between wages and the teachers' propensities to exit teaching. We then use these predicted wages to estimate the effect of the wage differential on the propensity to exit teaching. Specifically, the analysis simultaneously estimates an exit decision equation along with two wage equations, one for the non-teaching wage and another for the teaching wage, while correcting for selection bias if present. Estimating wages also provides information into compensating differentials for the work environment.<sup>1</sup>

The crux of using such an approach is identification. Identification can be secured through functional form or exclusion restrictions. The approach here depends on functional form, however, some natural exclusions are available. The present analysis excludes regressors in the exit decision equation from the wage equations. These are work environment characteristics for which teachers are not compensated, e.g., student body characteristics, whether the teacher was physically attacked or threatened by a student during the previous school year, whether the teacher had a teacher practicum, i.e., student teaching,

prior to full-time teaching, and the number of dependents under the age of five.

This study follows the careers of around 5000 public school teachers employed in U.S. public schools between 1999–2000 and 2004–2005 school years. The occupational status, industries in which departing teachers work, and earnings data are available for all former teachers through a follow-up survey. Additionally, this paper provides empirical evidence across the entire teacher experience distribution that tracks teachers across state lines as well as when they exit the labor force.

Our analysis yields several noteworthy results. First, the majority of inexperienced teachers exit full-time teaching to either the non-education sector or exit the labor market to care for a family member, while experienced teachers exit full-time teaching for positions inside the field of education but in administrative or non-teaching positions.<sup>2</sup> The majority of former teachers with only 1 year of teaching experience exit the labor force returning to school as a student.

The estimation results indicate that selection issues matter (regardless of gender). Adjusting wages for selection, the estimation further finds that the wage differential has a significant effect in the magnitude of a 2–3 percentage point increase in the probability of exiting the teaching profession for inexperienced teachers, while no effect is present for experienced teachers. The wage differential effect is comparable in magnitude to the decrease in probability of exiting due to the presence of a union for inexperienced teachers and only half the size of the effect of being threatened by a student the previous year for first year teachers. The results also suggest that experienced teachers are 12–16 percentage points less likely to exit teaching for every 1% increase in community earnings. These results are consistent with Boyd et al. (2008). For inexperienced teachers, a teacher practicum lowers the probability of exiting by 3–6 percentage points. Interestingly, no compensating differentials of sufficient size to be noteworthy are found. The results suggest that the work environment is a much stronger determinant than the wage differential.

The results also suggest that teacher characteristics matter more so than wages or the work environment. Teachers living in households with income over \$40,000 (excluding their own) increase the probability of exiting the teaching profession by 15–25 percentage points. This mostly reflects fewer constraints on the exit decision in households with higher income.

## 2. Modeling the theoretical and estimation frameworks

In this section, a utility model is explored in which a teacher evaluates her utility in each period to decide whether to remain in or exit the teaching profession. Suppose that teacher  $i$  derives utility from some combination

<sup>1</sup> Obviously the estimation procedure does not indicate what the unobservable are. One example may be ambitious individual tend to have higher wages and also tend to switch jobs/careers more frequently.

<sup>2</sup> In this paper we refer to inexperienced teachers as those with less than or equal to five and experienced teacher are those with more than five years experience

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