

Abstract Title Page
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Title: Investigating the Role of Human Resources in School Turnaround:
Evidence from Two States

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Abstract Body

Limit 4 pages single-spaced.

Background / Context:

Description of prior research and its intellectual context.

Teachers are generally recognized as the schooling factor accounting for the highest proportion of student learning outcomes (Aaronson et al., 2007; Hanushek, 1986). This implies the quick and dramatic improvement in school performance observed in turnaround (TA) schools was associated with a major change in the performance of its teachers. This change could be manifest in one of two ways—either the teachers in the school dramatically improve or previously ineffective teachers are replaced with effective teachers. This paper seeks to understand how each of these potential changes in the school’s human capital stock contributed to turnaround in Florida and North Carolina.

Replacing teachers in a low-performing school is a key element of several of the ARRA school improvement models; yet, the efficacy of wholesale staff replacement is not well established (Herman et al., 2008). This model is at odds with naturally occurring patterns in the labor market in which qualified or effective teachers move away from low-performing schools (Boyd et al., 2009; Hanushek et al., 2004), implying that such a change in the pool of human capital is unlikely without some extraordinary intervention efforts.

Likewise, improving the stock of current human capital appears to counter documented evidence on teacher performance. Teacher performance appears to be generally (though not perfectly) stable over time, and changes in performance (for better or worse) appear to be transitory (Goldhaber and Hansen, 2010). Prior studies generally find only small improvements in a teacher’s performance beyond the first few years of teaching (e.g., Rockoff, 2004), and no gains in human capital associated with the attainment of additional credentials such as an advanced teaching degree or national board certification (Goldhaber and Anthony, 2007). Moreover, prior empirical studies linking professional development to teacher productivity on student test scores are generally mixed and not rigorous enough to determine whether professional development actually has a net positive impact on students (Wayne et al., 2008) and a recent evaluation of a professional development program using a randomized control design found no detectable effects associated with the program (Garet et al., 2011).

In summary, both methods of affecting the pool of human capital in a school (either replacing it or improving upon it) appear similarly unlikely to occur without targeted intervention in a school. In evaluating how these two sources of improvement worked in TA schools in these states, this study cannot hypothesize a priori which of the two will dominate.

Purpose / Objective / Research Question / Focus of Study:

Description of the focus of the research.

This paper seeks to understand how two potential changes in each school’s teacher workforce contributed to turnaround in Florida and North Carolina. Specifically, the study investigates the following research question: is the improved achievement observed in successful turnaround schools most strongly associated with workforce *development* or *turnover* (or, some combination of the two)?

We utilize the Study I designations of chronically low-performing (CLP) and turnaround (TA) schools to investigate whether there are distinct differences that arise between TA and non-TA CLP schools in the teacher workforce. We relied on administrative data drawn from state longitudinal data bases, which include information on teachers' experience, credentials, and mobility. In addition, student-teacher linked test score data were used to calculate teachers' value-added estimates of effectiveness (i.e., the mean improvement in student test scores controlling for other covariates).

Setting:

Description of the research location.

(May not be applicable for research methods or panel submissions)

Chronically low-performing elementary and middle schools identified in Florida and North Carolina, using state administrative data on student performance spanning six school years (2002-03 through 2007-08).

Population / Participants / Subjects:

Description of the participants in the study: who, how many, key features, or characteristics.

(May not be applicable for research methods submissions)

The population of interest is the teacher workforce in schools identified in the study as chronically low performing. Key descriptors and characteristics of each of the study's data samples are presented in Table 1.

Intervention / Program / Practice:

Description of the intervention, program, or practice, including details of administration and duration.

(May not be applicable for research methods submissions)

This study does not investigate a particular intervention, program, or practice. Rather, this study seeks to investigate whether the observed improvement in performance in TA schools appears to come from workforce turnover (i.e., poor teachers exiting the school and effective teachers entering the school) or whether improvements appear to come from human capital development generally (i.e., improved performance observed across workforce generally).

Research Design:

Description of the research design.

A difference-in-difference-in-difference model is used to predict student-level test scores. The three levels of differences come from: 1) the study's pre- / post-period cutpoint; 2) a comparison of TA vs. non-TA CLP schools; and 3) a comparison between teacher groups in the school workforce, differentiating teachers as *outgoing* (those observed in the pre-period only), *incoming* (those observed in the post-period only), and *stable* (those observed in both pre- and post-periods). The econometric model estimated is as follows:

$$\begin{aligned}
 A_{ijst} = & A_{i,t-1}\beta_1 + X_{it}\beta_2 + TA_s\beta_3 + POST_t\beta_4 \\
 & + OUTGOING_j\beta_5 + TA_s * POST_t\beta_6 + OUTGOING_j * TA_s\beta_7 \\
 & + INCOMING_j * POST_t\beta_8 + INCOMING_j * TA_s * POST_t\beta_9 + \varepsilon_{ijst}
 \end{aligned}$$

In this model, current achievement on test scores for student i , linked with classroom teacher j , in school s , at time t (A_{ijst}) is the dependent variable. Explanatory student-level variables in the model are the student's prior test scores in both reading and math ($A_{i,t-1}$), current student characteristics including gender, race, eligibility for free or reduced-price lunch, special education status, limited English proficiency status (X_{it}). The indicator variables used for the difference-in-difference-in-difference estimation strategy represent different schools (TA_s , with non-TA schools as the omitted reference group), different time periods ($POST_t$, with the pre-period omitted), and different groups of teachers ($OUTGOING_j$ & $INCOMING_j$, with stable teachers as the reference group).

Statistical, Measurement, or Econometric Model:

Description of the proposed new methods or novel applications of existing methods.
(May not be applicable to submissions in sections other than research methods)

Not applicable.

Usefulness / Applicability of Method:

Demonstration of the usefulness of the proposed methods using hypothetical or real data.
(May not be applicable submissions in sections other than research methods)

Not applicable.

Data Collection and Analysis:

Description of the methods for collecting and analyzing data.
(May not be applicable for research methods submissions)

Data analysis on student-teacher linked administrative education data in two states. No supplemental data were collected.

Findings / Results:

Description of the main findings with specific details.
(May not be applicable for research methods submissions)

Table 2 presents the estimated coefficients from the primary model. Results are reported from both Florida (in columns 1-4) and North Carolina (columns 5-8), with specifications both excluding school random effects (odd-numbered columns) and those including school random effects (even-numbered).

Three noteworthy findings emerge from the estimated regression coefficients. First, a general negative selection is observed among all CLP schools in most data samples in which outgoing teachers are associated with lower student achievement (excepting North Carolina elementary schools). Second, a general improvement is observed among all teachers (both stable and incoming) in TA schools during the post-period, supporting the hypothesis of overall productivity improvement in teachers. Third, with the exception of Florida middle schools, there is no significant difference in the productivity of incoming teachers in TA schools during the

post-period, which suggests the recruitment of particularly effective teachers to CLP schools did not play a systematic role in explaining these schools' performance improvements.

Conclusions:

Description of conclusions, recommendations, and limitations based on findings.

The results suggest TA schools improved through a combination of improving the stable teachers who had been in the school even when it was performing poorly and bringing in relatively effective talent into the school. Note, however, that incoming teachers in TA schools during the post-period were in general not more productive than stable teachers in TA schools during the post-period (though they were more productive than incoming teachers in non-TA schools during the same period), giving little evidence that "talent transfer" played a role in improving these schools.

It is important to note that the evidence presented here is descriptive only, and does not necessarily refute relying on a strategy of replacing staff to support school turnaround; however, it simply shows that improvements from the pool of stable teachers appear to account for considerable improvements in performance within these historical turnaround schools.

Finally, it is important to note that while the model employed here attributes the differences in school performance over time to changes in the effectiveness of teachers in the school, both new and existing, these differences may not be due to teachers alone. The administrative data employed here are not sufficiently detailed to separate the role of the teacher from the role of the principal or other school-wide interventions. Findings from the Study's survey and case study data may cast more light on human resource factors in the context of other reform initiatives.

Appendices

Not included in page count.

Appendix A. References

References are to be in APA version 6 format.

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- Hanushek, E. A. (1986). The economics of schooling. *Journal of Economic Literature*, 24(3), 1141–1177.
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- Rockoff, J. E. (2004). The Impact of Individual Teachers on Student Achievement: Evidence from Panel Data. *The American Economic Review*, Vol. 94, No. 2, pp. 247-252.
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Appendix B. Tables and Figures

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Table 1. Descriptive Statistics of Teachers and Students in Four Data Samples, by TA status

State	Florida				North Carolina			
	Elementary		Middle		Elementary		Middle	
School sample	TA	Non-TA	TA	Non-TA	TA	Non-TA	TA	Non-TA
Student Body Characteristics								
Proportion of female students	50.7%	50.7%	53.5%	49.9%	48.9%	51.1%	50.4%	50.4%
Proportion of African American students	54.9%	46.4%	42.8%	40.0%	57.9%	60.9%	62.4%	72.0%
Proportion of Hispanic students	16.9%	25.4%	30.8%	14.8%	8.7%	8.2%	6.7%	5.1%
Proportions of parents holding BA degree or higher	.	.	.	.	22.6%	17.8%	25.5%	24.4%
Proportion of students with limited English proficiency	6.1%	7.1%	4.3%	0.8%	4.4%	3.0%	2.3%	1.7%
Proportion of students ever eligible for free or reduced-price lunch program	88.4%	87.6%	82.9%	74.2%	74.3%	75.0%	67.1%	76.5%
Mean student achievement in math (standardized)	-0.412	-0.385	-0.209	-0.160	-0.436	-0.517	-0.306	-0.390
Mean re-enrollment rate (2003 and 2004 only)	62.9%	65.6%	27.6%	31.8%	48.6%	43.2%	26.0%	34.2%
Mean school enrollment	101	102	419	433	89	81	188	177
Teacher Characteristics								
Proportion of females	83.2%	83.7%	69.6%	72.9%	89.0%	94.0%	82.3%	82.0%
Proportion of minority teachers (Currently classified as Black or Hispanic)	38.5%	40.9%	46.4%	33.9%	33.3%	26.0%	46.6%	47.4%
Proportion of teachers with 4 or more years of experience	58.8%	61.0%	54.0%	79.6%	74.8%	72.0%	69.8%	64.9%
Proportions of teachers fully licensed	.	.	.	.	86.4%	84.8%	77.4%	76.0%
Mean proportion of teachers returning in following year (2003 and 2004 only)	52.1%	57.6%	40.7%	35.6%	62.0%	56.0%	45.2%	46.6%
Total Schools	17	94	3	24	8	66	5	37

Table 2. Regression estimates of difference-in-difference-in-difference estimators

State	Florida				North Carolina			
	Elementary		Middle		Elementary		Middle	
School sample	No	Yes	No	Yes	No	Yes	No	Yes
School Fixed Effects								
TA	0.002 (0.013)	0.008 (0.027)	-0.053** (0.014)	-0.065* (0.032)	-0.048** (0.017)	-0.028 (0.026)	-0.015 (0.015)	0.011 (0.039)
Post	0.116** (0.008)	0.113** (0.008)	0.030** (0.007)	0.034** (0.007)	0.005 (0.007)	0.010 (0.007)	-0.037** (0.007)	-0.032** (0.007)
TA*Post	0.125** (0.018)	0.126** (0.018)	0.141** (0.025)	0.155** (0.026)	0.153** (0.023)	0.146** (0.023)	0.073** (0.022)	0.067** (0.022)
Outgoing	-0.017 (0.009)	-0.026** (0.009)	-0.034** (0.008)	-0.039** (0.008)	0.018* (0.008)	0.016 (0.009)	-0.031** (0.007)	-0.018* (0.008)
Outgoing*TA	0.009 (0.023)	0.026 (0.024)	-0.037 (0.021)	-0.024 (0.023)	0.027 (0.027)	0.011 (0.028)	0.014 (0.022)	-0.000 (0.022)
Incoming*Post	-0.048** (0.007)	-0.059** (0.007)	-0.025** (0.008)	-0.035** (0.008)	-0.015 (0.008)	-0.034** (0.009)	-0.045** (0.009)	-0.037** (0.009)
Incoming*TA*Post	0.017 (0.017)	0.032 (0.017)	-0.063* (0.028)	-0.062* (0.030)	0.003 (0.025)	0.009 (0.026)	0.051 (0.027)	0.042 (0.027)
Observations	55,548	55,548	34,582	34,582	39,516	39,516	37,353	37,353
R-squared	0.577	0.576	0.628	0.628	0.641	0.641	0.682	0.682