Estimating the Effects of No Child Left Behind on Teachers' Work Environments and Job Attitudes

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Several recent studies have examined the impacts of No Child Left Behind (NCLB) on school operations and student achievement. We complement that work by investigating the law's impacts on teachers' perceptions of their work environments and related job attitudes, including satisfaction and commitment to remain in teaching. Using four waves of the nationally representative Schools and Staffing Survey, which cover the period from 1994 to 2008, we both document overall trends in teacher attitudes across this time period and take advantage of differences in the presence and strength of prior state accountability systems and differences in likely impacts on high and low poverty schools to isolate NCLB effects. Perhaps surprisingly, we show positive trends in many work environment measures and job satisfaction and commitment across the time period coinciding with the implementation of NCLB. We find, however, relatively modest evidence of an impact of NCLB accountability itself. There is some evidence that the law has negatively affected perceptions of teacher cooperation but positively affected feelings of classroom control and administrator support. We find little evidence that teacher job satisfaction or commitment has changed in response to NCLB.

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Ten years into the implementation of No Child Left Behind (NCLB), a growing body of research seeks to assess the law's impact on American public schools. Much of this work rightly focuses on effects on students, with evidence suggesting that NCLB has resulted in small but positive effects on student achievement, particularly in math (e.g., Ballou & Springer, 2011; Dee & Jacob, 2011). Although research into the mediating factors driving this achievement growth is nascent, it is unlikely that NCLB could affect student learning without affecting the learning environment, including instruction. The logic of accountability underlying the law suggests as much: providing measures of student outcomes pegged to established standards and enacting consequences for poor performance should give schools incentives to find ways to improve,

including changing teachers' approaches to teaching (Manna, 2011). Indeed, studies find that NCLB has led teachers to devote more classroom time to core subjects, to spend more time searching for better instructional strategies, and, perhaps less productively, to "teach to the test" (Dee, Jacob, & Schwartz, 2013; Murnane & Papay, 2010; Reback, Rockoff, & Schwartz, 2011).

Of course, change often comes with difficulty, and inducing enough change in the instructional environment to impact student learning seems likely to have had effects on teachers, both intended and unintended. For example, stronger accountability likely had the intended consequence of increasing teachers' feelings of performance pressure. If this pressure increased too much or became too prolonged, however, it may also have had the unintended consequence of increasing teacher stress or feelings of burnout, particularly if teachers see the tests as inadequate or the goals as unattainable (see Hill & Barth, 2004). As another example, accountability may focus teachers on some material over others or on specific students, but if this external emphasis runs counter to their own professional judgment, they may experience internal conflict, frustration, and, eventually, emotional exhaustion (Berryhill, Linney, & Fromewick, 2009). These stresses are in addition to those that may accompany working in a school labeled (or perhaps soon to be labeled) as "failing" or subject to sanctions, which teachers can find demoralizing (Santoro, 2011).

Anecdotal evidence suggests that these kinds of negative effects of NCLB on teachers are legitimate concerns. For instance, in a *USA Today* feature on "five big ways [NCLB] is changing schools," Toppo (2007) says the law is "driving teachers crazy," quoting teachers who use words like *frustration, embittered,* and *joyless.* An *Associated Press* story about the first 10 years of NCLB described teacher morale withering under the law as they felt they were being "judged on

factors out of their control and in ways that were unfair" (Hefling, 2012).[1] Reports from teachers' unions echo similar concerns, suggesting that NCLB is "accelerating teacher burnout, and, consequently, teacher turnover" (Gerson, 2007). Surveys of teachers typically confirm these conclusions, finding unfavorable views of NCLB and concern from about the impact of the law (Center on Education Policy, 2006; Deniston & Gerrity, 2010; Sunderman et al., 2004)—including concerns that the testing required to fulfill the accountability requirements of NCLB are burning teachers out and driving good teachers out of the profession (Cavanagh, 2012; Teachers Network, 2007).

Despite these compelling anecdotes, however, the impact of NCLB on teachers attitudes' about their jobs and their assessments of their working conditions remains unclear because most evidence on the matter has been gathered in limited or non-representative samples. Yet understanding the impact of NCLB on teachers is keenly important, not only because teachers are a main stakeholder group in education policy but because teacher attitudes and perceptions of the work environment have been linked empirically to policy-relevant outcomes, such as teacher turnover (Allensworth, Ponisciak, & Mazzeo, 2009; Grissom, 2012; Ingersoll, 2001; Ladd, 2011; Loeb, Darling-Hammond, & Luczak, 2005). The importance of work attitudes as an appropriate outcome for study is reinforced by voluminous research from other fields connecting work attitudes not only to employee retention but to such job outcomes as performance, lateness, and absenteeism (e.g., Cotton & Tuttle, 1986; Currivan, 2000; Harrison, Newman, & Roth, 2006; Judge et al., 2001; Tett & Meyer, 1993).

Our examination of the impacts of NCLB on teachers is grounded in a prominent model of job stress from research in the private sector, which we argue provides theoretical guidance

[1] Commentary in popular education outlets similarly links NCLB to declining morale. For example, a February 2012 *Education Week* blog post noted that "the neoliberal policies of hyper accountability" enshrined in NCLB have "led to an increase of…burnout" (Cody, 2012).

regarding the specific mechanisms through which accountability reform should impact generalized attitudes such as job satisfaction and organizational commitment. Specifically, we adopt the Demand, Control, Support (DCS) model (Krasek & Theorell, 1990), which recent studies have applied to attitudes among public sector workers as well (Noblett & Rodwell, 2009). The model suggests that changes to job demands, autonomy in the classroom, and support from colleagues and supervisors are likely to be the primary vehicle through which NCLB will influence teacher satisfaction. It is important to note that the model does not offer a directional prediction regarding the impact of accountability reforms on job demands, autonomy in accomplishing work tasks, or support in the workplace, but it does suggest that a worker's perceptions of a reform's impact on these factors helps to predict how that reform affects their more generalized attitudes toward the job.

To test the impact of NCLB on job demands, perceived autonomy, and workplace support, as well as on more general attitudes like satisfaction and commitment, we utilize a nationally representative sample of 140,000 teachers from multiple waves of the National Center for Education Statistics' Schools and Staffing Survey. The use of large-scale data on teacher attitudes over time, including pre- and post-NCLB, provides a vast improvement to most existing studies of NCLB effects on teachers, which have relied on small samples and retrospective designs that have asked teachers whether their morale or satisfaction has declined since NCLB, potentially subjecting them to recall bias (e.g., Byrd-Blake et al., 2010). In contrast, our estimation strategy takes advantage of the fact that some states had accountability systems of differing strength in place prior to the implementation of NCLB to arrive at arguably causal estimates of the impact of that implementation on teacher attitudes (Dee & Jacob, 2011).

Students and Teachers under Accountability Reforms

Not surprisingly, there has been considerable interest in the impact of both state- and national-level accountability reforms in education. Studies focusing on the former have focused primarily on student achievement (e,g., Hanushek & Raymond, 2005) and on organizational behaviors—such as resource reallocation (e.g., Booher-Jennings, 2005; Reback, 2008), teaching to the test (e.g., Pedulla et al., 2003; Hannaway & Hamilton, 2008), and outright cheating (Jacob & Levitt, 2003)—designed to improve performance on state exams. Studies of NCLB have focused primarily on the impact of the reform on test scores (Ballou & Springer, 2011; Dee & Jacob, 2011; Neal & Schanzenbach, 2010) and on organizational responses by districts and schools (CEP, 2006; Dee, Jacob, & Schwartz, 2013; Rouse et al., 2007).

A limited number of studies have examined the impact of NCLB—or the state accountability reforms that predated NCLB—on teacher attitudes, such as anxiety, job security, and satisfaction. The results have been mixed, but generally suggest a negative relationship between accountability and teachers' feelings about their work. For example, Haladyna et al. (1998) find that accountability regimes produce tension and anxiety in teachers who feel that they are being evaluated by standardized tests. Similarly, Mulvenson et al. (2005) suggest that teachers mandated to use standardized assessments had higher levels of anxiety that those who were not required to test and that the level of teacher anxiety correlated negatively with student performance. Reback, Rockoff, and Schwartz (2011) find lower reported levels of job security in schools that were close their state's performance threshold and, thus, in the greatest danger of failing to make AYP. They also found that teachers of high-stakes subjects in schools near proficiency cutoffs worked longer hours than similar teachers in schools not under accountability pressures. A Center on Education Policy report (2006) concluded that NCLB has increased

pressure on teachers while negatively affecting staff morale. Byrd-Blake et al. (2010) report that teachers say retrospectively that their morale has declined in the years since NCLB was signed and that they feel frustrated by a test-driven instructional culture.

Reports of impacts of NCLB on teacher perceptions or attitudes have not been uniformly negative, however. Teachers report that NCLB has benefitted schools by providing them with clearer expectations for student learning and highlighting the needs of disadvantaged students (Murnane & Papay, 2010). Hamilton et al. (2007) find that teachers felt an increased sense of autonomy and that their schools had generally "changed for the better" under NCLB. Dee, Jacob, and Schwartz (2013) show that NCLB had a positive impact on teachers' perceptions of student engagement. Teachers in the Byrd-Blake et al. (2010) study identified positive changes to the instructional climate in recent years, including "more engaged learning" and "more student involvement" (461).

A Framework for Understanding the Impact of NCLB on Teachers

Existing research suggests that NCLB and prior accountability reforms have had impacts on teacher attitudes. The number of analyses, however, has been limited, and samples have often been unrepresentative of the population of teachers. More importantly, the choice of teacher variables to examine has been largely unguided by theory. This section draws on and expands a theoretical model from the private sector management literature in order to provide a framework for the examination of NCLB's impact on teacher attitudes. Specifically, it suggests that understanding the impact of NCLB on job demands, autonomy in the classroom, and support from coworkers and supervisors can help us to predict the ways in which the reform will influence teachers' satisfaction with and commitment to their jobs.

A relatively well-developed line of inquiry exists in the private management and occupational health literatures regarding the impact of performance-oriented reforms on the attitudes of employees. Among the most commonly applied of these has been the Demand-Control-Support, or Job Strain, model (Karasek, 1979; Karasek & Theorell, 1990). The model hypothesizes that performance reforms will have a primary influence on three employee perceptions: the demands placed on an individual by her job, the level of decision-making authority that she feels she has, and the support that she receives from supervisors and coworkers (see van der Doef & Maes, 1999, for a review). Ultimately, the model predicts that the impact of reforms on employee stress or satisfaction is a product of the interaction of these perceptions. When performance reforms create job demands that exceed the control and support necessary to meet those demands, the model predicts high job stress and lower employee satisfaction and commitment. The approach has received widespread support in research on private organizations and is among the most commonly used theoretical approaches in occupational stress research (Fox et al., 1993).

The predictors of satisfaction outlined in the DCS approach accord well with previous work on teacher satisfaction. Studies in that literature have examined antecedents of satisfaction that are likely to be impacted by performance and accountability reforms like NCLB. For example, studies have demonstrated a consistent relationship between job stress, including long hours, and satisfaction (Butt et al., 2005). Scholars have also shown that professional autonomy, often measured as control in the classroom, predicts satisfaction among teachers (Shann, 1998; Bogler, 2001). Finally, research has also found support from supervisors and colleagues to be a strong correlate of satisfaction (Allensworth, Ponisciak, & Mazzeo, 2009; Bloland & Selby, 1980; Grissom, 2011).

Given these linkages, the DCS approach provides an intuitive framework for considering the mechanisms by which accountability reforms like NCLB might influence satisfaction. Before moving on, it is important to note that we are not explicitly testing the three-way interaction between job demands, autonomy, and workplace support in the production of satisfaction. Doing so is intractable given the estimation strategy we adopt (and describe below) in order to increase confidence in the causal nature of the findings we report. Instead, we simply use the framework to identify teacher perceptions that are both likely to be influenced by accountability pressures and likely to contribute to key policy-relevant attitudes like job satisfaction and commitment. We then use the impact of NCLB on these factors to predict and better understand the impact of the reform on satisfaction and commitment.

The empirical portion of the paper thus proceeds in two parts. First, it examines the impact of NCLB on perceptions among teachers of job demands, control, and support. We begin by analyzing whether the amount of effort expended by teachers went up or down after NCLB implementation. Research both in schools (Reback, Rockoff, & Schwartz, 2011) and in other public organizations (Korunga et al., 2003) suggests that accountability reforms can have this effect. We then test whether teachers' perceived level of discretion in the classroom changed as a result of the reform. The broader performance reform literature suggests that autonomy and control might move in either direction (see Osborne & Gaebler, 1992; Brodkin, 2011), though research specifically focused in education finds that teachers reported a greater sense of autonomy in the classroom post-NCLB (Hamliton et al., 2007). Lastly, we examine job support, assessing whether the pressure of performance targets affected perceived relationships between teachers and their colleagues, principals, and parents. A particular concern about accountability implementation is that it eroded relationships among teachers, perhaps by inducing them to view

one another as competitors. Alternatively, it is possible that accountability reforms bonded school personnel more tightly together. Evidence from the broader literature in public performance reforms suggests that both outcomes are possible (Kellman, 2006; Brockner et al., 2004).

As the DCS framework suggests, the direction of these relationships—or more specifically, the consistency of that direction—should help us to understand the impact of NCLB on teacher satisfaction and job commitment. If the reform is consistently associated with negative outcomes for teachers (i.e., longer hours, less control, and so forth), then we would expect that it ultimately diminished job satisfaction and decreased commitment. Alternatively, if the effect of the NCLB on the antecedents of satisfaction were consistently positive (e.g., higher levels of colleague support, more pay) then we would expect overall satisfaction and commitment to have increased after the implementation of the reform. If, however, NCLB had a mixed or null impact on the factors described above, then there may not be a measureable impact on satisfaction or other generalized attitudes.

Based on the analyses of demand, control, and support, the second portion of the analysis offers a prediction about the reforms expected impact on more global attitudes and then offers specific empirical tests. The first of these is whether the reform had an observable impact on the more generalized construct of job satisfaction, and the second is whether the reform influenced the related construct of intent to remain in the profession, which a large body of management research has linked closely to satisfaction with one's employment (see Tett and Meyer 1993 for a meta-analytic review). Our analysis complements others seeking to understand the impacts of NCLB on teachers and teacher working conditions (Dee, Jacob, & Schwartz, 2013).

Data and Methods

For this study, we built a cross-sectional time series of data on teachers and schools spanning four waves of the Schools and Staffing Survey (SASS). SASS is a nationally representative survey of public school personnel collected approximately every four years. The four waves we utilize were collected during the 1993-94, 1999-2000, 2003-04, and 2007-08 academic years, which means that we have data on two time points prior to the date that No Child Left Behind took effect in 2002-03 and two time points afterward.[2] Throughout the remainder of the paper we will refer to the survey years by year corresponding to the second year in the survey wave (i.e., 1993-94 will be "1994").

In selected SASS schools, survey data are collected from multiple randomly selected teachers on such topics as school organization, professional development, and perceptions of the school climate. Demographic, experience, and educational background data also are collected. Unique respondent identifiers make teacher responses linkable to the schools in which they work. Pooling the data across years, we utilize data on approximately 140,000 regular full-time public school teachers. Survey weights are used in all analysis to account for the complex sampling strategy SASS employs.

Dependent Variables

The primary constructs for which we aim to examine the impact of No Child Left Behind are demand, control, job support, job satisfaction, and job commitment. We measure each at the teacher level using items from the SASS teacher questionnaires. Our measure of demand is total weekly hours worked, measured as a teacher's estimate of how many hours he or she works on

[2] We follow Dee, Jacob, and Schwartz (2013) in using 2002-03 as the initial implementation year for NCLB. See Appendix A in that article for a discussion.

all teaching-related duties during a typical week.[3] As shown in Table 1, which provides descriptive statistics for the study's variables, the mean across years is approximately 50 hours per week.

[TABLE 1 ABOUT HERE]

To capture control, we make use of six items asked in each SASS wave that ask teachers how much control they feel they exercise in their own classrooms over: selecting textbooks and materials; selecting content, topics and skills to be taught; selecting teaching techniques; evaluating students; disciplining students; and determining the amount of homework to be assigned. The scale for each item ranges from "No control" to "Complete control,"[4] though the number of points in the scale varies across years. To equate the scales, we converted each one to a three-point scale for no control, some control, and complete control. Polychoric factor analysis on the converted items revealed one underlying *control* factor,[5] which Cronbach's α suggested to have a high degree of reliability ($\alpha = 0.78$). Factor scores were used to assign a single control measure to each teacher and then standardized across observations to facilitate interpretation.[6]

Job support is captured using three items. Teachers were asked to respond to each of these statements using a 4-point Likert scale (*strongly disagree, somewhat disagree, somewhat agree, strongly agree*) each year; for all Likert variables we coded each scale so that *strongly agree* received a value of 4 with the remaining responses descending accordingly. The first

[3] The questions concerning this variable vary somewhat across SASS waves. In 1994 and 2000, we created this total from a composite of three questions which asked respondents how many hours they were required to work each week during school hours, how many hours they spend on student interactions outside of school, and how much other time they spent. In 2004 and 2008, they were simply asked to estimate their total hours worked in a typical week. We cannot rule out the possibility that differences in answers between the two sets of years are due in part to differences in question wording.

[4] In 2004 and 2008, the range was "No control" to "A great deal of control."

[5] This determination was made by examining a scree plot. The eigenvalue for the first factor was 3.7. The factor loadings for three of the six variables (selecting teaching techniques, evaluating students, and determining the amount of homework were all above 0.8, and two (choosing content and disciplining students) had loadings above 0.7. The remaining variable (choosing textbooks and materials) had a factor loading of 0.67.

[6] The mean for this variable is slightly negative in Table 1 due to sample weighting.

measures peer support: “There is a great deal of cooperative effort among staff members.” The second measures administrator support: “The school administration’s behavior toward the staff is supportive and encouraging.” The third measure captures perceived support from parents: “I receive a great deal of support from parents for the work I do.” Means for these items ranged from 2.6 (parent support) to 3.3 (administrator support).

We measure job satisfaction with the Likert response to: “I am generally satisfied with being a teacher at this school.” Teachers are quite satisfied in general, averaging 3.46 of 4 points across years. A drawback of this variable, however, is that it was not measured on the 1994 SASS survey. We thus supplement our analysis of the teacher satisfaction variable with analysis of a measure of teachers’ satisfaction with their salary, which *was* asked in all four survey waves (“I am satisfied with my teaching salary.”). Salary satisfaction is lower than overall job satisfaction, averaging 2.25 out of 4 points.

Finally, we measure job commitment using teachers’ responses to the questionnaire item: “How long do you plan to remain in teaching?” Unfortunately, the response items for this question, which remain constant over the 1994, 2000, and 2004 waves of SASS, changed in 2008, though the changes were primarily to add specificity to the response “Until I am eligible for retirement,” which was a single category prior to 2008.[7] To measure intent to intent to remain in teaching, we created a dichotomous variable that was equal to 1 if the person responded “As long as I am able” or “Until I am eligible for retirement” (or, in 2008, one of its subcategories). The variable was coded as 0 for any other response, which included “will probably continue unless something better comes along,” “definitely plan to leave teaching as soon as I can,” and

[7] In 2008, this response item was broken into “from this job” and “from a previous job,” and an additional item was added for “Until I am eligible for Social Security benefits.” An additional item, “Until a specific life event occurs (e.g., parenthood, marriage),” which was not included in earlier waves, was also added.

"undecided at this time." Approximately 74% of the pooled sample was coded as intending to remain in teaching by this definition.[8]

Methodological Approaches

The main goal of our analysis is to isolate the impact of NCLB on teacher outcome variables. A primary difficulty for this analysis lies in disentangling the effects of NCLB from other unobserved changes occurring simultaneously, given that NCLB was implemented across all states at the same time. Like prior studies of NCLB (Dee & Jacob, 2011; Dee, Jacob, & Schwartz, 2013), we take advantage of the fact that many states had implemented school accountability systems in the decade prior to the passage of NCLB. To the degree that the consequentialist accountability system imposed by NCLB was similar to the system already in place in those states, we would expect the additional accountability "treatment" imposed by NCLB to be small or even nonexistent. In contrast, in other states, NCLB marked the first experience with high-stakes school accountability, meaning that if NCLB had effects on our outcomes of interest, we would expect them to be greatest in the *no prior accountability* states. This expectation suggests a difference-in-differences approach to estimating the impact of NCLB:

$$Y_{ijst} = \beta_0 + \beta_1 NCLB_t + \beta_2(No\ Prior\ Accty_s \times NCLB_t) + \beta_3 X_{it} + \beta_4 S_{jt} + \gamma_s + \varepsilon_{ijst} \quad (1)$$

Equation 1 represents an outcome *Y* for teacher *i* in school *j* in state *s* at time *t* as a function of whether NCLB has already been implemented (this variable is set equal to 1 in the 2004 and 2008 SASS years and 0 otherwise) and an interaction between *NCLB* and whether the teacher resides in a state with no prior (i.e., pre-NCLB) accountability system, which is constant across

[8] Approximately 41% of teachers responded "as long as I am able," while 32% responded "until retirement."

years for all states not implemented a state accountability system prior to NCLB.[9] The model also includes a vector of teacher (X) and school (S) characteristics and a state fixed effect, plus mean-zero random error ε.[10] Teacher characteristics include indicators for being female, black, and Hispanic; age, experience, and experience squared, plus indicators for holding a Master's degree, and union membership (see Table 1 for descriptive statistics). School characteristics include percent black, Hispanic, and free/reduced lunch eligible, plus school enrollment size, enrollment squared, and indicators for regular (non-specialized) school, urban and rural location (suburban omitted), and school level (middle or high, with elementary omitted). Controlling for these covariates, coefficient β_1 captures any difference in the level of the outcome variable Y associated with the two time points following the passage of NCLB compared to the two time points prior. Coefficient β_2 estimates any differential change following NCLB in the states with and without prior accountability systems; a meaningful coefficient on this interaction suggests an impact of NCLB accountability provisions on Y.[11]

Of course, simply categorizing states as having or not having an accountability system prior to NCLB ignores variation in those systems in their intensity that may affect our estimates. For example, a state may have had a weak accountability system in place, in which case NCLB may in fact have represented a substantive treatment. Such a state would not make a good "control" for the states treated by NCLB and lead us to underestimate the impact of the law on Y. To guard against this concern, we estimated a variant of equation (1) that replaces the *no prior accountability* variable with the Carnoy and Loeb (2002) index of state accountability strength,

[9] Our coding of *no prior accountability* states follows the coding of Dee, Jacob, and Schwartz (2013). Table A1 in that paper provides a list.
[10] All models were run using ordinary least squares (OLS), clustering standard errors at the state level. For limited dependent variables, we also estimated logit or ordinal logit models and obtained substantively consistent results.
[11] It is important to underscore that the impact of NCLB captured by this coefficient is limited to the accountability provisions in the law. Other facets, such as the highly qualified teacher requirement, which were not present in prior state accountability policies, are not captured.

which measures the strength of each state's accountability system on a scale of 0 (weak accountability) to 5 (strong accountability) as of 2000. Because this measure is only available as of 2000, in these models we drop observations from 1994, using 2000 as the only pre-NCLB time point. In this case, a significant coefficient for β_2 suggests that NCLB had an impact on *Y* in the *opposite* direction, since it estimates the differential impact of the law on states with strong pre-existing accountability systems.[12] As a check on these results, we also ran versions of the models substituting Lee and Wong's (2004) measure of late-1990s accountability strength for the Carnoy and Loeb measure and found similar results.[13]

Another potential drawback of the difference-in-differences approach in equation (1) is that it measures the shift in the mean of the outcome variable associated with NCLB implementation but does not allow a shift in pre-existing trends. To address this concern, we also estimate a version of Dee, Jacob, and Schwartz's (2013) comparative interrupted time series (CITS) model, which takes the form:

$$Y_{ijst} = \beta_0 + \beta_1\tau_t + \beta_2 NCLB_t + \beta_3(Years\ under\ NCLB_t) + \beta_4(No\ Prior\ Accty_s \times \tau_t) + \beta_5(No\ Prior\ Accty_s \times NCLB_t) + \beta_6(No\ Prior\ Accty_s \times Years\ under\ NCLB_t) + \beta_7 X_{it} + \beta_8 S_{jt} + \gamma_s + \varepsilon_{ijst} \quad (2)$$

The two new terms introduced in equation (2) are the linear time trend τ, defined from the year 1989 (before any state had implemented accountability reform) forward, and the variable *Years under NCLB*, which is defined as the number of years at time *t* since NCLB was implemented (year – 2002) and 0 for the years prior to NCLB's signing. The three interaction terms estimate not only a differential mean shift associated with NCLB in states with and without prior

[12] For consistency with the CITS models, we also include a linear time trend, though omitting it makes little substantive difference on the results.
[13] These models are omitted for brevity.

accountability systems (β_5) but differential time trends (β_4) and differential shifts in those time trends after NCLB implementation (β_6). Following Dee, Jacob, and Schwartz (2013), the total effect of NCLB in equation (2) as of 2008 (the most recent SASS year) can be represented as the mean shift associated with NCLB in the no prior accountability states plus the effect of completing 6 years under the NCLB regime for those states: $\hat{\beta}_5 + 6 \times \hat{\beta}_6$.

Both the difference-in-differences and CITS modeling approaches face potential threats to causal inference. The most important is the possibility of unobserved changes to determinants of *Y* occurring around the passage of NCLB but concentrated in the states without prior accountability systems. Such potential unobserved confounders are difficult to anticipate and can never be fully ruled out. Investigation of this issue by Dee, Jacob, and Schwartz (2013), who also use SASS data for some of their analysis, generally find few causes of concern. Still, we take an additional step. Operating from the assumption that NCLB effects should have been more pronounced in high-poverty schools—since those schools were both more likely to receive Title I funds (and thus to be subject to NCLB sanctions) and to have difficulty meeting NCLB accountability targets (due to having larger numbers of low-achieving students)—we re-estimate equation (1) separately for high- and low-poverty schools. Akin to a difference-in-differences-in-differences model, we then test for differences in the *no prior accountability* × *NCLB* interaction across the two models using Chow tests. Significant differences would suggest that NCLB had differential impacts in the two types of schools in states with and without prior accountability, potentially providing further evidence on the law's effects that are both of substantive interest and that help obviate omitted variables concerns, since such unobserved confounders would have to be time-, state- and poverty status-specific.

Results

Demand, Control, and Support

We begin by examining the potential impact of NCLB on teachers' weekly hours worked, our measure of job demands. The left panel of Figure 1 displays the trend in this variable from 1994 to 2008 separately for states with and without pre-NCLB accountability systems. The figure shows that average hours worked were nearly coincident for teachers in the two types of states in the years prior to NCLB, with both showing a marked increase—approximately four hours per week—between 1994 and 2000. Both increased an additional two hours between 2000 and 2004, before leveling off between 2004 and 2008. Naively, the large mean increase in hours worked between the pre-NCLB and post-NCLB years, totaling approximately seven hours, could suggest a positive impact of NCLB on weekly hours worked, or it could indicate a continuation of a trend begun prior to the law's passage that NCLB did not affect. Here the comparison between states with and without prior accountability systems is useful. Because the upward trend in hours prior to NCLB's passage is very similar in the two types of states—but the treatment of NCLB should be concentrated in the states without prior accountability systems—we can use the differential shift after NCLB's implementation to estimate the effect of the law. The graph shows that, in fact, the increase between the pre-NCLB and post-NCLB years was slightly larger in states *with* prior accountability systems, which, by the logic of our estimation strategy, would indicate a slight *negative* impact of NCLB on hours worked.

Regression estimates are shown in Table 2. Although included in all of the models, the coefficients on the teacher and school covariates are omitted from this and subsequent tables for

brevity.[14] Column 1 shows the difference-in-differences estimate. As suggested by Figure 1, the coefficient on NCLB is large and positive ($\beta = 5.2$, $p < 0.01$). The coefficient on the interaction, however, is negatively signed, though not statistically significant at conventional levels. Column 2 shows the results from the model using the accountability strength index; the interaction is not statistically significant. Column 3 gives the CITS estimate, which again cannot be distinguished statistically from 0. In short, while teachers' hours worked clearly increased from the pre-NCLB to the post-NCLB era, there is little evidence in these models that this increase is attributable to the accountability regime imposed by the law.

[TABLE 2 ABOUT HERE]

The right panel in Figure 1 displays trends in our control measure, the standardized factor variable combining teachers' feelings of control in their classrooms. The figure shows that pre-NCLB trend is similar though not quite parallel, with feelings of control in prior-accountability states declining slightly more between 1994 and 2000 than in states without prior systems. In both states, feelings of control increased substantially between 2000 and 2004 before falling, though mean feelings of control are clearly much higher in both cases after NCLB. Column 4 of Table 2 shows that, controlling for other factors, feelings of classroom control increased more in states without prior accountability systems ($\beta = 0.06$, $p = 0.06$), evidence of a small positive causal impact—just six-hundredths of a standard deviation in the control index. The accountability strength results in column 5 are consistent with this conclusion: teachers in states with weaker prior accountability systems increased their feelings of classroom control

[14] Coefficients on the control variables suggest that female, nonwhite, nonunion and more experienced teachers work fewer hours, as do teachers in smaller schools, elementary schools, and schools with larger numbers of low-income students. Teachers in suburban schools report greater hours worked than teachers in urban or rural schools.

more following NCLB (β = -0.02, p < 0.01). The CITS estimate is negative but not statistically significant (column 6).[15]

Next we turn to perceptions of support from peers, administrators, and parents, summarized descriptively in Figure 2. Panel (a) graphs means by year and prior accountability status for teachers' ratings of cooperative effort among the school staff, alongside similar graphs for perceptions of administrator and parent support in panels (b) and (c), respectively. All three variables show average *increases*, of similar magnitudes (approximately 0.15 to 0.20 points), between the pre- and post-NCLB periods. In Table 3, we use multivariate regression to test for statistically different increases in states without prior accountability systems. The evidence is modest. The CITS model only estimates a negative impact of NCLB on teacher cooperation (β = -0.10, p < 0.05). In a more robust finding, both the difference-in-differences (β = 0.04, p = 0.10) and CITS models (β = 0.10, p = 0.06) uncover a positive impact of NCLB on administrator support. There is no evidence in any model of an effect of NCLB on teacher perceptions of parent support.[16]

[TABLE 3 ABOUT HERE]

Looking across the findings regarding the impact of NCLB on the potential precursors of job satisfaction and commitment, we make three general observations. First, there are significant differences in the levels of each of the variables we examined that coincide with the implementation of NCLB. As compared to the pre-NCLB time period, teachers after NCLB are

[15] Among the control variables, characteristics associated with greater feelings of classroom control included being female, black, and Hispanic, and having greater years of experience. Age, holding an MA, being a union member, and working in a school with larger numbers of black, Hispanic, and low-income students all were associated with lower feelings of control, as was working in a larger, urban, and elementary school.

[16] Among the control variables, black, older, and non-union teachers, as well as those working in schools with lower fractions of traditionally disadvantaged students and those in middle and high schools consistently reported lower perceptions of teacher cooperation, administrator support, and parent support across models. For other variables, the associations were more mixed. For example, female teachers reported higher teacher cooperation and parent support but lower administrator support.

working longer hours, perceive greater control in their own classrooms, and feel greater support among peers, administrators, and parents. Second, only one of these differences—the increase in hours worked—is consistent, in the sense of the Demand-Control-Support framework, with a decrease in the desirability of the teaching profession in the post-NCLB era. Third, there is only modest evidence from the comparisons of states with and without prior accountability systems that any of these changes are directly attributable to NCLB itself, rather than to other policy shifts or other forces. Moreover, the causal effects are not consistently in the same direction. There is some evidence that NCLB may have increased feeling of classroom control and perceptions of administrator support but reduced cooperation among teachers, though those competing results are not robust to the specification of the models. In short, given the relatively large changes in the antecedents of job satisfaction and commitment over the time period we examine, we might expect to find significant changes in satisfaction and commitment as well. However, our estimates do not lead to an expectation that NCLB has had much of an impact—let alone the large negative effects sometimes attributed to the law—on these variables.

Job Satisfaction and Job Commitment

Figure 3 begins to examine these expectations. The left panel shows the trend in teacher job satisfaction from 2000 to 2008. The trend is increasing in each year for teachers in states both with and without prior accountability systems. Counter to the rhetoric and anecdotal evidence surrounding the relationship between NCLB and teacher satisfaction (e.g., Sunderman et al., 2004), the post-NCLB mean for all teachers, pooling 2004 and 2008, is about 0.08 points *higher* than the mean in 2000 (about 0.1 s.d.). There is not much evidence of a differential shift between states with and without prior accountability systems, and indeed, although the coefficients are all

consistent with a small negative impact of NCLB, none of the coefficients in the first three columns of Table 4, which report the multivariate results for this variable, are statistically distinguishable from zero.[17]

A weakness of this analysis is the omission of 1994 data on job satisfaction, which was not included on the SASS survey that year. As a second look at more specific area of job satisfaction for which data was available in all years, we examine teachers' reported satisfaction with their teaching salary, first descriptively in Figure 3(b) and in a regression format in columns 4 – 6 of Table 4. Figure 3(b) shows that—like job satisfaction—average salary satisfaction increased from 2000 to 2004 and again from 2004 to 2008, though it also shows that the increase followed a decline from 1994 to 2000. States with and without prior accountability systems appear to have had similar trends. Indeed, the multivariate models in Table 4 show no statistically meaningful evidence of a difference.[18] These results are consistent with the null findings for job satisfaction.[19]

[TABLE 4 ABOUT HERE]

Figure 4 shows trends in the closely related concept of intent to remain in teaching, a construct with clear policy relevance. Once again, there were substantial increases in the period between 1994 and 2008 across both types of states. In 1994, approximately 65% of teachers intended to remain in the profession until retirement or as long as possible. By 2008, this fraction had climbed to approximately 77%. The final three columns of Table 4, however, show no evidence that the increase in teacher job commitment resulted from NCLB; all three focal

[17] For the control variables, female, black, less experienced, older, and non-union teachers reported higher satisfaction, while teachers with MA degrees, those in middle and high schools, and those working in schools with larger numbers of black, Hispanic, and free/reduced lunch students reported lower satisfaction.
[18] The patterns for the control variables are very similar to those for overall job satisfaction, except that urban teachers are significantly less satisfied with their pay while middle and high school teachers are more satisfied.
[19] We also ran a version of the models shown in columns 4 – 6 that controlled for teacher salaries under the theory that adjusting for actual salary—which Dee, Jacob, and Schwartz (2013) found NCLB to have increased—salary satisfaction and job satisfaction would be even more closely related. The results were very similar.

coefficients are small—particularly relative to the increase in job commitment between the pre- and post-NCLB years—and not statistically significant.[20]

To summarize, the evidence presented here does not support the conclusion that NCLB has left teachers much less satisfied or committed to teaching than they were before the law's implementation. In fact, satisfaction and job commitment were both substantially higher in the years subsequent to NCLB's passage. However, estimates of differences between states with and without prior accountability systems are small and, despite the large sample sizes, statistically indistinguishable from zero across models.

Testing for Differences in High-Poverty and Low-Poverty Schools

Given the targeting of NCLB's sanction provisions at low-performing Title I schools and the greater difficulty high-poverty schools have in making Adequate Yearly Progress (Balfanz et al., 2007), we might expect that, despite relatively weak evidence of an impact of NCLB on teachers' work or perceptions in the average school, effects of the law might be concentrated among teachers in schools with the largest numbers of low-income students. We could consider differential effects on teachers in these schools in states with and without prior accountability systems an additional form of evidence of NCLB impacts. With these expectations in mind, we re-estimated the difference-in-differences models separately for teachers in schools in high-poverty schools—defined as those in the top quartile of percent free/reduced lunch students in a given year—and low-poverty schools—defined as those in the bottom quartile of the same measure. On average, 78% of students in the high-poverty schools were subsidized lunch-eligible, compared to 7% of students in the low-poverty schools.

[20] Among the control variables, factors associated with lower feelings of job commitment included being female, black, or non-Hispanic, experience, age, not being a union member, and working in urban, middle, or high schools or schools with larger numbers of black students.

The results are provided in Table 5. For each dependent variable, coefficients on *NCLB* and its interaction with *no prior state accountability* are shown with the results of Chow tests for the equality of the interaction term coefficient between the high-poverty and low-poverty sample. Panel (a) shows results for the demand and control variables, followed by the job support measures in panel (b) and the satisfaction and commitment measures in panel (c). Across all three panels, the results are quite consistent. First, the coefficient on *NCLB* shows that the post-NCLB time period was associated with increases in every dependent variable in both high- and low-poverty schools, and that these increases were, for most variables, of similar magnitudes in both kinds of schools. Second, in only one case was the interaction term statistically distinguishable from zero for either school type, though note that the smaller sample sizes reduce power to detect statistical differences.[21] This variable was intent to remain in teaching, for which the differential negative effect of NCLB in states without prior accountability systems is actually found to be significant in *low-poverty* schools, a result inconsistent with the expectation of a greater negative impact of NCLB in schools with large numbers of low-income students. Third, in no cases could the test for equality of the interaction term across samples reject the null hypothesis that the coefficients were equal. In other words, there is no evidence of a difference by poverty in the effect of NCLB on states with and without prior accountability systems for any of the variables examined. A robustness check comparing the fourth poverty quartile to quartiles 1 through 3 obtained a similar set of null results for these tests.

[TABLE 5 ABOUT HERE]

Discussion and Conclusions

[21] It is worth noting that the sample sizes are still quite large, totaling about 35,000 in each model except for teacher job satisfaction (N ≈ 26,000), reducing concerns about power loss.

This article has considered the impact of NCLB on the job attitudes of public school teachers, arguing that an application of an oft-used framework from the private management literature provides a useful lens for examining the contention that NCLB has negatively impacted teachers' attitudes about their work. Drawing on multiple waves of the nationally representative Schools and Staffing Survey, we indeed document substantial changes in the antecedents of job satisfaction and job commitment since the implementation of NCLB, though the direction of some of these changes was not consistent with the negative impact narrative. For example, while teachers' hours worked have increased, so have their feelings of classroom control and their perceptions of support from peers, administrators, and parents. Concomitantly, teacher job satisfaction and commitment to the profession appear to have increased over this time period as well.

Moreover, when we leverage differences in states with and without prior accountability systems in an attempt to identify a causal effect of NCLB on these measures, the results are generally inconsistent with a large negative effect on teacher attitudes. There is little evidence of an effect of NCLB on hours worked. This null finding accords well with research on the impact of NCLB on other measures that might capture job demands, such as Dee, Jacob, and Schwartz's (2013) finding that NCLB had no measurable effect on class sizes. There are some indications of negative effects of NCLB on perceptions of teacher cooperation but also potentially offsetting positive effects of NCLB on perceptions of administrator support and classroom control. This latter finding is consistent with findings from some previous descriptive work on the impact of the reform (see Hamilton et al., 2007).

Given the mixed results concerning the antecedents of generalized satisfaction, as well as uncertainty about the weights teachers attach to those antecedents, the DCS model does not

suggest a large impact for NCLB on job satisfaction and commitment. In line with this expectation, we find little evidence of effects of the law on either outcome, either when we compare states with and without prior accountability systems or when we further assess this difference across high- and low-poverty schools. Simply stated, our results do not support media accounts (Toppo, 2007; Hefling, 2012), academic reports (Hill and Barth, 2004; Center on Education Policy, 2006; Deniston & Gerrity, 2010; Sunderman et al., 2004) or policy rhetoric more generally that portray NCLB as undermining teacher morale and intent to remain in the profession.

Our empirical strategies and the use of a very large, nationally representative sample of teachers allow us to reach the conclusion that NCLB has had small or null effects on the variables we examine with some confidence. Nonetheless, there are limitations to this study that warrant caution when interpreting the results. First, existing SASS data provide only a small number of time points with which to identify trends prior to and after the passage of NCLB, and in fact for one variable in our analysis (overall satisfaction), just one pre-NCLB time point is available. Additional years of data would no doubt improve the quality of the estimates. Other measurement issues, such as general noisiness in self-reported attitudinal data, changes across years in the number of response categories for the question used to construct the job commitment variable or the fact that we rely on single-item attitudinal measures, may also pose challenges to reliability. Additionally, it is possible that NCLB is only beginning to have substantively important impacts on teachers in more recent years as states have fully implemented the law and its sanction provisions, a hypothesis future research can test as newer data become available.

Perhaps a more central concern for our analyses—and indeed any analysis seeking to identify NCLB's impacts—is its means of identifying the differential pressure of NCLB on

different types of teachers as a strategy for estimating its effects. We make use of different strategies, including leveraging the existence and strength of prior accountability plans and making comparisons among high- and low-income schools, but these approaches are imperfect. Future analysis with additional data or more direct measures of accountability pressure may yield more nuanced results. For example, a promising empirical strategy developed by Reback, Rockoff, and Schwartz (2011) exploits the fact that state influence over the cutoffs for Adequate Yearly Progress (AYP) means that schools on the accountability "bubble"—i.e., those where accountability pressures are greater because the school is just above or just below the AYP threshold—in one state may be well above or below in another state. The resulting differences-in-differences approach they use to identify the impact of NCLB accountability pressure on test scores could be adapted to examine impacts on teacher attitudes as well.

Before concluding, it is also important to place our findings within the context of recent changes in the implementation of NCLB. In our study, school districts had good reason to believe they might lose their federal funding if they did not meet AYP benchmarks set by their state. However, in 2012, the federal government granted waivers to 11 states with a high percentage of underperforming districts, potentially lessening the stress placed on teachers and administrators by the federal policy. Of course, by that same logic, waivers might also reduce the incentive for districts and schools to provide teachers with greater autonomy in hopes of meeting AYP standards, which is one plausible explanation for our empirical finding that teachers reported *greater* control over their classrooms after the implementation of NCLB. However intriguing they might be, answering questions about these and other potential impacts of waivers requires that we first have an accurate understanding of the relationship between the policy as it was originally implemented and the attitudes of teachers. For that reason, the results reported in

this paper remain relevant and important to recent changes in NCLB implementation and help inform ongoing conversations about future reform as part of a potential reauthorization.

References

Allensworth, E., Ponisciak, S., & Mazzeo, C. (2009). The schools teachers leave: Teacher mobility in Chicago Public Schools. Chicago, IL: Consortium on Chicago School Research.

Balfanz, R., Legters, N., West, T.C., & Weber, L.M. (2007). Are NCLB's measures, incentives, and improvement strategies the right ones for the nation's low-performing high schools? *American Educational Research Journal, 44*(3), 559-593.

Ballou, D., & Springer, M. G. (2011). Has NCLB encouraged triage? Accountability and the distribution of achievement gains. *Unpublished manuscript.*

Bellante, D., & Link, A.N. (1981). Are public sector workers more risk averse than private sector workers? *Industrial and Labor Relations Review, 34*(3), 408-412.

Berryhill, J., Linney, J.A., & Fromewick, J. (2009). The effects of education accountability on teachers: Are policies too stress provoking for their own good? *International Journal of Education Policy & Leadership, 4*(5), 1-14.

Bloland P., & Selby T., (1980). Factors associated with career change among secondary school teachers: A review of the literature. *Educational Research Quarterly, 5*(3), 13–24.

Bogler, R. (2001). The influence of leadership style on teacher job satisfaction. *Educational Administration Quarterly, 37*(5), 662-683

Brockner, J., Spreitzer, G., Mishra, A., Hochwarter, W., Pepper, L. & Weinburg, J. (2004). Perceived control as an antidote to the negative effects of layoffs on survivors' organizational commitment and job performance. *Administrative Science Quarterly, 49*(1), 76-100.

Brodkin, E.Z. (2011). Policy work: Street-level organizations under new managerialism. *Journal of Public Administration Research and Theory, 21*(2), 1253-1277.

Booher-Jennings, J. (2005). Below the bubble: Educational triage and the Texas accountability system. *American Educational Research Journal, 42*(2), 231-268.

Butt, G. & Lance, A. (2005), Secondary teacher workload and job satisfaction. *Educational Management Administration and Leadership, 33*(4), 401-22.

Byrd-Blake, M., Afolayan, M.O., Hunt, J.W., Fabunmi, M., Pryor, B.W., & Leander, R. (2010). Morale of teachers in high poverty schools: A post-NCLB mixed methods analysis. *Education and Urban Society, 42*(4), 450-472.

Carnoy, M., & Loeb, S. (2002). Does external accountability affect student outcomes? A cross-state analysis. *Educational Evaluation and Policy Analysis, 24*(4), 305-331.

Cavanagh, S. (2012). Survey: N.C. teachers say high-stakes tests dominate classes. *Education Week,* March 8, 2012. Available at http://blogs.edweek.org/edweek/state_edwatch/2012/03/survey_nc_teachers_dissatisfied_with_high-stakes_tests.html?cmp=ENL-EU-NEWS2.

Center on Education Policy. (2006). *From the capital to the classroom: Year 4 of the No Child Left Behind Act.* Available at www.cep-dc.org.

Cody, A. (2012). Hyper-accountability, burnout and blame: A TFA corps member speaks out. *Education Week*, February 24, 2012. Available at http://blogs.edweek.org/teachers/living-in-dialogue/2012/02/hyper-accountability_burnout_a.html?cmp=ENL-EU-VIEWS2.

Cotton, J. L., & Tuttle, J. M. (1986). Employee turnover: A meta-analysis and review with implications for research. *Academy of Management Review, 11*(1), 55-70.

Currivan, D. B. (2000). The causal order of job satisfaction and organizational commitment in models of employee turnover. *Human Resource Management Review, 9*(4), 495-524.

Dee, T. & Jacob, B. (2010). The impact of no child left behind on students, teachers, and schools. *Brookings Papers on Economic Activity*, 149-207.

Dee, T. & Jacob, B. (2011). The impact of no child left behind on student achievement. *Journal of Policy Analysis and Management, 30*(3), 418-446.\

Dee, T., Jacob, B, & Schwartz, N. (2013). The effects of NCLB on school resources and practices. *Educational Evaluation and Policy Analysis, 35*(2), 252-279.

Dinham, S. & Scott, C. (2000). Moving into the third, outer domain of teacher satisfaction. *Journal of Educational Administration, 38*, 379–396.

Deniston, R.D., & Gerrity, K.W. (2010). Elementary school teachers' perceptions of no child left behind and its effect on morale. *Scholarly Partnerships, 5*(2), article 4.

Figlio, D.N. (1997). Teacher salaries and teacher quality. *Economics Letters, 55*(2), 267.

Fox, M.L., Dwyer, D.J., & Ganster, D.C. (1993). Effects of stressful job demands and control on physiological and attitudinal outcomes in a hospital setting. *The Academy of Management, 36*(2), 289-318.

Gerson, J. (2007). NCLB: Bad for teachers, bad for kids. *United Teacher, 37*(2). 14.

Grissom, J.A. (2011). Can good principals keep teachers in disadvantaged schools? Linking principal effectiveness to teacher satisfaction and turnover in hard-to-staff environments. *Teachers College Record, 113*(11), 2552-2585.

Grissom, J.A. (2012). Revisiting the impact of participative decision-making on public employee retention: The moderating influence of effective managers. *American Review of Public Administration, 42*(3), 1-19.

Haladyna, T., Haas, N. & Allison, J. (1998). Continuing tensions in standardized testing. *Childhood Education, 74*(5), 262-273.

Hamilton, L., Stecher, B., Marsh, J., McCombs, J.S., Robyn, A., Russell, J.L., Naftel, S., & Barney, H. (2007). Standards-based accountability under no child left behind: Experiences of teachers and administrators in three states. Santa Monica, CA: RAND.

Hannaway, J., & Hamilton, L. (2008). *Performance-based accountability policies: Implications for school and classroom practices.* The Urban Institute and RAND Corporation. Washington, DC.

Hanushek, E.A., Kain, J., & Rivkin, S. (2004). Why public schools lose teachers. *Journal of Human Resources, 39*(2), 326–354.

Hanushek, E.A. & Raymond, M.E. (2005). Does school accountability lead to improved student performance? *Journal of Policy Analysis and Management, 24*(2), 297-327.

Hanushek, E.A. & Woessmann, L. (2011). How much do educational outcomes matter in OECD countries? *Economic Policy, 67,* 1-65.

Harrison, D. A., Newman, D. A., & Roth, P. L. (2006). How important are job attitudes? Meta-analytic comparisons of integrative behavioral outcomes and time sequences. *Academy of Management Journal*, *49*(2), 305-325.

Hefling, K. (2012, January 7). Education law's promise falls short after 10 years. *Associated Press.*

Hill, D.M., & Barth, M. (2004). NCLB and teacher retention: Who will turn out the lights? *Education and the Law*, *16*(2-3), 173-181.

Houston, D.J. (2000). Public-service motivation: A multivariate test. *Journal of Public Administration Research and Theory, 10*(4), 713-728.

Imazeki, J., & Reschovsky, A. (2004). Is no child left behind an un (or under) funded federal mandate? Evidence from Texas. *National Tax Journal, 57,* 571-588.

Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal, 38*(3), 499-534.

Jacob, B. A. & Levitt, S. (2003). "Rotten apples: An investigation of the prevalence and predictors of teacher cheating." *Quarterly Journal of Economics, 118*(3), 843-877.

Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly, 24,* 285-308.

Karasek, R., & Theorell, T. (1990). *Healthy work: Stress, productivity, and the reconstruction of working life.* New York: Basic Books.

Kellman, S. (2006). Downsizing, competition, and organizational change in government: Is necessity the mother of invention? *Journal of Policy Analysis and Management, 25*(4), 875-895.

Korunga, C, Scharitzer, D., Carayons, P. & Sainfort, F. (2003). Employee strain and job satisfaction related to an implementation of quality in a public service organization: A longitudinal study, *Work and Stress, 17,* 52-72.

Ladd, H.F. (2011). Teachers' perceptions of their working conditions: How predictive of planned and actual teacher movement? *Educational Evaluation and Policy Analysis, 33*(2), 235-261.

Lee, J., & Wong, K.K. (2004). The impact of accountability on racial and socioeconomic equity: Considering both school resources and achievement outcomes. *American Educational Research Journal*, *41*(4), 797-832.

Loeb S., Darling-Hammond L., & Luczak J. (2005). How teaching conditions predict teacher turnover in California schools. *Peabody Journal of Education, 80*(3), 44–70.

Manna, P. (2011). Education: Federal government programs and issues. *Oxford Bibliographies*. New York: Oxford University Press.

Mulvenson, S. W., Stegman, C. E., & Ritter, G. (2005). Test anxiety: A multifaceted study on the perceptions of teachers, principals, counselors, students, and parents. *International Journal of Testing, 5*(1), 37-61.

Murnane, R.J., & Papay, J.P. (2010). Teachers' views on No Child Left Behind: Support for the principles, concerns about the practices. *Journal of Economic Perspectives*, *24*(3), 151-166.

Neal, D., & Schanzenbach, D. W. (2010). Left behind by design: Proficiency counts and test-based accountability. *Review of Economics and Statistics*, *92*(2), 263-283.

Noblett, A.J. & Rodwell, J.J. (2009). Integrating job stress and social exchange theories to predict employee strain in reformed public sector contexts. *Journal of Public Administration Research and Theory, 19*(3), 555-578.

Osborne, D. E., & Gaebler, T. (1992). *Reinventing government: How the entrepreneurial spirit is transforming the public sector.* Reading, MA: Addison-Wesley.

Pedulla, J. J., Abrams, L. M., Madaus, G. F., Russell, M. K., Ramos, M. A., & Miao, J. (2003). *Perceived effects of state-mandated testing programs on teaching and learning: Findings from a national survey of teachers.* Boston: Boston College, National Board on Testing and Public Policy.

Reback, R. (2008). Teaching to the rating: School accountability and the distribution of student achievement. *Journal of Public Economics, 92,* 1394-1415.

Reback, R., Rockoff, J. & Schwartz, H.L. (2011). Under press: Job security, resource allocation, and productivity in schools under NCLB. *NBER Working Paper, No. 16745.*

Rouse, C., Hannaway, J., Goldhaber, D., & Figlio, D. (2007). Feeling the Florida heat? How low-performing schools respond to voucher and accountability pressure. *National Bureau of Economic Research,* working paper 13681.

Santoro, D.A. (2011). Good teaching in difficult times: Demoralization in the pursuit of good work. *American Journal of Education, 118*(1), 1-23.

Shann, M. H. (1998). Professional commitment and satisfaction among teachers in urban middle schools. *Journal of Educational Research, 92,* 67–75.

Sunderman, G.L., Tracey, C.A., Kim, J., & Orfield, G. (2004). *Listening to teachers: Classroom realities and No Child Left Behind*. Cambridge, MA: The Civil Rights Project at Harvard University.

Teachers Network. (2007). A survey of teachers on No Child Left Behind. Available at http://teachersnetwork.org/TNLI/NCLB_Survey_Results.pdf.

Tett, R. P., & Meyer, J. P. (1993). Job satisfaction, organizational commitment, turnover intention, and turnover: Path analyses based on meta-analytic findings. *Personnel Psychology*, *46*(2), 259-293.

Toppo, G. (2007). How Bush education law has changed our schools. *USA Today.* http://www.usatoday.com/news/education/2007-01-07-no-child_x.htm.

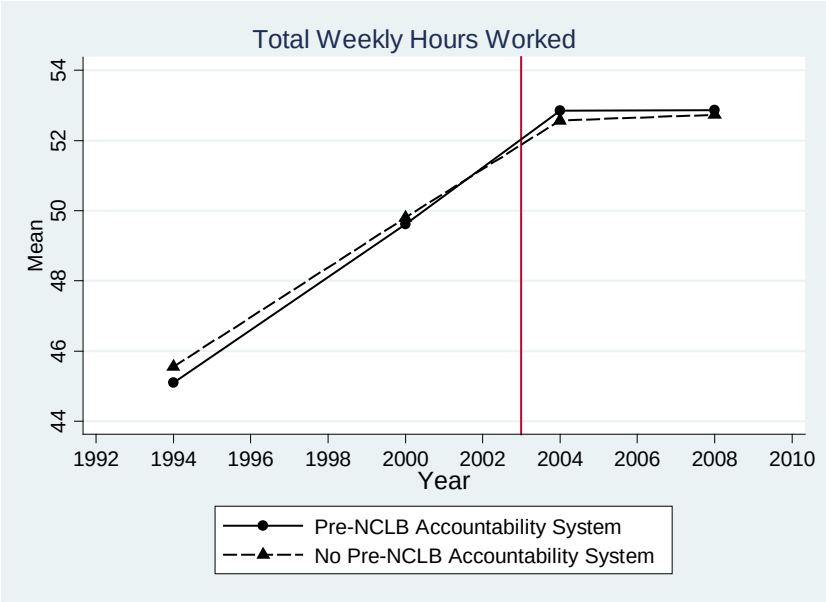
van der Doef, M., & Maes, S. (1999). The job demand-control(-support) model and psychological well-being: A review of 20 years of empirical research. *Work and Stress, 13,* 87-114.

Van Wart, M., & Berman, E. (1999). Contemporary public sector productivity values: Narrower scope, tougher standards, and new rules of the game. *Public Productivity & Management Review, 22*(3), 326-347.

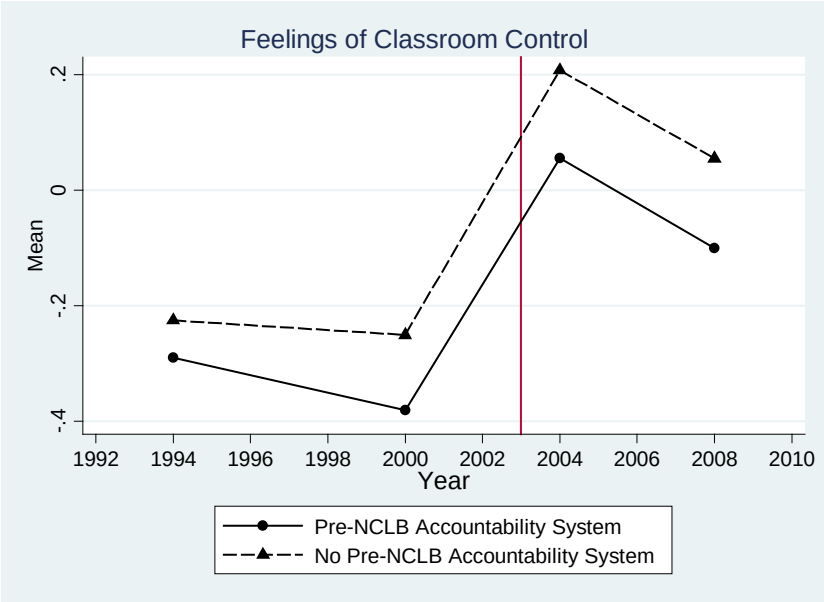
Young, B., Worchel, S., & Woehr, D. (1998). Organizational commitment among public service employees. *Public Personnel Management, 27*(3), 339-348.

FIGURE 1: Measures of Demand and Control Before and After NCLB

(a)



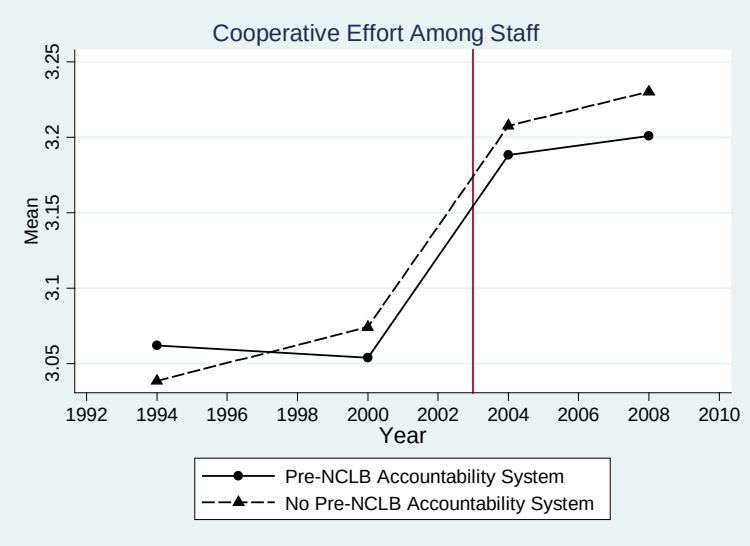
(b)



Notes: Means calculated using survey sampling weights.

FIGURE 2: Feelings of Job Support Before and After NCLB

(a)



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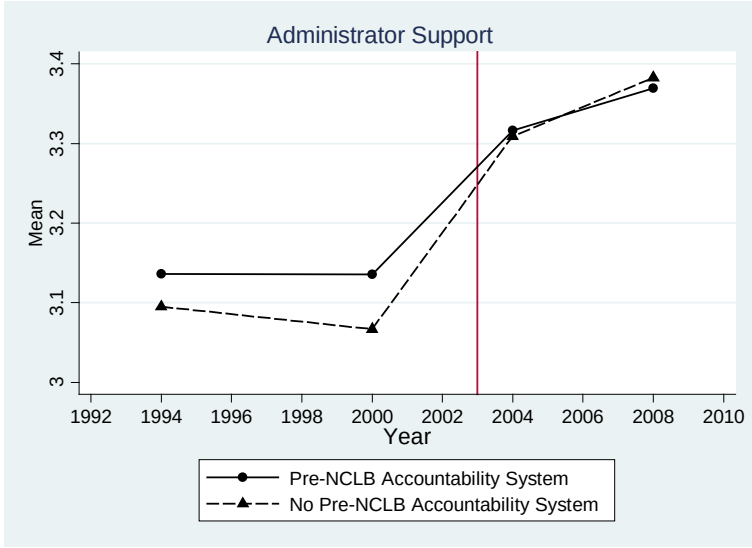
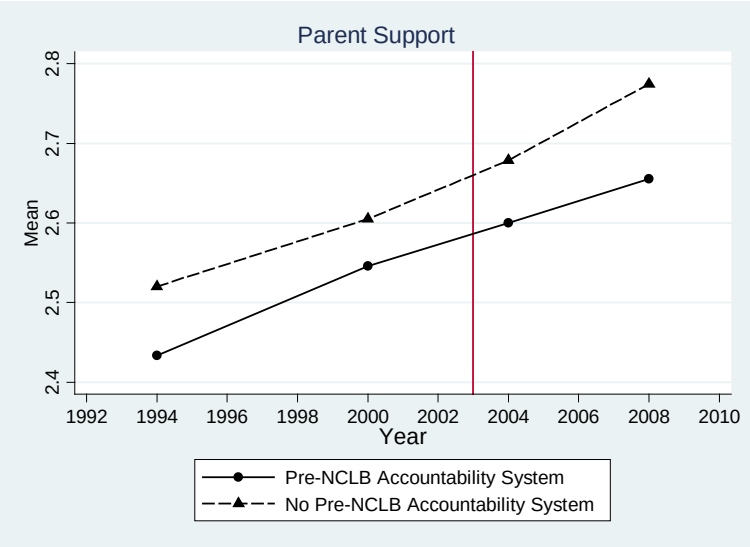


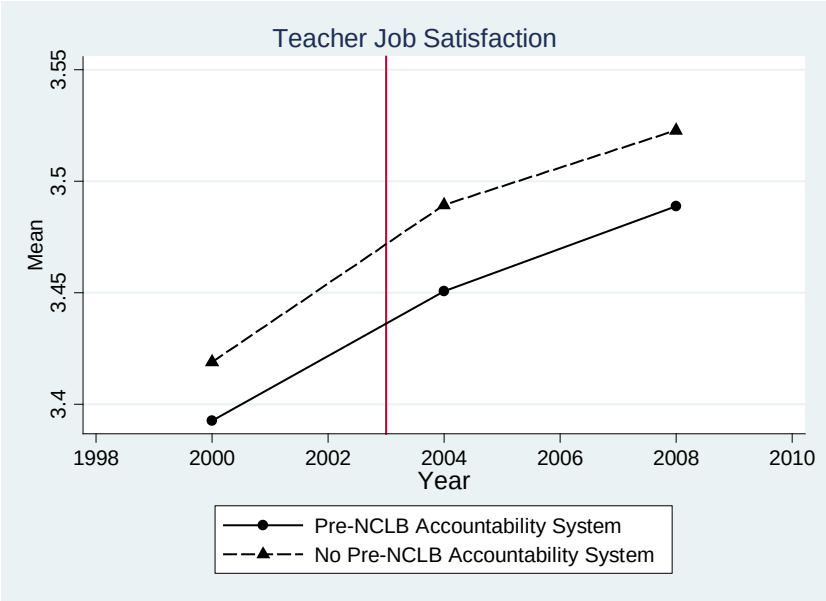
(c)



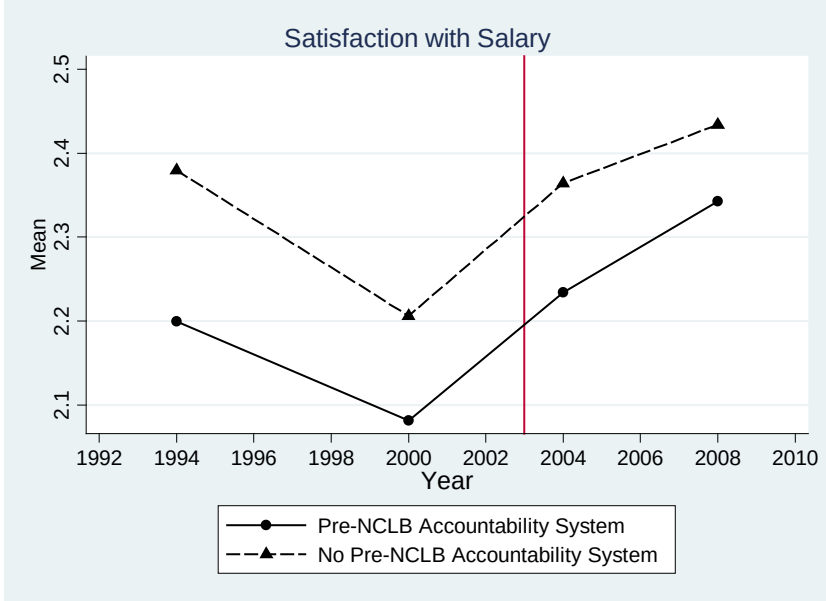
Notes: Means calculated using survey sampling weights.

FIGURE 3: Teacher Satisfaction Before and After NCLB

(a)

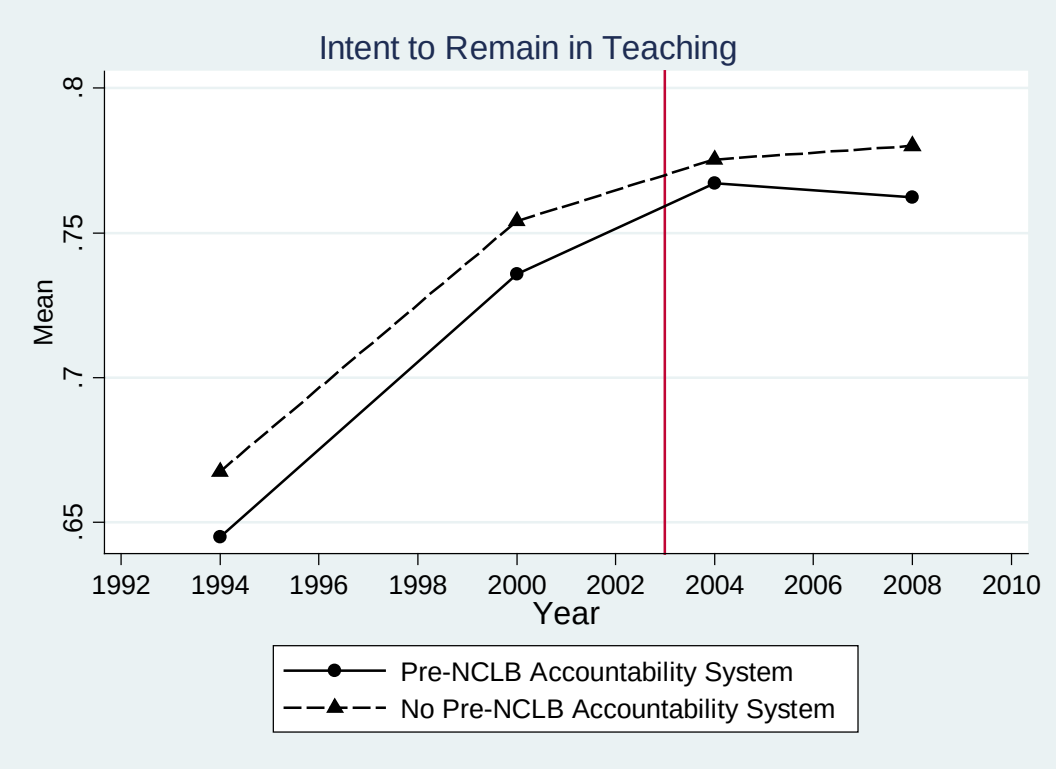


(b)



Notes: Means calculated using survey sampling weights. Job satisfaction was not included on the 1994 SASS survey.

FIGURE 4: NCLB and Teacher Job Commitment



Notes: Means calculated using survey sampling weights.

TABLE 1: Descriptive Statistics

Variable	N	Mean	SD	Min	Max
Total weekly hours worked	139630	50.53	10.48	1	105
Teacher classroom control (factor)	139630	-0.12	1	-4.2	1.3
Cooperative effort among staff	139630	3.14	0.82	1	4
Administrator support	139630	3.25	0.88	1	4
Parent support	139630	2.6	0.92	1	4
Teacher job satisfaction	113420	3.46	0.73	1	4
Satisfaction with salary	139630	2.25	1	1	4
Intent to remain in teaching	139630	0.74	0.44	0	1
Teacher Characteristics					
Female	139630	0.74	0.44	0	1
Black	139630	0.08	0.27	0	1
Hispanic	139630	0.06	0.24	0	1
Years experience	139630	13.69	9.86	0	64
Age	139630	43.23	10.8	20	94
Holds Master's degree	139630	0.47	0.5	0	1
Union member	139630	0.78	0.41	0	1
School Characteristics					
Percent black students	139630	16.67	24.43	0	100
Percent Hispanic students	139630	15.39	24.17	0	100
Percent free/reduced lunch	139630	39.76	28.94	0	100
School size (in 100s)	139630	8.15	6.05	0.01	53.8
Regular (non-special) school	139630	0.93	0.26	0	1
Urban	139630	0.27	0.44	0	1
Rural	139630	0.27	0.44	0	1
Middle school	139630	0.19	0.39	0	1
High school	139630	0.29	0.45	0	1

Note. Sampling weights used. Sample sizes are approximately 36,360 in 1994; 34,380 in 2000; 36,600 in 2004; and 32,280 in 2008. Sample sizes rounded to nearest ten per NCES non-disclosure rules.

TABLE 2: Changes in Demand and Control Measures After NCLB by Prior Accountability Status

Dependent Variable:	Total Weekly Hours Worked			Teacher Feelings of Classroom Control		
	(1)	(2)	(3)	(4)	(5)	(6)
NCLB	5.168**	2.974**	1.963**	0.359**	0.717**	0.571**
	(0.142)	(0.347)	(0.230)	(0.021)	(0.039)	(0.030)
No Prior State Accountability x NCLB	-0.524		-0.519	0.057+		-0.000
	(0.375)		(0.416)	(0.029)		(0.059)
Accountability Strength Index in 2000 x NCLB		0.091			-0.024**	
		(0.082)			(0.008)	
Linear time trend		-0.007	0.725**		-0.041**	-0.010**
		(0.037)	(0.038)		(0.004)	(0.003)
No Prior State Accountability x Time trend			-0.057			0.009+
			(0.048)			(0.005)
Years Under NCLB			-0.754**			-0.032**
			(0.057)			(0.004)
No Prior State Accountability x Years NCLB			0.124+			-0.006
			(0.072)			(0.008)
Constant	47.331**	48.191**	41.209**	-0.176**	0.251**	-0.130*
	(0.379)	(0.525)	(0.515)	(0.038)	(0.064)	(0.050)
Observations	139630	102680	139630	139630	102680	139630
Adjusted R^2	0.099	0.069	0.117	0.080	0.096	0.084
CITS Estimated Effect of NCLB by 2008			0.230			-0.035
			(0.439)			(0.047)

Note. Models estimated via OLS. Standard errors clustered at the state level. + p<0.10, * p<0.05, ** p<0.01. All models include teacher and school control variables and state fixed effects. Sample sizes rounded to nearest ten per NCES non-disclosure rules.

TABLE 3: Changes in Perceptions of Job Support After NCLB by Prior Accountability Status

Dependent Variable:	Cooperative Effort among Staff			Administrator Support			Parent Support		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
NCLB	0.155**	0.106**	0.152**	0.217**	0.153**	0.168**	0.193**	0.022	0.031
	(0.012)	(0.022)	(0.017)	(0.015)	(0.036)	(0.033)	(0.011)	(0.023)	(0.023)
No Prior State Accountability x NCLB	0.003		-0.043+	0.039+		0.058	-0.000		0.001
	(0.019)		(0.022)	-0.023		(0.047)	(0.023)		(0.035)
Accountability Strength Index in 2000 x NCLB		0.006			-0.001			0.002	
		(0.008)			(0.009)			(0.008)	
Linear time trend		0.006**	-0.005+		0.014**	-0.002		0.021**	0.018**
		(0.002)	(0.003)		(0.005)	(0.003)		(0.002)	(0.002)
No Prior State Accountability x Time trend			0.009*			-0.005			-0.006
			(0.004)			(0.004)			(0.005)
Years Under NCLB			0.011*			0.016*			0.002
			(0.004)			(0.007)			(0.002)
No Prior State Accountability x Years NCLB			-0.008			0.007			0.012
			(0.006)			(0.009)			(0.009)
Constant	3.214**	3.129**	3.236**	3.465**	3.317**	3.497**	2.747**	2.554**	2.611**
	(0.033)	(0.040)	(0.038)	(0.025)	(0.054)	(0.023)	(0.038)	(0.043)	(0.047)
Observations	139630	102680	139630	139630	102680	139630	139630	102680	139630
Adjusted R^2	0.045	0.044	0.045	0.038	0.037	0.038	0.097	0.098	0.099
CITS Estimated Effect of NCLB by 2008			-0.090*			0.099+			0.071
			(0.043)			(0.051)			(0.070)

Note. Models estimated via OLS. Standard errors clustered at the state level. + p<0.10, * p<0.05, ** p<0.01. All models include teacher and school control variables and state fixed effects. Sample sizes rounded to nearest ten per NCES non-disclosure rules.

TABLE 4: Changes in Teacher Satisfaction and Job Commitment After NCLB by Prior Accountability Status

Dependent Variable:	Teacher Job Satisfaction			Satisfaction with Salary			Intent to Remain in Teaching		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
NCLB	0.108**	0.028	0.062**	0.155**	0.074	0.144**	0.075**	0.023*	0.003
	(0.009)	(0.020)	(0.015)	(0.027)	(0.047)	(0.044)	(0.007)	(0.010)	(0.008)
No Prior State Accountability x NCLB	-0.012		0.006	-0.040		0.061	-0.008		-0.011
	(0.011)		(0.025)	(0.056)		(0.062)	(0.009)		(0.015)
Accountability Strength Index in 2000 x NCLB		0.005			-0.002			0.003	
		(0.004)			(0.013)			(0.004)	
Linear time trend		0.010**			0.023**	-0.021**		0.000	0.016**
		(0.003)			(0.005)	(0.006)		(0.001)	(0.002)
No Prior State Accountability x Time trend						-0.011			-0.000
						(0.009)			(0.002)
Years Under NCLB			0.012**			0.047**			-0.016**
			(0.003)			(0.009)			(0.003)
No Prior State Accountability x Years NCLB			-0.004			-0.002			0.001
			(0.005)			(0.013)			(0.004)
Constant	3.571**	3.461**	3.576**	2.292**	1.987**	2.504**	0.440**	0.468**	0.304**
	(0.024)	(0.033)	(0.025)	(0.056)	(0.063)	(0.073)	(0.024)	(0.032)	(0.022)
Observations	103260	102680	103260	139630	102680	139630	139630	102680	139630
Adjusted R^2	0.039	0.039	0.039	0.102	0.100	0.106	0.045	0.047	0.050
CITS Estimated Effect of NCLB by 2008			-0.02			0.049			-0.003
			(0.013)			(0.095)			(0.023)

Note. Models estimated via OLS. Standard errors clustered at the state level. + p<0.10, * p<0.05, ** p<0.01. All models include teacher and school control variables and state fixed effects. Sample sizes rounded to nearest ten per NCES non-disclosure rules. Model 3 omits the linear time trend and the interaction between the time trend and no prior state accountability due to missing data on the dependent variable in 1994.

TABLE 5: Changes After NCLB in High-Poverty and Low-Poverty Schools

	Panel A: Demand and Control Measures			
Dependent Variable:	Total Weekly Hours Worked		Teacher Feelings of Classroom Control	
Sample:	High Poverty	Low Poverty	High Poverty	Low Poverty
	(1)	(2)	(3)	(4)
NCLB	5.636**	4.671**	0.293**	0.467**
	(0.328)	(0.228)	(0.029)	(0.020)
No Prior State Accountability x NCLB	0.017	-0.395	0.032	-0.014
	(0.781)	(0.535)	(0.045)	(0.040)
p-value from Chow test for equality of interaction term	0.51		0.36	

	Panel B: Job Support Measures					
Dependent Variable:	Cooperative Effort among Staff		Administrator Support		Parent Support	
Sample:	High Poverty	Low Poverty	High Poverty	Low Poverty	High Poverty	Low Poverty
	(5)	(6)	(7)	(8)	(9)	(10)
NCLB	0.173**	0.174**	0.217**	0.270**	0.124**	0.222**
	(0.016)	(0.024)	(0.031)	(0.023)	(0.034)	(0.024)
No Prior State Accountability x NCLB	-0.034	-0.014	0.001	-0.008	-0.009	0.017
	(0.038)	(0.029)	(0.047)	(0.038)	(0.043)	(0.042)
p-value from Chow test for equality of interaction term	0.67		0.87		0.64	

	Panel C: Satisfaction and Commitment Measures					
Dependent Variable:	Teacher Job Satisfaction		Satisfaction with Salary		Intent to Remain in Teaching	
Sample:	High Poverty	Low Poverty	High Poverty	Low Poverty	High Poverty	Low Poverty
	(11)	(12)	(13)	(14)	(15)	(16)
NCLB	0.084**	0.142**	0.195**	0.166**	0.077**	0.091**
	(0.023)	(0.020)	(0.038)	(0.043)	(0.010)	(0.009)
No Prior State Accountability x NCLB	-0.010	-0.033	-0.038	-0.082	-0.018	-0.033*
	(0.042)	(0.027)	(0.066)	(0.088)	(0.019)	(0.015)
p-value from Chow test for equality of interaction term	0.70		0.56		0.56	

Note. Models estimated via OLS. Standard errors clustered at the state level. + p<0.10, * p<0.05, ** p<0.01. All models include teacher and school control variables and state fixed effects. High-poverty and low-poverty schools defined as those schools in the fourth and first quartile of percent free and reduced price lunch students, respectively. Sample size for high-poverty schools is N = 35,180 and for low-poverty schools is N = 34,570, except in the teacher satisfaction models in columns 11 and 12 (N = 26,200 and N = 25,500, respectively). Sample sizes rounded to nearest ten per NCES non-disclosure rules.