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Did No Child Left Behind Affect Teacher Attendance? Evidence from North Carolina

Attaching incentives to students' performance on standardized exams has the potential to alleviate the principal-agent problem inherent in the relationship between stakeholders and schools, improve student achievement, and reduce the costs of public education. Indeed, this is the motivation behind the state-level consequential accountability policies introduced in the 1990s and the 2001 passage of the federal No Child Left Behind Act (NCLB).¹ The efficacy of such policies is central to the current debate surrounding the reauthorization of the Elementary and Secondary Education Act, under which NCLB was first passed.

Consequential accountability policies are typically associated with modest, statistically significant increases in student achievement ranging from 10 to 30 percent of a test-score standard deviation (Figlio and Loeb 2011). However, critics contend that these test-score gains are illusory and reflect strategic responses by schools rather than true learning gains. Evidence of strategic responses to the incentives provided by consequential accountability policies runs the gamut from the relatively innocuous (e.g., "narrowing of the curriculum") to the nefarious (e.g., explicit teacher cheating). As a result, the mechanisms through which consequential accountability policies affect academic achievement are not entirely understood, but they have implications for the design of future education policies and the public sector performance standards movement more generally.

Increased teacher effort is one potential mechanism through which consequential accountability policies might improve student achievement, as teachers play a critical role in the educational process. Teacher attendance measures one dimension of teacher effort that is known to affect student

achievement.² Moreover, teacher absences are financially costly and create negative externalities by influencing the attendance of their peers. This article is based on a recent Upjohn Institute Working Paper (Gershenson [2015]; see http://research.upjohn.org/up_workingpapers/217/) that examines one potential mechanism through which consequential accountability policies affect student achievement by considering how, if at all, the threat of sanctions associated with failing to meet NCLB's performance standards affected teacher absence rates in North Carolina.

Accountability Pressure in Early Years of NCLB

NCLB required all schools to make adequate yearly progress (AYP), which included meeting percent proficient, attendance, and test-participation thresholds both overall and for specific subgroups of the student population. Furthermore, the act mandated additional sanctions (e.g., restructuring and state takeover) on Title 1 schools that failed to make AYP in consecutive years. The subsequent discussion focuses on Title 1 schools, as they comprise the majority of North Carolina's public primary schools, and the threat of sanctions there was particularly salient.

In 2004, teachers in schools that failed to make AYP in 2003 (the first year of NCLB) were under considerably

more pressure than their counterparts in schools that made AYP in 2003, as the former were in schools at risk of failing to make AYP for two consecutive school years.³ Thus, teachers in schools that failed to make AYP in 2003 compose the treatment group, while their counterparts in schools that made AYP in 2003 compose the control group. However, a simple comparison between the 2004 attendance records of teachers in the treatment and control groups is unlikely to provide a valid estimate of the effect of failing to make AYP on teacher absences, as the treatment (i.e., failing to make AYP in 2003) was not randomly assigned to schools. Specifically, the schools that failed to make AYP in 2003 might systematically differ from their counterparts that made AYP in 2003 in both observable and unobservable ways.

Main Results

That problem can be avoided using a difference-in-differences (DD) strategy that uses data from 2003 to control for preexisting differences between treatment and control schools. The method's name comes from the fact that in its simplest form, the DD estimate is simply the difference between two differences: the difference in average annual absences between treatment and control schools, between 2003 and 2004. Table 1 presents the sample averages used to compute the DD estimate of the effect of failing to make AYP on annual teacher absences. The DD point estimate of -1.25 , which is strongly statistically significant, suggests that on average teachers in schools that failed to make AYP in 2003 took 1.25 fewer absences in 2004. To put this number in perspective, note that the average teacher was absent about 8.7 times per year, so 1.25 represents a

Table 1 Mean Annual Teacher Absences

Year	School failed in 2003	School passed in 2003	Difference
2004	7.97	8.97	-1.00
2003	9.01	8.76	0.25
Difference	-1.04	0.21	-1.25***

NOTE: N = 8,080 teacher-years. The standard error of the difference-in-differences estimate of -1.25 , which is robust to clustering at the school level, is 0.43. *** $p < 0.01$.

SOURCE: Author's calculations using data from the North Carolina Education Research Data Center.

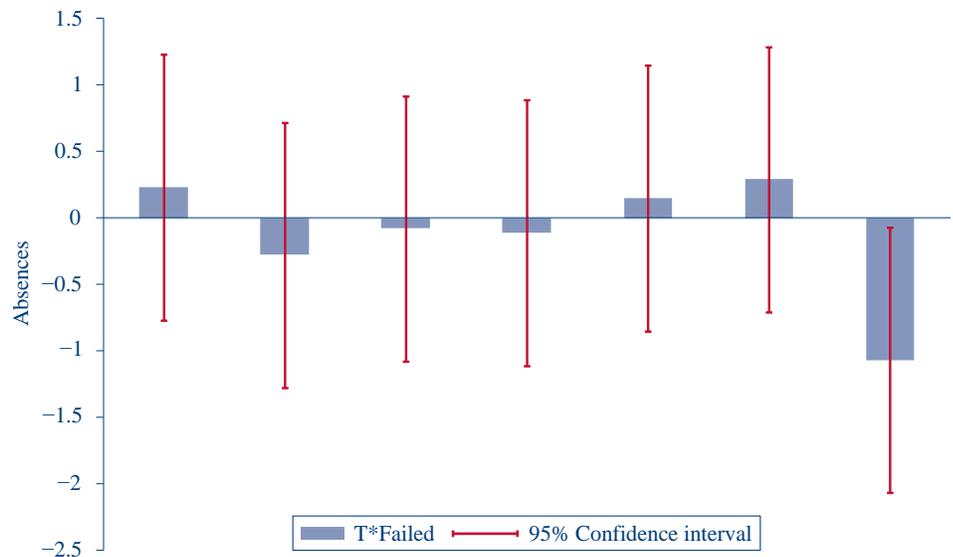
14 percent decrease. The DD estimate remains similar in magnitude when the sample is restricted to teachers who did not change schools between 2003 and 2004, which suggests that the effect of sanctions associated with failing AYP on teacher absences is driven by within-teacher changes in behavior, not by changes in the composition of schools' teaching staffs. The decrease is even larger among more effective teachers who attended selective undergraduate institutions and who have higher value-added measures of effectiveness.

More sophisticated regression-based DD estimators that control for observed teacher qualifications, observed school characteristics, school fixed effects, teacher fixed effects, and school-specific time trends yield similarly sized, statistically significant estimates ranging from about -1.0 to -1.6 . These results suggest that the main results are not driven by changes in the student bodies of "treatment" schools relative to those of "control" schools between 2003 and 2004. The DD estimate presented in Table 1 is similarly robust to the way in which teacher absences are measured. For example, the analogous DD estimate of the effect of accountability pressure on the likelihood that a teacher is absent 15 or more times per school year is -0.03 , which represents a 30 percent decline.

Sensitivity Analysis

The DD estimates discussed above are suggestive of a causal effect of failing AYP in 2003, and the resulting increase in accountability pressure, on teachers' 2004 attendance. However, the validity of DD estimates hinges on the "common trends" assumption that there was no preexisting differential trend in teacher absences in treated schools (i.e., schools that failed AYP in 2003). This assumption is easily tested in an event-study framework using several years of data prior to the passage of NCLB. Intuitively, the event-study model includes placebo "treatment effects" of failing AYP in 2003 on absences in prior years. Event-study estimates, using data from 1997 to 2004, are depicted in Figure 1. The bars represent the effect of failing AYP in 2003 on annual teacher

Figure 1 Event-Study Estimates, 1997–2004



NOTE: 95% confidence intervals, which are robust to clustering at the school level, are reported. SOURCE: Author's calculations using data from the North Carolina Education Research Data Center.

absences in each year from 1998 onward. If the common trends assumption holds—that is, there is no preexisting differential trend in the treated schools—the 1998–2003 interaction terms should be statistically indistinguishable from zero. Indeed, this is exactly what we see in Figure 1, as each of the 95 percent confidence intervals includes zero. However, in 2004, the year in which we expect to see an effect of failing AYP in 2003, the estimated effect is about -1.10 and statistically significantly different from zero. This is in line with the DD estimates discussed above and provides further evidence that the DD estimate presented in Table 1 can be given a causal interpretation.

Conclusion

The estimated effect of performance standards on teacher absences is consistent with previous research on the malleability of teacher effort, as Ahn (2013) and Jacob (2013) find evidence that teacher effort, as measured by teacher absences, responds to incentives. Moreover, the magnitudes of the effects discussed above are similar to those of the estimated effects of a policy change in Chicago that granted principals the discretion to dismiss

probationary teachers (Jacob 2013). Finally, the estimates reported here likely underestimate the total effect of NCLB's accountability pressure on teacher effort, as NCLB placed pressure on all schools, including those that made AYP in 2003, and attendance only represents one dimension of effort.

The results discussed here have at least three implications for education policy and for public-sector performance standards more generally. First, that teacher absences declined in response to increased accountability pressure suggests that one mechanism through which consequential accountability policies affect student achievement is through increased teacher effort. Second, these results contribute to the growing body of evidence that teacher effort, as measured by absences, responds to both school- and individual-level incentives. In particular, salient incentives associated with school-level academic performance can alter individual teacher behaviors. Finally, the heterogeneity in teachers' responses to the threat of sanctions suggests potential benefits to policy designs and teacher training programs that account for such differences. For example, to the extent that teachers in tested and nontested grades responded differently to the threat of sanctions,

standard labor economic theory suggests that if jobs in tested grades are more stressful, such jobs can pay compensating differentials. The differentials need not be monetary and could instead be provided in the form of additional planning periods, teaching aids, mentorship, or professional development. Similarly, that the increase in effort was particularly strong among more effective teachers suggests that providing additional support to less effective teachers may be helpful, particularly for teachers and schools subject to increased accountability pressure.

Notes

1. See Figlio and Loeb (2011) for a thorough review of such policies.
2. For example, Herrmann and Rockoff (2012) provide persuasive evidence that teacher absences in New York City's public schools harmed student achievement.
3. Years refer to the spring semester of academic years, so 2003 refers to the 2002–2003 academic year.

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