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CHILDREN LEFT BEHIND:
THE EFFECTS OF STATEWIDE JOB LOSS ON STUDENT ACHIEVEMENT

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ABSTRACT

Given the magnitude of the recent recession, and the high-stakes testing the U.S. has implemented under the No Child Left Behind Act (NCLB), it is important to understand the effects of large-scale job losses on student achievement. We examine the effects of state-level job losses on fourth- and eighth-grade test scores, using federal Mass Layoff Statistics and 1996-2009 National Assessment of Educational Progress data. Results indicate that job losses decrease scores. Effects are larger for eighth than fourth graders and for math than reading assessments, and are robust to specification checks. Job losses to 1% of a state's working-age population lead to a .076 standard deviation decrease in the state's eighth-grade math scores. This result is an order of magnitude larger than those found in previous studies that have compared students whose parents lose employment to otherwise similar students, suggesting that downturns affect all students, not just students who experience parental job loss. Our findings have important implications for accountability schemes: we calculate that a state experiencing one-year job losses to 2% of its workers (a magnitude observed in seven states) likely sees a 16% increase in the share of its schools failing to make Adequate Yearly Progress under NCLB.

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Introduction

Increased emphasis on student test scores over the last decade has come during a time of significant economic turmoil. Since the No Child Left Behind Act (NCLB) became law in 2002, the United States has experienced two recessions, including the largest recession since the Great Depression, and high rates of job displacement as traditionally U.S.-based industries have moved overseas. Given evidence on the effects of both parental job loss and local-area job loss on youth academic success (Ananat, Gassman-Pines, & Gibson-Davis, forthcoming; Stevens & Schaller, 2011), it is important to understand how economic downturns may affect aggregate student test scores. Such an understanding is vital to clarifying what affects student test performance and, therefore, to forming appropriate school accountability policies.

Studies that attempt to examine the effects of economic losses on academic achievement face two major challenges to validity. First, in most instances, there are likely to be unmeasured or unobserved characteristics that affect both a given family's financial status and the family's well-being. For example, in families facing health or substance-use problems, parents may be less likely to maintain employment and children may also have less school success than in other families. While an instrumental variables approach can be used to address the endogeneity of parental job loss, such an identification strategy still faces a second challenge to validity. That is, it may miss effects of local economic crises on children that come through channels other than parental unemployment. Such channels could include increased stress among parents and teachers, declines in the tax base that reduce school resources, or spillover effects in the classroom from peers whose parents lose jobs. Using children whose parents have not lost employment as a control group for those whose parents are displaced, thereby assuming that these other channels are unimportant, may understate the effects of job loss on both groups of children. In fact, we find in this paper that research addressing the first but not the second challenge understates the aggregate achievement effects of economic downturns by as much as an order of magnitude.

In this paper, we address these two empirical challenges by examining the impact of state-level job losses caused by business closings and layoffs on states' student achievement test scores. Using plausibly exogenous variation in business closings permits us to identify the causal effect of an economic downturn on all students and on vulnerable subgroups of students in particular. Our findings can provide insight to policy makers and researchers seeking solutions to cope with the effects of the recent economic crisis and to those seeking to understand and evaluate student achievement.

Background

A broad consensus now exists that business layoffs and closings can be viewed as exogenous shocks to workers and communities when conditioning on prior characteristics (Jacobson, LaLonde, & Sullivan, 1993; Stevens, 1997) and that effects on workers and communities subsequent to layoffs and closings can therefore be interpreted as causal effects of job loss. The explanation behind this consensus is as follows. When an individual is fired or quits, it may reflect negative unobservable characteristics of that individual, or of the individual's community. In contrast, however, closings and downsizings occur because of larger macroeconomic and international trade forces. Although firms might close or relocate due to declining worker productivity in an area (which, again, might reflect unobservable community characteristics), empirically it has been repeatedly found that once fixed effects for the area are included, firm decisions are not predictable using changes in community characteristics.

One strand of literature has used this empirical strategy to examine the effects of an individual-level job loss (whether a household head loses a job because of a closing, regardless of how many others in the community are affected) on family-level outcomes such as income, parenting practices, or children's test scores. Another strand has concentrated on the effects of community-level job losses (the total number of jobs lost in a community) on community-wide outcomes such as levels of employment or welfare receipt. However, few of these have looked at family and child-level outcomes. We complement previous work in these two literatures by using the second empirical strategy but focusing on children's achievement as the outcome of interest. This approach allows us both to identify causal effects of job loss and to identify effects on children that do not come solely through their parents' employment status. Below, we discuss the previous individual-level and community-level literatures on the effects of job loss and use them to generate hypotheses on why community-wide job losses might affect aggregate levels of child academic performance.

Effects of individual-level job loss

Parental job loss can affect child development in two ways. First, parental job loss can lead to changes in families' material resources. Second, parental job loss can lead to changes in families' psychological well-being and functioning.

Job loss leads to lower earnings both in the short term, while parents look for new employment, and over the longer term, because people who lose their jobs due to industry downturns often must start over in new firms and new industries (Jacobson et al., 1993; Stevens, 1997). Family income affects children's outcomes. Studies using rigorous causal methods have found that changes in parental income and material resources lead to changes in children's well-being and, in particular, their achievement test scores (e.g., Dahl & Lochner, 2009; Morris & Gennetian, 2003).

Job loss can also affect children's outcomes by changing parents' psychological well-being and thereby altering family functioning. A meta-analysis of over 100 individual studies show that individuals who have lost employment have worse psychological health than those who have not lost employment (McKee-Ryan, Song, Wanberg, & Kinicki, 2005). Longitudinal studies that observe families before and after a parental job loss have found that job loss leads to decreased family functioning and impaired parent-child interactions (Conger & Elder, 1994; Jones, 1988; Kalil & Wightman, 2010; McLoyd, Jayaratne, Ceballo, & Borquez, 1994). Parental mental health problems and impaired parent-child interactions have both been strongly linked to worse child adjustment and lower levels of school achievement (Elder, Eccles, Ardelt, & Lord, 1995; McLoyd, 1998). On the other hand, it is possible that job loss could lead parents to have more time available to spend with their children, which could have beneficial effects on child school achievement. However, research has shown that, compared to employed parents, unemployed parents do not spend more time with their children, either in general (Edwards, 2008; Kalil & Ziol-Guest, 2011) or specifically on education-related activities that could lead to greater academic achievement (Levine, forthcoming).

Research has shown that changes in individuals' economic and psychological well-being that result from job loss lead to negative effects on children's school-related outcomes. Involuntary parental job loss has been shown to increase grade repetition in cross-sectional studies (Kalil & Ziol-Guest, 2008) and longitudinal studies using child fixed effects (Kalil & DeLeire, 2002; Stevens & Schaller, 2011) and GPAs (Rege, Telle, & Votruba, 2011). A study using adolescents' reports of their parents' job loss showed that job loss was associated with a decrease in test scores (Kalil & DeLeire, 2002). Longitudinal research using administrative records to identify job loss due to plant closings found that parental job loss was associated with declines in adolescent GPA (Rege et al., 2011). Another study using administrative records to identify job losses found, in both OLS regressions and instrumental variables specifications, that parental job losses increase school-related behavior problems (Hill, Morris, Castells, & Walker, 2011). Finally, involuntary parental job loss also appears to have longer-lasting effects on children, such as lower earnings, greater receipt of public assistance, and lower college attendance in adulthood (Coelli, 2010; Oreopoulos, Page, & Stevens, 2008).

Effects of community-level job losses

In addition to evidence that job loss results in detrimental effects on those individuals who lose jobs and their children, there is also evidence that firm layoffs and shutdowns can affect those who live in the impacted community, whether they lose employment or not. Within the economics discipline, several researchers have measured the causal effects of job loss on community-level employment, earnings, and public-assistance receipt. A set of studies by Black, McKinnish, and Sanders (2003; 2005a; 2005b) examining booms and busts in the steel and coal industries in the 1970s and 1980s found that economic downturns led to lower employment not only within but also outside of the initially affected industries. Additionally, those who remain employed in an area that has experienced large job losses also experience decreased earnings (Blanchflower & Oswald, 1994).

In addition to changes in employment and earnings, those who live in an area that has experienced job losses may also experience increased stress and decreased well-being, even when they do not personally experience job loss. Longitudinal research with individual fixed effects has shown that increases in the regional unemployment rate decreases employed individuals' reported life satisfaction (Clark, Knabe, & Rätzel, 2010; Luechinger, Meier, & Stutzer, 2010). Similarly, longitudinal cross-national studies have shown that increases in countries' unemployment rates were also associated with decreases in their employed citizens' life satisfaction (Clark et al., 2010; Luechinger et al., 2010; Ochsen, 2008; Ochsen & Welsch, 2006). Time-series analyses have shown that increases in the local unemployment rate were associated with increases in psychological distress for those who were employed (Dooley & Catalano, 1984; Dooley, Catalano, & Rook, 1988). Using two waves of data, Fenwick and Tausig (1994) also found that increases in the local unemployment rate were associated with increases in individuals' psychological distress.

These individual changes resulting from community-level job losses could have profound effects on the school setting and on students' experience in schools. For example, given the findings reviewed above, teachers who remain employed may still experience increases in stress. Higher levels of teacher stress are related to lower levels of student academic achievement, mainly through changes in teacher-student classroom interactions (Wiley, 2000). Relatedly, if students are in classrooms with peers whose parents have lost jobs, the interactions among students within the classroom may be altered, potentially affecting all students' levels of achievement. Less positive classroom interactions are related to lower growth in children's academic achievement over time (Hamre & Pianta, 2001; Pianta, Belsky, Vandergrift, Houts, & Morrison, 2008).

Besides changes to individual income and health resulting from community-level job losses, such job losses may also lead to structural community-level changes.[1] When a community

[1] Significant outmigration is one potential structural change at the community level that would plausibly both directly affect test scores (depending on the average test scores of the students who leave the community) and affect

has an economic downturn, that community experiences structural changes that will affect all children regardless of whether their families face unemployment. An economic downturn can reduce the viability of the local economy, causing decreased property values and tax revenues (Zippay, 1991). Decreased property values and tax revenues, in turn, may lower resources and quality of public schools. Although associations between school funding and student achievement are inconsistent (Hanushek, 2003; Ludwig & Bassi, 1999), changes in school funding may affect other aspects of school quality, including teacher-pupil ratios and teachers' education and experience. These dimensions of school quality have been associated with student achievement (Croninger, Rice, Rathbun, & Nishio, 2007; Rockoff, 2004). Although fewer opportunities in the local private labor market plausibly increase teacher retention, which has been linked with higher student achievement (Rockoff, 2004), previous work finds no net effect of local downturns on teacher turnover (Ananat et al., forthcoming).

The evidence consistently indicates that those who maintain their jobs in the wake of local job losses experience lower earnings and worse psychological health, effects similar to, although less intense than, those experienced by individuals who lose employment. Evidence also strongly suggests that lower earnings and worse psychological health among parents lead to lower academic achievement among children. Moreover, community-level structural changes stemming from local firm layoffs and shutdowns, which may also negatively affect student achievement, are by definition the same for those who do and do not lose employment. We hypothesize, therefore, that parents who maintain employment in the wake of local job losses,

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the community through vacant housing, etc. However, outmigration in response to industry downsizing is believed to take an entire generation to complete (Blanchard & Katz, 1992), which makes it unlikely to affect test scores either directly or indirectly within a year of a job loss event. Ananat et al. (forthcoming), looking at North Carolina, find no migration response to job loss within a year either between counties or out of state.

like parents who lose employment, see their children's academic performance decline, albeit by a smaller amount.

Only one previous study of which we are aware has examined the relationship between community-level job losses and aggregate academic outcomes for children. That study examined exogenous job losses in North Carolina counties and found that local job losses decreased eighth grade achievement test scores, but had no effect on the math and reading scores of fourth grade students (Ananat et al., forthcoming). The present study adds to this literature by using the U.S. states as the units of analysis and investigating whether state-level job losses induced by firm closings and layoffs lead to decreases in test scores among fourth- and eighth-graders.

Statewide job losses likely affect test scores both through lower achievement among children whose parents lose jobs and through additional state-level mechanisms that affect all children. We do not, therefore, expect that the relationship between statewide job losses and state average test scores will be simply the relationship between individual-level parental job loss and measures of children‘s academic achievement identified in earlier papers (Kalil & DeLeire, 2002; Rege et al., 2011), scaled by the size of the total job loss in relation to the size of the community. Rather, we expect that our estimate of the total statewide effect will be larger than such a scaled estimate, for two reasons. First, even in a large downturn, most children do not experience parental job loss. Small effects on the majority of children whose parents do not lose employment may, in aggregate, contribute as much or more to the total relationship between statewide job loss and test scores as does the large effect on the minority of children whose parents lose employment. Second, earlier papers have used children who do not experience parental job loss as a control for those who do. If, instead, children who are unaffected by parental job loss experience academic achievement effects in the same direction as those whose parents are affected by job loss, standard "treatment minus control" effect estimates will tend to understate the true effect of parental job loss on child test scores. Based on the literature reviewed above, we believe that effects of statewide job losses will be in the same direction for children whose parents lose jobs and for children whose parents do not, although the magnitude of the effects likely differs. Thus, we hypothesize that our estimates of aggregate effects of state-level job loss on test scores will be considerably larger than would be implied by extrapolations from previous research.

Data

We use two data main sources, one for test score information and one for job loss information. Student academic performance data are from the National Center for Education Statistics' National Assessment of Educational Progress (NAEP), which has administered standardized tests to a nationally representative sample of students in roughly two year intervals since 1964 (National Center for Education Statistics, 2010). We focus our analysis on mathematics and reading assessments administered to fourth and eighth graders from 1996 to 2009, which NAEP reports as state-level average scores and state-level percentile distribution scores for all fifty states and the District of Columbia when available.[2] Scores are reported for students overall as well as for subgroups of students by gender and race in the fourth grade and by gender, race, and student-reported parent educational attainment in the eighth grade. Math assessments were administered in 1996, 2000, 2003, 2005, 2007 and 2009. Reading assessments were administered in 1998, 2002, 2003, 2005, 2007 and 2009. The tests are always administered in the first quarter of the year, between January and March.

[2] NAEP also conducts assessments of twelfth-grade students' academic performance, but those data are only available at the state level beginning in 2009, the last year of our panel.

Table 1 presents sample descriptive statistics of demographics of students who took the NAEP assessments. The sample is fairly evenly split between male and female students. White students make up the majority of students on average, but there are state-years in which either black students or Hispanic students are the majority. The national trend over time shows a growth in the share of Hispanic students from seven percent to between 14 and 16 percent and a decline in the share of white students of about 10 percentage points. This pattern is consistent among both fourth and eighth graders. The national share of black students appears to remain relatively stable at about 15 percent. These demographics are consistent with the demographics of children in the United States. However, the distribution of reported parent education in our sample is skewed towards higher educational attainment when compared to national estimates (on average, over 45 percent of students in the sample report that at least one of their parents has a college degree, while in the 2000 Census only 28 percent of households with comparably-aged children reported that at least one parent has a college degree) (calculated from IPUMS 2000 5% sample (Ruggles et al., 2004)). This difference may reflect a tendency of students to overstate their parents' levels of education. Although these student reports of parental education appear inflated, we believe that, on average, they probably accurately reflect the ordinal ranking of parent education (i.e. children who misreport their parents' education do so by shifting their parents' education reports upward). Thus, we feel comfortable using the parental education subgroups as ranked categories, but caution against external generalizations using the parent-education subgroup results.

Mean assessment scores and standard deviations for all students and for subgroups of students separately by grade level and test subject are presented in Table 2. The NAEP assessments are designed to have a possible score range of 0 to 500 for individual students. The first two columns in each subject-year grouping represent the mean and standard deviation of the state average assessment scores. The third column is the average across years of the national student-level standard deviation for a given assessment and year. Because the first two columns are descriptive statistics of a summary statistic, it is not surprising that the standard deviations for individual students (presented in the third column) are much larger than those for the state averages. Even so, there is substantial variation between states in average assessment scores. Large differences, in expected directions, also exist between the average assessment scores of different subgroups of students. White students score significantly higher than black and Hispanic students in both subjects and grade levels, and eighth graders whose parents have higher education levels have higher scores on average in both math and reading (fourth graders are not asked about parent education).

For the purposes of analysis, we standardized each state-level assessment score to have a mean of zero and standard deviation of one (using the individual student level, not the state, standard deviation), which allows for comparison of test scores across subjects, grades, and years. The sample is organized in state-year observations yielding a maximum of 306 observations for each grade and subject. Not all states administered examinations in all years, and some states did not report assessment scores for all student subgroups. Table A1 in the data appendix lists which states participated in the NAEP assessments for each year of our sample.

Job loss data are from the Bureau of Labor Statistics' (BLS) Mass Layoff Statistics, which report, for each state and the District of Columbia when available, the number of workers in a year who are affected by mass layoffs (defined as 50 or more workers) that last longer than thirty days (BLS does not collect data on closings and layoffs affecting fewer than 50 workers). Data are available from 1995 to 2009. For each year, the BLS reports two measures of workers affected by job loss. The first is the total number of initial claimants (TIC), which reflects the total number of workers who filed unemployment claims after a job loss or layoff of 50 or more workers. The second is the total number of separations, which is the number of workers who lost jobs because of a mass layoff. A mass layoff is defined by BLS as one in which 50 workers from the same firm have filed unemployment insurance claims in a 5-week period. Once BLS classifies that layoff event as a mass layoff, it then contacts the firm to gather information about the total number of workers who lost jobs in that layoff event (separations). Separations is our preferred measure since it should capture all workers who experience a mass layoff instead of just those workers who then also filed unemployment claims. However, the separations measure is likely to suffer from greater measurement error than TIC because it involves the extra step of contacting companies for further information on layoffs that are identified through initial unemployment claims. As discussed in the Methodology section, we combine these two measures in a two-stage least squares approach to reduce measurement error.

Table 3 presents summary statistics for separations and TIC. For the purposes of our analysis, we express both separations and TIC as a percentage of the working age population (age 25 – 64, measured for each state in the 2000 Census) over a one year time period. On average, 0.71 percent of workers are affected by separations and 0.66 percent of workers file unemployment claims. The variation in these two measures is roughly the same. Figure 1 plots yearly separations and TIC. The measures are highly correlated, with the percentage of workers affected by separations slightly higher than the percentage of workers who file for unemployment claims in every year except 2008 and 2009.

As demonstrated in Figure 2, there is substantial variability in job losses across states and years. Figure 2 presents the minimum and maximum percent of workers in each state affected by job separations over the 14 years. The maximum percentage of workers affected by job loss ranges from less than one half of one percent in Maryland in 2009 to nearly 3.5 percent affected in Alaska in 2009. There is also significant variation within states, as demonstrated by the difference between the minimum and maximum percent affected in each state. While the highest observed job loss did occur during the Great Recession (Alaska in 2009), many states experienced their largest losses in the 2002 recession (Colorado, Illinois), or even in years of relatively strong national economic growth, such as 1996 (Maine).

We focus on job loss rather than the state unemployment rate because the unemployment rate can be biased by changes in job-seeking behavior that are confounded with other changes in a community. For example, new entrants to the labor market after a job-training program begins can increase the unemployment rate, while bad economic news can discourage workers from looking for work and decrease the unemployment rate. By contrast, firm-level closings and layoffs can more plausibly be viewed as exogenous "shocks" that are driven by the global economy (we also test the exogeneity of these events).

Methodology

In order to explain the effects of job losses on test scores, we estimate the equation:

$$Score_{st} = \beta JobLoss_{st-1} + \delta_t + \delta_s + \varepsilon \qquad (1)$$

In this specification, $Score_{st}$ represents the mean scaled test score for students in state *s* at time *t*. Separate equations are estimated for each of the four subject-grade combinations, as well as for race, gender and parental education subgroup scores. In alternative models, we estimate the equation using scaled percentile scores as dependent variables; these models indicate if the effect of job loss is consistent throughout the test score distribution. $JobLoss_{st-1}$ represents the percent of workers in a state affected by mass layoffs for the year-long period up to and including the quarter the tests were administered (this measure is discussed further below). We also include state fixed effects (δ_s) to account for the possibility that states that have higher job losses on average may also have lower test scores on average, and year fixed effects (δ_t) to account for nation-wide time-varying factors that may affect both job losses and test scores. In order to account for between-state variation in the total number of test takers, we weight each regression by the sample size of test takers in each state. We report heteroskedasticity-robust standard errors that are clustered at the state level.

Our measure of job loss, $JobLoss_{st}$, is a composite of two noisy measures of job loss, separations and TIC. Use of either of these measures on its own, therefore, is likely to lead to attenuation bias, while a composite based on the correlation between the two can increase the reliability of our estimate of job destruction (Angrist & Pischke, 2009). The noise in our measure of TIC comes from the fact that not all workers who lose jobs file for unemployment. The noise in our measure of separations is due to the fact that, when contacted by the government, employers may not accurately report the number of workers affected by a layoff. Each measure is composed partly of a "true" signal of underlying job destruction, *D*, and partly of an error term:

$$Separations_{st} = \gamma D_{st} + \varepsilon$$

$$TIC_{st} = \sigma D_{st} + u$$

Where $corr(\varepsilon,u)<1$

The correlation of the two measures, therefore, is:

$$Corr(Separations_{st}, TIC_{st}) = D_{st} + \upsilon,$$

Where $\upsilon < min(\varepsilon,u)$.

Specifically, we estimate a two-staged least squares specification where, in the first stage, we use TIC to predict separations, and then report the coefficient on $\widehat{Separations}_{st-1}$ in an equation predicting $Score_{st}$. Note that $\widehat{Separations}_{st-1}$ is simply $\gamma\widehat{Corr}\ (Separations_{st}, TIC_{st})$. Using the estimated correlation of the two measures as our measure of job loss provides a more precise estimate of job destruction than does either measure on its own (Angrist & Pischke, 2009). Using two-stage least squares rather than simply using the correlation as the right-hand side variable in an OLS regression means that our standard errors are automatically adjusted to take into account that $\widehat{Separations}_{st-1}$ is a statistical artifact rather than a direct measurement.

Results

Main estimates

Table 4 presents the results of estimating the impact of job losses on average test scores. In this table each cell represents the coefficient and standard error on separations derived from estimating equation (1) for a given subject-grade-subgroup combination. For example, the first cell in the third column is the coefficient derived from estimating the average impact of separations on all students in the sample who took an eighth grade math assessment. The interpretation of this estimate is that job losses that affect one percent of a state's working-age population decrease that state's average eighth-grade math score by 0.076 standard deviations, or by almost three points on average.

Results in Table 4 suggest two main points. First, state-level job losses do not appear to significantly affect fourth grade test scores. In contrast, they significantly and negatively affect eighth grade math scores. Second, math scores are more sensitive to job losses than are reading scores. In both the fourth-grade and eighth-grade samples, the point estimates on math assessments are larger in magnitude than those for reading (although this difference is not statistically significant at conventional levels in the fourth grade). These results are consistent with results from similar analysis using county-level job loss and academic performance data from North Carolina (Ananat et al., forthcoming), which also finds effects of job losses on eighth but not fourth grade test scores.

Subgroup estimates

Turning to the rest of Table 4, results from the estimation of equation (1) on scores from subgroups of students support the main conclusions drawn from the full sample results. We find that, consistently across subgroups, fourth-grade students are not affected by job losses. All estimated effects are negative but small (less than .05 standard deviations) and statistically insignificant. In addition, across all subgroups of eighth graders, performance in math appears to be more sensitive to job losses than performance in reading. For each subgroup, the effect of job losses on eighth-grade math scores is consistently more negative than the effect on that subgroup's reading scores, with coefficients ranging from -.025 to -.102. Two-thirds of the subgroup effects on math scores are statistically significant. By contrast, while all estimated effects on reading are negative, with coefficients ranging from -.002 to -.047, only one subgroup effect on reading scores is statistically significant (the score for those who report that their parents have less than a high school education).

When looking at math scores among subgroups of eighth graders, we find evidence of subgroup differences only in some cases. There is no evidence of gender differences in the effect of job losses on math scores: both male and female students experience just under a 0.08 standard deviation decline in math scores in response to job loss to 1% of a county's working age population. There is also no clear gradient in math test scores by reported parental education:

effects are of similar magnitude for those reporting that their parents have a high school diploma, some college, or a college diploma, with estimates of the decline in scores varying only slightly, from .061 to .072, although only the college graduate results are statistically significant. The effect for those who report that their parents have less than a high school diploma is smaller (.025 standard deviations). There is some evidence, however, for racial and ethnic differences in effects on math scores: the point estimate for the decline in math performance of black students is more than a tenth (.109) of a standard deviation, compared to about .065 standard deviations among both white and Hispanic students, although the difference in estimates is not statistically significant.

For reading scores, there is some evidence of differential effects by reported parental education and by race and ethnicity. Those who report that their parents have less than a high school education experience a significant .047 decline in reading scores in response to a job loss affecting 1% of workers in the state. Those who report that their parents are high school graduates experience a nonsignificant decline about half as large (.025), while point estimates of the decline for those who report that their parents have some college or a college degree are close to zero (.004 and .003). However, differences in effects for parental education subgroups are not statistically significant. Similarly, point estimates of the decline for blacks are larger (.042) than for Hispanics (.028), and are near zero for whites (.002); however, none of the reading results by race are significantly different from zero or from each other.

Percentile test scores

We have also estimated equation (1) replacing average state scores with percentile scores as the dependent variable. The percentile results for eighth graders are presented in Table 5. The results for fourth-grade students, similar to those for the average test scores outcome measure, do not exhibit statistical significance and are not presented here (available upon request). As in Table 4, each cell represents the coefficient and standard error on separations from a separate regression for each of the various subgroups and for both math and reading. These results follow the same pattern as the results when using average test scores as an outcome. Math scores are typically more responsive to job losses than are reading scores. Black students' test scores across the distribution are more responsive to job losses than are white or Hispanic students. Math scores for students whose parents have not completed high school are less responsive to job losses than are the scores of other students, while reading scores for this group are more responsive to job losses than are other students'.

Robustness checks

Our main results – that math scores are more sensitive to job losses than reading scores, and that eighth graders are more sensitive to job losses than fourth graders – are robust across subgroups of students and are also robust to percentile outcome measures. In this section we discuss six other robustness checks (estimates from all of these checks are available upon request).

First, we estimated the model 51 times excluding each state individually. While the state fixed effects we include in our model will absorb any persistent relationship between test scores and job loss in a particular state, these specifications test whether severe events in a particular state (such as Hurricane Katrina in Louisiana) that can cause above-average job losses and below-average test scores significantly affect our results. All results are similar when dropping each state, meaning that no single state is driving our results.

Second, we performed a similar exercise excluding each year. While the year fixed effects we include in our model will absorb the effects of any nationwide phenomenon that affected both job loss and test scores in a given year, these specifications further test whether severe events that may have affected both outcomes in only some parts of the country (such as 9/11 on the mid-Atlantic region), significantly affect our results. All results are similar when dropping each year, meaning that no one-time sub-national event is driving our results.

Third, we ran unweighted regressions. While the analysis on which our main results are based weighs each state-year observation by the number of test takers in that state and year (and, where appropriate, subgroup) this analysis treats all state-year observations equally. Whereas our main results can therefore be interpreted as reporting the effects in the typical state in which a student lives (the results most important to a national policymaker), these results can be interpreted as the effects on a state itself (a result important to state policymakers). Analysis conducted using unweighted observations obtains results that are substantially similar to those shown here.

Fourth, we conducted analysis using only subsets of states for which we were not missing data on racial subgroups. Because of geographical variation in the size of the population of black and Hispanic students, some states did not report subgroup scores for either or both black or Hispanic students in some years. In order to test whether the differential estimated responses to job losses experienced by black students compared to white or Hispanic students was driven by larger proportions of black students living in regions that are more sensitive to job loss, we estimated models using only the subsample of state-years for which there were no missing observations for blacks. The racial differences in sensitivity to job losses are robust to this specification change. We performed a similar exercise using observations on Hispanic students and obtained similar results.

Fifth, we conducted analysis using only a balanced panel of states for which we are never missing job losses or NAEP scores in years in which the tests are conducted. (Table A1 lists, for each state, the years in which it reported test scores, job losses, and both.) We did so in order to test whether the estimated responses to job losses are influenced by the inclusion of states that only selectively report job losses or test scores (whose participation decisions in BLS data collection and/or NAEP data collection are perhaps influenced by their economies or by their expected scores). Because we have a shallow panel of only six observations for each state-grade-test, this robustness check likely reduces measurement error as well (since state fixed effects are unlikely to be well estimated for states that are observed fewer than six times, meaning that such states will contribute significant noise to our estimates). In fact, while the number of students we observe is reduced by 40% under the restriction that job losses are never missing, the estimated effect of a 1% job loss on eighth-grade math scores increases by 50% to -0.114 standard deviations, and the t-statistic increases as well to 3.7. Similarly, while the number of students we observe is reduced by 29% under the restriction that NAEP scores are never missing, the estimated effect of a 1% job loss on eighth-grade math scores increases by 26% to -.096 standard deviations, and the t-statistic is stable at 2.8. These results suggest that our estimates are not only robust to but actually strengthened by restricting to a balanced panel.

Finally, we examined the effects of job loss on test scores using only the subset of state-years in which the state started the year with a high (above median) unemployment rate. Given the mechanisms we propose through which we believe job losses affect child academic achievement, we hypothesize that job losses should matter more in times and places when the local economy is already under stress. We believe job losses will have stronger effects on stress, on family and community functioning, and subsequently on test scores, when a high pre-existing unemployment rate makes it more difficult to find a new job after experiencing job displacement. That is in fact what we find: in areas with high current unemployment, the estimated effect of a 1% job loss on eighth-grade math scores increases by 28% to -.097 standard deviations, and precision increases as well.

Falsification checks

We also conducted falsification checks in which we estimated equation (1) using future job losses instead of lagged job losses for eighth grade students. Significant estimates from these regressions would cast doubt on our identifying assumption that job losses, conditional on state and year fixed effects, can be viewed as exogenous shocks to states. Such results would instead suggest that states that experience above-average job losses in a given year already had declining test scores. However, the results of the falsification checks, which are presented in Table 6, are generally small and statistically insignificant. Only two of the twenty coefficients are marginally significant at the 10% level, and of these one is in the unexpected (positive) direction. One of the twenty results presented is significant at the 5% level, and it, too, is in the unexpected (positive) direction. These estimates lend support to the assumption that changes in state test scores do not occur until after job losses occur, and hence the relationship between job losses and test scores can be interpreted causally.

Discussion

Our results show that statewide job losses affect the achievement test scores of children, particularly those in eighth grade. We find particularly strong impacts on eighth grade math scores. Impacts on eighth grade math scores were similar in magnitude across important student subgroups and were found across the test score distribution.

On average, we find that job losses to one percent of a state's working-age population lead to decreases in states' average eighth-grade math test scores of .076 standard deviations. This effect on child school achievement is similar in magnitude to the impacts of programs that provided low-income parents with generous earnings supplements (Morris, Gennetian, & Duncan, 2005). Moreover, many curricular interventions, which are *designed* to impact test scores, when rigorously evaluated have effect sizes no larger than .10 standard deviations (e.g. Malloy's (1988) evaluation of Indiana's Prime Time program; Rouse & Krueger's (2004) evaluation of the Fast ForWord program). Given that our outcome measure is states' average test scores and that individual students are likely to vary considerably in their exposure to their state's total job losses, this effect size is considerable. States with large job losses (we observe maximum losses of 3.4%) are predicted to experience average test score declines of over a 25% of a standard deviation, or nearly 10 points.

Also, given the accountability standards enacted in NCLB legislation, even small changes in average test scores could have large implications, if they change schools' proficiency levels. In the 2009-10 school year, 38% of schools failed to make Adequate Yearly Progress (AYP) as mandated under NCLB (Center on Education Policy, 2011). Under conservative assumptions, we estimate that a state that experienced a downturn leading to job losses to 2% of its workers (a magnitude that we observe in seven states) would have had only 32% of its schools fail to achieve AYP in the absence of a downturn (a 16% decline).[3] Taking into account downturns as an extenuating factor in test performance could improve the accuracy, fairness, and (given the expensive and sometimes disruptive interventions launched when a school fails to achieve AYP) cost-effectiveness of accountability policy.

[3] This calculation assumes: that school-level test score standard deviations are closer to student than to state standard deviations (30 points, compared to 36 for students and 9 for states, a conservative assumption); and that school averages are normally distributed.

Policymakers and researchers alike have so far paid little attention to the potential effects of job losses on aggregate test scores, although they do frequently acknowledge the struggles of children facing parental job loss. One likely explanation for this oversight is that observers assume that the aggregate impacts of job loss are simply the difference in outcomes between children whose parents do and do not lose jobs (e.g., those found by Hill et al., 2011; Kalil & DeLeire, 2002; Rege et al., 2011) scaled by the share of workers who lose jobs. Since these studies find that students who face parental job loss experience outcome declines of .06 to .17 standard deviations relative to students who do not face parental job loss, observers who extrapolate from these studies to predict population-level effects of a 1% job loss would estimate effect sizes of .0006 to .0017 standard deviations, and would erroneously conclude that aggregate effects are negligible.

Our estimate of .076 standard deviations is an order of magnitude larger. We argue that this difference is due to the fact that our methodology captures negative effects of job loss on workers and families who maintain employment but are affected by their friends' and neighbors' job loss and the resulting changes to their communities. If we assume that these other children are affected by statewide job loss, albeit less severely than those who experience parental unemployment, it becomes straightforward to reconcile our study with the findings of earlier studies that contrast the two groups of children, as illustrated in Table 7. For example, suppose that children whose parents do not lose employment, but who are indirectly affected either at home or at school, experience test score declines that are one-third the magnitude of the decline experienced by students whose parents lose employment. In that case, a .224 standard deviation decrease among students who parents lose jobs would imply a .075 standard deviation decrease among other students, and the combination of these effects would produce a .076 standard deviation decrease in the state. The combination would also produce a .15 standard deviation decrease in the test scores of children experiencing parental job loss *relative* to other children, exactly the estimate that Kalil and DeLeire (2002) report for this difference (see row 5 of Table 7). Note that extrapolating from the Kalil and DeLeire estimate by assuming that children whose parents do not lose employment experience zero declines, however, would miss 98% of the total impact.

Comparing our estimates to those in two other studies that use the same approach as Kalil and DeLeire (2002), by Hill et al.(2011)[4] and Rege et al. (2011), suggests effects on children who do not experience parental job loss that are 30-56% the size of the effects on those who do experience parental job loss (see rows 4 and 8 of Table 7). Given the many pathways through which job loss can affect children that are similar for both groups of children, and given that studies have found that stress from downturns, for example, is at least as great for those who maintain employment as for those who lose employment, we view these calibrated differences in effect sizes as highly plausible. We therefore view our findings and the evidence from previous work as highly consistent, as laid out in Table 7. Our paper builds on this previous work to significantly advance our understanding of the effects of downturns on children.

Although we find significant impacts of job losses on eighth-grade math scores, we find few significant impacts on eighth-grade reading scores. This is consistent with the findings of many school-based interventions (Abdulkadiroglu, Angrist, Dynarski, Kane, & Pathak, 2009; Angrist, Dynarski, Kane, Pathak, & Walters, 2010; Decker, Mayer, & Glaserman, 2004; Dobbie & Fryer, in press; Hoxby & Murarka, 2009). It may be that math skills are more highly influenced by factors external to the family, including the school and community contexts, than

[4] We use the OLS estimates from Hill et al., as their OLS empirical strategy is most comparable to the strategy we and the other papers we discuss employ.

reading skills, which may be more highly influenced by the family context. It may also be the case that math test scores are more sensitive to recent influences than are reading scores, since it may be easier to isolate and test recently-taught math concepts on an exam than it is to isolate particular reading skills. Further research is needed to understand why math scores may be more responsive to changes in the immediate economic circumstances of students' communities.

It is also worth noting that we find few significant effects of job loss on fourth graders. Older children appear to be more harmed by job losses than younger children, either because they are developmentally more vulnerable or because families are better able to shield younger children from the effects of job losses. The difference in effects between eighth and fourth graders that we find here is consistent with the results in our previous work (Ananat et al., forthcoming).

In general, we find that patterns of significant effects are consistent across subgroups. This is important because it suggests that statewide job losses do appear to be changes to the economic circumstances of the whole state, and not merely to particular industries that may employ individuals with characteristics different from those of the average worker in the state.

There is some evidence, however, that educationally disadvantaged groups, such as minorities and children whose parents have lower levels of education, may experience more detrimental effects of statewide job losses, as our largest eighth-grade math score effects are found for black students and we find a significant decline in the reading test scores of students whose parents have less than a high school diploma. Further research should examine whether already educationally disadvantaged students experience even more disadvantage in the school setting when their community experiences an economic downturn.

Conclusion

This paper finds that students experience sizeable declines in test scores in the wake of economic downturns. We argue that students who do not experience parental job loss, as well as those who do, are hurt by downturns. The failure in previous research to capture effects on the former group of students means that inferences drawn from that research have understated aggregate effects of downturns by an order of magnitude. When correctly measured, aggregate effects of nearly one-tenth of a standard deviation in math test scores are comparable to effects of policy interventions, such as Tennessee STAR (Word, 1990), that have generated enormous policy interest. The magnitude of these effects suggests that costs to students from downturns are a relevant consideration, along with other costs of recessions, for policymakers considering economic stimulus and other policies to mitigate effects of markets on society.

In addition, in this era of greatly increased focus on school accountability for student performance, education policy makers and leaders should be cognizant of the external factors that can negatively influence student achievement. Statewide job losses, which occur from factors external to schools, such as pressure from globalization and stock market fluctuations, can significantly influence student achievement and are well beyond the control of teachers and school administrators. The significant effect these losses can have on schools' abilities to meet accountability goals suggests that policymakers may want to consider recent economic change when defining whether a school is meeting accountability targets.

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Table 1. Descriptive Statistics - Student Demographics by Year and Subject

Year	1996	1998	2000	2002	2003	2005	2007	2009
Subject	Math	Reading	Math	Reading	Both	Both	Both	Both
A. fourth Grade								
% Male	51	49	50	51	51	51	51	51
Race/Ethnicity								
% Black	16	17	18	19	17	16	15	15
% Hispanic	7	7	9	10	12	15	16	16
% White	71	67	65	64	64	61	61	61
B. eighth Grade								
% Male	50	49	50	50	51	51	50	51
Race/Ethnicity								
% Black	15	16	16	17	15	15	15	15
% Hispanic	7	8	7	9	10	13	14	14
% White	72	67	69	67	68	64	63	63
Parent Education								
% Less than HS	7	7	7	6	6	7	7	7
% HS Grad	24	22	22	19	18	18	18	17
% Some College	18	19	17	20	18	17	17	17
% College Grad	41	40	41	45	46	46	46	47

Source: National Center for Education Statistics - http://nces.ed.gov/nationsreportcard/

Table 2. Descriptive Statistics - Test Scores by Grade Level, Subject and Subgroup

A. fourth Grade

	Math			Reading		
	Mean[1]	**St.Dev.[2]**	**Indiv. Std. Dev.[3]**	**Mean**	**St.Dev.**	**Indiv. Std. Dev.**
All Students	234	9.4	29.1	218	7.7	36.4
Gender						
Female	233	9.2	28.3	221	7.5	35.7
Male	235	9.7	29.8	214	8.1	36.8
Race/Ethnicity						
Black	214	10.7	26.8	198	8.0	34.4
Hispanic	223	9.3	27.6	202	8.1	36.3
White	241	8.1	25.9	227	5.1	32.7

B. eighth Grade

	Math			Reading		
	Mean	**St.Dev.**	**Indiv. Std. Dev.**	**Mean**	**St.Dev.**	**Indiv. Std. Dev.**
All Students	277	9.6	36.4	262	6.8	34.8
Gender						
Female	276	9.4	35.3	267	6.7	33.7
Male	278	9.8	37.5	257	7.0	35.2
Race/Ethnicity						
Black	252	9.9	33.3	243	5.2	33.1
Hispanic	261	8.6	34.2	246	5.8	35.1
White	286	7.5	32.7	270	4.3	31.5
Parent Education						
Less than HS	258	8.4	32.8	245	5.4	32.9
HS Grad	266	9.4	33.5	253	6.5	32.3
Some College	280	7.4	31.6	266	5.0	30.8
College Grad	288	9.1	35.3	271	6.5	32.8

1. *Mean* is computed by taking the average across states and years of the reported state-level averages of individual student scores. The mean is weighted at the state level by the number of students in each state.
2. *St. Dev.* Is computed by taking the standard deviation across states and years of the reported state-level averages of individual student scores. The standard deviation is weighted at the state level by the number of student in each state.
3. *Indiv. Std. Dev.* Is computed by taking an average across years of the national student-level standard deviations reported by NAEP for a given assessment and year
Source: National Center for Education Statistics - http://nces.ed.gov/nationsreportcard/

Table 3. Descriptive Statistics - Job Losses as a Percent of Working Age Population

	Obs.	Mean	Std. Dev.	Min	Max
Separations[1]	506	0.71	0.47	0	3.39
Total Initial Claimants[2]	506	0.66	0.47	0	3.66

1. Separations is calculated by dividing the total yearly number of separations in a state by the working age population (ages 25-64) in that state.

2. Total Initial Claimants is calculated by dividing the total yearly number of claimants in a state by the working age population (ages 25-64) in that state.

Source: Bureau of Labor Statistics - http://www.bls.gov/mls/

Table 4. Estimation Results - Impact of Job Losses on Student Test Scores

	fourth Grade		eighth Grade	
	Math	**Reading**	**Math**	**Reading**
All Students	-0.032	-0.013	-0.076***	-0.009
	(0.035)	(0.020)	(0.027)	(0.022)
Student Subgroups				
Gender				
Female	-0.033	-0.003	-0.077***	-0.007
	(0.029)	(0.018)	(0.029)	(0.019)
Male	-0.023	-0.022	-0.072***	-0.022
	(0.038)	(0.024)	(0.027)	(0.025)
Race/Ethnicity				
Black	-0.010	-0.015	-0.109**	-0.042
	(0.042)	(0.035)	(0.049)	(0.041)
Hispanic	-0.014	-0.011	-0.064***	-0.028
	(0.051)	(0.023)	(0.024)	(0.017)
White	-0.049	-0.029	-0.066*	-0.002
	(0.037)	(0.022)	(0.036)	(0.026)
Parent Education				
Less than HS	--	--	-0.025	-0.047**
			(0.037)	(0.022)
HS Grad	--	--	-0.072	-0.025
			(0.047)	(0.035)
Some College	--	--	-0.061	-0.004
			(0.043)	(0.020)
College Grad	--	--	-0.062**	-0.003
			(0.027)	(0.022)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Each cell represents the coefficient and standard error on *Separations* derived from estimating equation (2) for a given subject-grade-subgroup combination. The specification equation (2) includes both state and year fixed effects.

Table 5. Estimation Results - Impact of Job Losses on Percentile Test Score Outcomes (8th Grade)

	Math					Reading				
Percentile	**10th**	**25th**	**50th**	**75th**	**90th**	**10th**	**25th**	**50th**	**75th**	**90th**
All Students	-0.078**	-0.081**	-0.077***	-0.071***	-0.064***	-0.048	-0.023	-0.008	0.001	0.009
	(0.039)	(0.033)	(0.026)	(0.024)	(0.023)	(0.034)	(0.029)	(0.021)	(0.015)	(0.015)
Student Subgroups										
Gender										
Female	-0.087**	-0.087***	-0.076***	-0.069**	-0.071***	-0.034	-0.013	0.003	0.009	0.020
	(0.036)	(0.033)	(0.028)	(0.027)	(0.026)	(0.033)	(0.025)	(0.017)	(0.017)	(0.019)
Male	-0.069	-0.075**	-0.077***	-0.077***	-0.055***	-0.061	-0.028	-0.017	-0.009	-0.004
	(0.043)	(0.033)	(0.027)	(0.023)	(0.021)	(0.042)	(0.035)	(0.026)	(0.020)	(0.017)
Race/Ethnicity										
Black	-0.101	-0.122**	-0.139***	-0.118***	-0.089*	0.005	-0.030	-0.042	-0.051	-0.055
	(0.066)	(0.051)	(0.043)	(0.043)	(0.046)	(0.054)	(0.039)	(0.038)	(0.044)	(0.042)
Hispanic	-0.058	-0.065**	-0.059***	-0.077***	-0.056*	-0.076***	-0.033	-0.005	-0.006	0.022
	(0.041)	(0.027)	(0.022)	(0.024)	(0.029)	(0.028)	(0.026)	(0.028)	(0.021)	(0.025)
White	-0.059	-0.065	-0.068**	-0.062**	-0.055*	-0.026	-0.008	0.001	0.006	0.018
	(0.051)	(0.043)	(0.034)	(0.031)	(0.029)	(0.051)	(0.035)	(0.023)	(0.019)	(0.016)
Parent Education										
Less than HS	0.006	-0.024	-0.030	-0.046	-0.042	-0.055	-0.054*	-0.029	-0.052**	-0.062**
	(0.038)	(0.042)	(0.043)	(0.039)	(0.052)	(0.052)	(0.032)	(0.028)	(0.025)	(0.029)
HS Grad	-0.099*	-0.085	-0.071	-0.058	-0.046	-0.082	-0.028	-0.015	-0.003	0.010
	(0.060)	(0.055)	(0.050)	(0.037)	(0.034)	(0.054)	(0.049)	(0.035)	(0.031)	(0.029)
Some College	-0.037	-0.056	-0.067	-0.073*	-0.076**	-0.046	-0.026	0.002	0.015	0.024
	(0.037)	(0.046)	(0.048)	(0.038)	(0.032)	(0.029)	(0.028)	(0.020)	(0.018)	(0.021)
College Grad	-0.076**	-0.067**	-0.066**	-0.049*	-0.044	-0.026	-0.013	-0.007	-0.002	0.012
	(0.031)	(0.027)	(0.026)	(0.027)	(0.028)	(0.038)	(0.026)	(0.020)	(0.017)	(0.018)

*** p<0.01,** p<0.05,* p<0.1. Robust standard errors in parentheses. Cells represent estimate on *Separations* from equation (1) for a subject-grade-subgroup.

Table 6. Falsification Results - Impact of Future Job Losses on Student Test Scores (eighth Grade)

	Math	Reading
All Students	-0.028	0.022
	(0.035)	(0.017)
Student Subgroups		
Gender		
Female	-0.028	0.028*
	(0.034)	(0.017)
Male	-0.034	0.020
	(0.033)	(0.020)
Race/Ethnicity		
Black	-0.005	0.020
	(0.034)	(0.022)
Hispanic	-0.091*	0.024
	(0.049)	(0.032)
White	-0.024	0.019
	(0.041)	(0.017)
Parent Education		
Less than HS	-0.002	-0.020
	(0.025)	(0.034)
HS Grad	-0.010	0.012
	(0.033)	(0.032)
Some College	-0.015	0.013
	(0.034)	(0.019)
College Grad	-0.016	0.040**
	(0.032)	(0.018)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Each cell represents the coefficient and standard error on *Separations* derived from estimating the specification for a given subject-grade-subgroup combination. The specification includes state and year fixed effects.

Table 7. Calibration: Combinations of direct and indirect effects consistent with a population average effect of .076 SD

	A	B	C	D	E	F	F
	Spillover	Direct effect on 1% of population who experience parental job loss	Indirect effect on 99% of population who do not experience parental job loss	Difference between those who do and do not experience parental job loss	Papers finding the difference listed in column D	Estimated population effect when extrapolating to aggregate effect from column D (i.e. when assuming spillover = 0)	Share of true effect missed when extrapolating to aggregate effect from column D (i.e. when assuming spillover = 0)
(1)	0.00	7.600	0.000	7.600		0.076	0.0%
(2)	0.10	0.697	0.070	0.628		0.006	91.7%
(3)	0.20	0.365	0.073	0.292		0.003	96.2%
(4)	0.30	0.248	0.074	0.173	Hill et al.	0.002	97.7%
(5)	0.33	0.224	0.075	0.150	Kalil and DeLeire	0.001	98.0%
(6)	0.40	0.187	0.075	0.112		0.001	98.5%
(7)	0.50	0.150	0.075	0.075		0.001	99.0%
(8)	0.56	0.136	0.075	0.060	Rege et al.	0.001	99.2%
(9)	0.80	0.095	0.076	0.019		0.000	99.8%
(10)	1.00	0.076	0.076	0.000		0.000	100.0%

"Spillover" refers to effects on children whose parents do not experience job loss as a percentage of the *true* direct effect on children whose parents experience job loss.

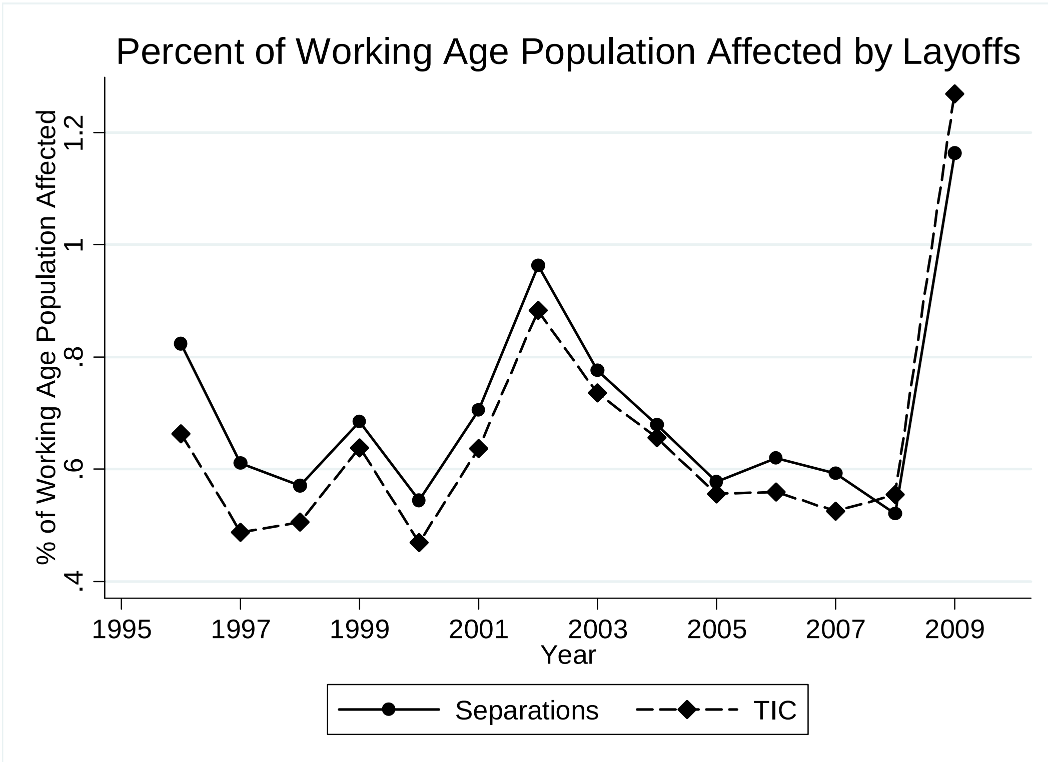

Figure 1. Percent of Working Age Population Affected by Layoffs as Represented by Separations and Total Initial Unemployment Claims

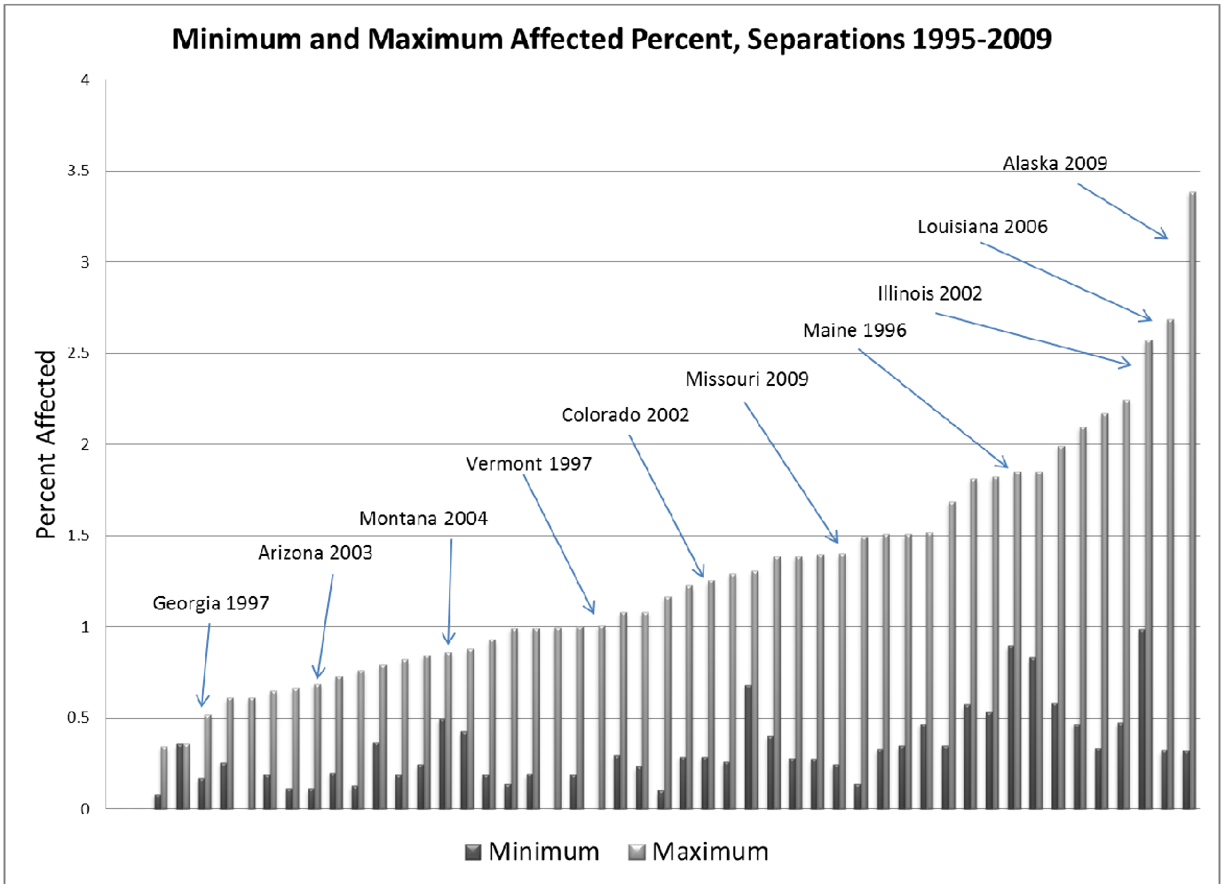

Figure 2. Minimum and Maximum Percent of Working Age Population Affected by Job Loss, 1995-2009

Table A1. States Reporting both Test Score and Job Loss Data

Year:	1996	1998	2000	2002	2003	2005	2007	2009
Alabama	X		X	X			X	X
Alaska	X				X		X	X
Arizona			X	X	X	X	X	X
Arkansas	X		X	X	X		X	X
California	X	X	X	X	X	X	X	X
Colorado	X				X		X	X
Connecticut	X		X	X	X	X	X	X
Delaware		X		X				X
District of Columbia								
Florida	X	X		X	X	X	X	X
Georgia	X	X	X	X	X	X	X	X
Hawaii		X	X	X			X	X
Idaho				X	X	X	X	X
Illinois			X		X	X	X	X
Indiana	X		X	X	X	X	X	X
Iowa					X	X		X
Kansas			X	X	X	X	X	X
Kentucky		X	X	X	X	X	X	X
Louisiana	X	X	X	X	X	X	X	X
Maine	X	X		X				X
Maryland	X	X	X	X	X		X	X
Massachusetts	X	X	X	X	X	X	X	X
Michigan	X	X	X	X	X	X	X	X
Minnesota	X	X	X	X	X	X	X	X
Mississippi	X	X	X	X	X	X		X
Missouri	X	X	X	X	X	X	X	X
Montana	X				X			X
Nebraska					X			
Nevada		X	X	X				X
New Hampshire								
New Jersey					X	X	X	X
New Mexico		X		X			X	X
New York	X	X	X	X	X	X	X	X
North Carolina	X	X	X	X	X	X	X	X
North Dakota					X	X		
Ohio			X	X	X	X	X	X
Oklahoma		X		X	X		X	X
Oregon			X	X	X	X	X	X
Pennsylvania				X	X	X	X	X
Rhode Island				X				
South Carolina	X	X	X	X	X	X	X	X
South Dakota								
Tennessee	X	X	X	X	X	X	X	X
Texas	X	X	X	X	X	X	X	X
Utah			X	X			X	
Vermont	X							
Virginia	X	X	X	X	X	X	X	X
Washington	X	X		X	X	X	X	X
West Virginia	X				X		X	
Wisconsin	X	X			X	X	X	X
Wyoming								
Total	28	25	28	36	38	30	37	41

Sources: BLS job losses http://www.bls.gov/mls ; NCES test scores http://nces.ed.gov/nationsreportcard