Real Effects of Financial Distress of Workers: Evidence from Teacher Spillovers*

Gonzalo Maturana† Jordan Nickerson‡

January 2017

This paper studies the effects of financial distress on the productivity of workers. Using detailed data from the public school system in Texas, which allows us to exploit within-teacher variation and to control for a student's economic environment, we show that student performance decreases by 1.7% following a declaration of bankruptcy by their teacher. The effect of financial distress increases with the complexity of the task: Students designated as "at-risk" experience a 5.7% decrease in performance after their teacher files for bankruptcy. Overall, our results indicate that the financial distress of workers can have important consequences for the economy.

JEL classification: J01, I20, D10

keywords: bankruptcy, labor, worker productivity, education

*We are grateful to Francisco Gallego (discussant), Edith Hotchkiss, Darren Kisgen, Christopher Malloy, Jonathan Reuter, Jay Shanken, Phil Strahan, Sheridan Titman, as well as the seminar participants at Emory University, the University of Chile, the 2015 FRA Early Ideas session, and the 2016 Finance UC International Conference for their helpful comments. Additional results are available in an Internet Appendix at http://www.GonzaloMaturana.com or at http://www.JordanNickerson.com.

†Emory University, Goizueta Business School, 1300 Clifton Road, Atlanta, GA 30322; Phone: (404)727-7497. Email: Gonzalo.Maturana@emory.edu

‡Boston College, Carroll School of Management, 140 Commonwealth Avenue, Chestnut Hill, MA 02467; Phone: (617)552-2847. Email: Jordan.Nickerson@bc.edu

Real Effects of Financial Distress of Workers: Evidence from Teacher Spillovers

January 2017

Abstract – This paper studies the effects of financial distress on the productivity of workers. Using detailed data from the public school system in Texas, which allows us to exploit within-teacher variation and to control for a student's economic environment, we show that student performance decreases by 1.7% following a declaration of bankruptcy by their teacher. The effect of financial distress increases with the complexity of the task: Students designated as "at-risk" experience a 5.7% decrease in performance after their teacher files for bankruptcy. Overall, our results indicate that the financial distress of workers can have important consequences for the economy.

JEL classification: J01, I20, D10

keywords: bankruptcy, labor, worker productivity, education

What are the real consequences of household financial distress? Recent literature has studied this question in the context of labor outcomes (Mian, Rao, and Sufi 2013; Mian and Sufi 2014). However, the literature thus far has focused mainly on the role of reduced consumption on unemployment. In contrast, very little is known about the effects of household financial distress on labor productivity. This paper fills this void by examining how the financial distress surrounding personal bankruptcy affects workers' output.

Labor is a key input of aggregate production, so it is an important determinant of economic growth. For this reason, a considerable literature has focused on understanding the factors that contribute to labor productivity. This literature includes works that examine the impact of shocks to workers' health and workers' compensation incentives.[1] A better understanding of the role that financial distress plays in the productivity of workers provides additional insight into how individuals' financial shocks propagate through the economy.

It is challenging to isolate this effect in the traditional setting of a firm. While the financial distress of workers can lead to decreased productivity and subsequent firm underperformance, firm underperformance can also contribute to the financial distress of workers through a deterioration of employment prospects. To overcome this challenge, we focus on the performance outcomes of public school teachers. This setting offers the unique feature of remarkably stable employment prospects, thus alleviating concerns that firm underperformance contributes to worker bankruptcy.[2]

Specifically, we use the standardized test scores of students, which we observe at the grade level, as a proxy for the productivity of our workers. These scores provide a micro-level measure of productivity for a teacher on a task that is homogenous across time. The ability to observe repeated outcomes for an individual teacher on the same task allows us to exploit within-teacher variation to identify the effect of personal bankruptcy on labor

1. For example, Strauss (1986) and Graff Zivin and Neidell (2012) study the effects of nutrition and pollution on farming output, respectively. Lazear (2000) and Fryer (2013) study the effects of changes in worker compensation schemes.

2. The tenured status of teachers rarely results in dismissal of teachers after they exhibit low performance (Weisberg et al. 2009).

productivity. Additionally, the ability to observe standardized test scores at the grade level allows us to compare the performance across teachers within a school district at a given point in time, thus alleviating the concern that local factors may drive changes in student performance.

Our results indicate that the financial distress of a worker has a considerable impact on his or her labor productivity. The passing rate for a teacher's class falls by an average of 1.72% in the year the teacher files for personal bankruptcy. This effect is identified using time-series variation in a teacher's performance to alleviate concerns that low-quality teachers are more likely to file for bankruptcy. A remaining concern is that the financial health of a teacher could be correlated with the financial health of her student's parents, which may also adversely affect testing performance. To rule out this possibility, we consider the performance of a student cohort relative to the other cohorts in the same district at the same point in time and we control for the aggregate number of bankruptcies in the ZIP code of the campus. We also control for individuals who report a large amount of medical expenses to mitigate concerns that a teacher could suffer a health-related shock that causes personal bankruptcy while also negatively impacting her teaching ability. Similarly, we control for divorce, another primary driver of bankruptcy plausibly correlated with job performance.

This finding is particularly interesting for the following reasons: First, our results suggest that a negative shock to a worker's local economic environment which increases her likelihood of bankruptcy also adversely affects her labor output. This decreased labor productivity in turn results in a further deterioration of the local economy, thereby creating a feedback effect. Furthermore, our empirical setting allows us to identify the effect of financial distress on labor productivity in isolation from this feedback effect. Second, the context of our setting has specific implications for the education system. Overall, our results indicate that the actions of teachers have a substantial impact on the testing ability of their students. Finally, our results highlight the direct impact of an individual's financial decisions on others; specifically, the impact of an individual's credit mismanagement. Thus, we document a novel channel through

which this negative externality is transmitted: the education of another individual's children. Next, we turn to the channel through which financial distress affects worker productivity.

One possible explanation for the observed decrease in productivity is the significant time commitment associated with the act of filing for bankruptcy. This *time taxation* results in fewer hours available to spend on teaching-related tasks. Alternatively, this decreased productivity may be due to some type of psychological factor, such as emotional distress, experienced when entering a period of financial distress. These negative emotional states interfere with an individual's cognitive abilities (Pham 2007), which can lead to inattention and decreased performance. However, in contrast to *time taxation*, if bankruptcy is the result of years of debt accumulation, any such psychological effects should be present in the years surrounding the bankruptcy filing. Consistent with this second explanation, we find that the negative effect on students' test scores is not confined to the year of the bankruptcy filing. Instead, we find decreased test scores in the two years before the filing as well as the year after the filing.

An additional feature of our data is the ability to observe the test scores of particular subpopulations of all students. To this end, we next turn to the heterogeneous effect of financial distress on labor output across task complexity. Specifically, we focus on the populations of students who are classified by the state as *at-risk*, because a teacher likely must expend more effort to educate this subset of the student population. We find that at-risk students are the most adversely affected by the financial distress of their teacher, with the passing rate decreasing by 5.7%, on average, in the year of the bankruptcy filing. This result has two important implications. First, it is consistent with the financial distress of workers having a particularly pronounced impact on their productivity for more complex or more labor-intensive tasks. Second (and specific to the empirical setting of this paper), this result shows that the negative externality of a teacher's financial distress on students is at its largest for the subset of the student population at the center of policy reform. For example, at-risk students are a key student group in regard to recent policy such as the Every Student

Succeeds Act (ESSA).

To address the concern that teachers of lower quality are more likely to suffer financial distress and file for bankruptcy, we include teacher fixed effects throughout. Nonetheless, to gauge the effect of this alternative, we test this hypothesis directly, and we find no predictive ability of student test scores to forecast future bankruptcy activity among teachers. Additionally, we consider the alternative hypothesis that bankruptcy filings are associated with increased labor mobility, which would result in teacher transitions that adversely affect a student's testing score. Overall, we find no evidence that a teacher's bankruptcy activity is related to either the teacher's likelihood of transitioning between campuses or her labor market participation.

It is important to discuss the institutional features unique to our setting as we evaluate the external validity of this effect and evaluate the ability to draw general inferences from our results. Most notably, we consider the increased job security (relative to most professions) offered to public school teachers in our sample. Given the decreased likelihood of being terminated following poor performance, one must consider the following when interpreting our results: It is plausible that the effect of distress is more pronounced for workers in our sample, given that they face reduced turnoverperformance sensitivity. However, this decreased sensitivity also implies a lower level of labor productivity for all individuals in our sample. Therefore, it is unclear whether the differential effect of distress on labor output should differ in our sample relative to the representative worker.

This paper relates to two strands of recent literature that examine factors that affect the productivity of workers. First, this paper relates to the economic literature specific to the study of teacher performance. Harris and Sass (2011) show that teacher productivity increases with experience. Jackson (2013) shows that the matching between a school and a teacher is an important determinant of teacher productivity. In contrast, the evidence regarding the role of monetary incentives is mixed. Lavy (2009) shows that teacher productivity is sensitive to monetary incentives, while Fryer (2013) fails to find any effect of

monetary incentives. However, these studies relate primarily to benign factors, which do not adversely affect the performance of teachers. In contrast, in a different setting, Graff Zivin and Neidell (2012) show that agricultural workers exposed to pollution exhibit lower productivity. Our study complements this literature by documenting the adverse effect that a worker's financial distress has on her labor productivity.[3]

This paper is most closely related to Bernstein, McQuade, and Townsend (2016), who study the effect of household shocks on firm project selection. Specifically, they show that negative housing wealth shocks to patent inventors translate into fewer patents and patents of lower quality by the firms that employ them. Our paper complements this work by analyzing a different source of financial distress (i.e., personal bankruptcy). Additionally, our setting allows us to study a broader subset of the general population (teachers rather than inventors) using a different measure of output (i.e., test score outcomes of students). Together, both papers provide compelling evidence that household financial distress has significant effects on labor productivity.

In addition, this paper relates to the literature that studies the effect of teacher quality on student performance.[4] Rockoff (2004) utilizes a large teacher–student matched panel dataset to quantify the impact of individual teachers. Aaronson, Barrow, and Sander (2007) find that teacher quality is important, especially for lower-ability students. Our results are consistent with teachers influencing student performance, especially when students have a high degree of vulnerability.

Finally, this paper contributes to the understanding of recessionary periods. For example, following the recent U.S. housing crisis, and motivated by the negative externalities that foreclosures impose on the surrounding neighborhoods (Campbell, Giglio, and Pathak 2011), the U.S. government implemented the Making Home Affordable (MHA) initiative.

3. While we show that student performance deteriorates around the time of a teacher's bankruptcy, it is important to note that the aim of this paper is not to study the effects of consumer bankruptcy protection, as it is studied more generally by Dobbie and Song (2015); Dobbie, Goldsmith-Pinkham, and Yang (2015); and others. Rather, we use bankruptcy filings only to proxy for teacher financial distress.

4. See Hanushek and Rivkin (2006) for a survey on the topic.

MHA includes several programs for homeowners who are struggling financially to help them avoid foreclosure.[5] This paper documents an important cost of financial distress that can serve as an amplification mechanism to exacerbate the decline in local economic conditions. Furthermore, the results from our unique setting have potential implications regarding the long-lasting costs of financial distress through their adverse effect on the educational system. This effect, which likely has remained undetected by regulators, is potentially of great importance for long-term economic growth (Hanushek and Kimko 2000; Barro 2001).

The remainder of this paper is organized as follows: Section I discusses the data we used and the final sample we considered. Our main findings are presented in Section II, while the cross-sectional effects of financial distress are documented in Section III. Section IV is reserved for a discussion of alternative hypotheses. Finally, Section V concludes.

I. Data and Sample Selection

In this section, we describe our data sources, the sample selection process, and the final sample.

I.A. Teacher Employment Records

Our teacher employment information comes from the Texas Education Agency (TEA). More specifically, we obtain payroll records for all public school teachers in Texas from 1999 to 2011. The dataset includes a total of 585,000 teachers employed at 10,440 different campuses. Each TEA record provides the teacher's name, date of birth, demographics, tenure, salary, education level, and the grade level she teaches.[6]

5. Among these, the more relevant are the Home Affordable Modification Program (HAMP) and the Home Affordable Refinance Program (HARP). See Agarwal et al. 2016 and Agarwal et al. 2015 for evaluations of the HAMP and HARP, respectively.

6. The employment records also provide the subject taught by the teacher, when applicable.

I.B. Bankruptcy Records

We rely on personal bankruptcy filings as a proxy for financial distress. Specifically, we obtain all Chapter 7 and Chapter 13 bankruptcy records filed with the United States Bankruptcy Court from PACER for the Eastern District of Texas.[7] The dataset consists of 128,200 bankruptcy filings over the sample period from January 2000 to December 2014. We collect the filing and closing date, chapter type, as well as the full name and address of all debtors from case docket reports. Additionally, we collect employment information for specific bankruptcy filings from Schedule I forms.

I.C. Matching Procedure

Identifying the comprehensive universe of teacher bankruptcies is essential to our study. However, we do not have a unique identifier that is common between the two data sources. To overcome this challenge, we begin by following the same algorithm used in Maturana and Nickerson (2016). This algorithm matches teacher employment records to bankruptcy filings with the assistance of registered voter rolls. First, we obtain the teacher's physical and mailing addresses by matching the TEA records with the voting rolls using the teacher's name, date of birth, and gender. Second, we use the teacher's name and addresses to identify teachers in the bankruptcy records.[8] However, not all teachers are registered voters. To alleviate sample selection concerns, we augment this procedure and conduct a secondary matching procedure as follows: For each TEA record, we first identify all bankruptcy records that have both the same name and a physical address that is within 50 miles of the teacher's campus of employment. Second, for each potential match, we hand-collect the reported employer of all debtors from Schedule I of the bankruptcy filing. We classify all bankruptcy records as a match if the reported employer in Schedule I corresponds to the school district listed in the TEA record. We identify 7,172 teachers who filed for bankruptcy between 2000

7. While the state of Texas is comprised of four bankruptcy districts, we focus on the Eastern District, as this is the only district from which we are able to obtain a fee exemption waiver.

8. For more details on the matching algorithm, see Maturana and Nickerson (2016).

and 2014, 89.9% of which are matched using voter rolls, with the remaining 10.1% identified manually.

Finally, there is the concern that an omitted variable is correlated with both an individual's decision to file for bankruptcy and the productivity of her labor. Specifically, it is plausible that a worker experiences a health-related shock that decreases the worker's labor productivity while the associated medical expenses increase the likelihood of filing for bankruptcy.[9] Therefore, we parse the bankruptcy filings of individuals in our sample and collect the total dollar amount of reported medical expenses. We use this information to identify health-related bankruptcies.[10] Alternatively, another plausible omitted variable that is correlated with bankruptcy and worker performance is the action of filing for divorce. Therefore, we also collect all instances of divorce for the teachers in our sample who file for bankruptcy from the Texas Department of State Health Services.

I.D. Standardized Test Scores

The primary directive for the workers in our sample is to educate the students under their supervision. Thus, we turn to a uniform evaluation of student learning as a measure of labor productivity. Specifically, all students in the state of Texas were administered a series of common exams from 2003 to 2011, referred to as the Texas Assessment of Knowledge and Skills (TAKS). The TAKS test provides a standardized score for mathematics and reading comprehension, and was administered to all public school students in grades 3 through 8. We obtain student test scores aggregated at the campus–grade–year level, resulting in a sample of 127,371 observations for 7,108 campuses. In addition, this dataset contains aggregated campus–grade–year scores for varying subsets of the student population (e.g., aggregated test scores by student gender, ethnicity, and economic condition).

9. Himmelstein, Thorne, Warren, and Woolhandler (2009) document that 62% of personal bankruptcy filings are related to medical expenses, based on a sample of 1,032 individuals interviewed.

10. A small subset of the bankruptcy filings list the date of each outstanding debt. In these cases, we only consider medical expenses for the three years prior to the bankruptcy filing date.

I.E. Final Sample

We consider only school districts that fall in the Eastern District of Texas. To obtain the final sample, we consider teachers of grades 3 through 8 from 2003 to 2011 for which we have standardized test scores, resulting in 261,155 teacher–year observations from 243 school districts.[11] The descriptive statistics for the final sample are presented in Panel A of Table 1. The variable *1(bankruptcy)* is a dummy that takes the value of 1 for a teacher in a given school year if she files for bankruptcy from September of the school year to the following August, and 0 otherwise. Its mean value is 0.23%, which shows that a teacher filing for bankruptcy is a relatively uncommon event. The teachers in the sample have an average age of 42 years and an average salary of almost $45,000 per year. In addition, 75% of teachers have three or more years of experience. Finally, there is substantial variation in students' demographics across grades, which shows the importance of including cohort controls in the specifications below.

[INSERT TABLE 1 HERE]

Panel B of Table 1 provides summary statistics of the standardized test scores. For example, 81.6% of the general population of students meet the state-mandated standards for mathematics. In addition to statistics for the general population of students, the results in mathematics are also presented for specific subsets of the student population. These partitions include students defined as *at-risk* or identified as *gifted and talented*.[12] The table suggests that students classified as at-risk generally underperform relative to their peers, as 61.7% of them meet the state-mandated standards for mathematics, on average.

Panel B of Table 1 also indicates that the students in our sample, on average, perform worse on the mathematics portion of the standardized test relative to the reading comprehen-

11. In addition, we restrict the analysis to districts with five or more bankruptcies. Our results are robust to alternative bankruptcy count thresholds, as we discuss below.

12. Generally, Texas defines a student as *at-risk* if he or she has previously dropped out of school, has shown insufficient academic performance or severe misconduct, or is at social risk (see the Texas Education Code §29.081 for more details).

sive portion. To examine this relation in more detail, Figure 1 reports the kernel density for the percentage of students who achieve a passing score in each campus–grade–year by subject. The figure confirms the inferences drawn from the summary statistics presented above. Generally, a larger percentage of students fail to achieve a passing score on the mathematics portion of the TAKS test relative to the reading comprehension section. This imbalance is especially pronounced in campus–grade–years in which the percentage of students who obtain a passing score falls between 40% and 70%.

[INSERT FIGURE 1 HERE]

II. Main Result

To what extent does the financial distress of a worker bleed over into the productivity of her labor? To examine this question, we turn to the performance of students on standardized tests following the financial distress of their teacher. This environment affords us certain advantages relative to that of the traditional firm. A key feature of this setting is that it offers remarkably stable employment prospects. It is plausible that the financial distress of workers can lead to decreased firm productivity and subsequent firm underperformance. However, in the traditional setting, firm underperformance can also contribute to the financial distress of workers through a deterioration of employment prospects. This concern of reverse causality makes it particularly difficult to identify the effect of a *worker's* financial distress in the absence of firm distress. In contrast, public school teachers face a low probability of being laid off (Weisberg et al. 2009), which helps alleviate concerns that firm underperformance contributes to worker bankruptcy. In addition, the use of test scores provides an objective evaluation of our workers' primary directive: to educate the students under their care. Furthermore, the standardized nature of the testing process provides us with a measurement that is relatively homogenous both across workers in the cross-section as well as within-worker through time.

Recall, our employment records indicate the campus and grade level taught for each

teacher–year observation in our sample. However, we only observe student test scores at a more aggregate level (i.e., campus–grade–year). To align the two datasets, we assign the aggregated test scores for a given campus–grade–year to all teachers at that campus who teach that grade in the given school year. Additionally, when matching aggregated test scores to all N teachers assigned to a campus–grade–year, we weight each observation by $1/N$. The result is the ability to observe a micro-level measure of productivity for a teacher. This ability to observe repeated outcomes for an individual teacher on the same task is crucial to our identification strategy. It allows us to exploit within-teacher variation to identify the effect of personal bankruptcy on labor productivity.

Note that an alternative process involves first computing the average of all teacher-specific covariates for a given campus–grade–year. The resulting mean observation is then matched to the corresponding campus–grade–year test scores. However, this alternative reduces our flexibility to account for a relation between teacher quality and financial distress. Therefore, we opt for the former matching procedure to better address the possible concern that teachers who underperform in the classroom may have a greater propensity to file for bankruptcy.

Table 2 presents OLS results that show the effect of a teacher's bankruptcy on the percentage of students who meet state-mandated standards for mathematics and reading comprehension. To address the possible concern that unobservable teacher quality may be correlated with financial decision making, we include teacher fixed effects in all specifications. Thus, as discussed above, we rely on within-teacher variation to identify any possible effects. In addition to teacher fixed effects, all tests include school district–year fixed effects as a first step to alleviate concerns that any decrease in student test scores is being driven by local factors.

Recall from Figure 1 that students in our sample generally perform worse on the math portion of the TAKS test relative to the reading portion. It is plausible that the effect of a teacher on the test scores of her students, if any, is more pronounced when students face more challenging material. For this reason, we begin by examining the effect of teacher

financial distress on the percentage of students who meet standards for the math section of the test in Panel A of Table 2. The primary variable of interest is *1(bankruptcy)*. Recall that this dummy variable takes the value of 1 for a teacher in a given school year if she files for bankruptcy from September of that school year to the following August, and 0 otherwise. The first specification of the panel, which includes only district-year and teacher fixed effects, serves as our baseline. The coefficient of -1.256 (t-stat$=-2.91$) indicates that the amount of students passing the math portion of the exam falls by 1.26% in the year their teacher files for bankruptcy.[13] This represents a 1.54% decrease relative to the average percentage of students in our sample meeting the math standards.

The previous specification relies on time-series variation in a teacher's performance to alleviate concerns that less able teachers are also more likely to file for bankruptcy. However, a remaining concern is that a time-varying omitted variable exists that is correlated with a teacher's job performance and her likelihood of filing for bankruptcy. In the context of personal bankruptcies, the most likely candidate for this omitted variable is a health shock to an individual which increases the probability of bankruptcy while also negatively affecting labor productivity. To address this concern we parse the bankruptcy files for the teachers in our sample and classify any filing with medical expenses greater than $1,500 as a health-related bankruptcy. From this classification we construct an indicator variable, *medical-related bankruptcy*, that takes on a value of one in the year of a bankruptcy filling with medical expenses exceeding the threshold. An additional event plausibly related to both bankruptcy and labor output is the dissolution of a marriage. Therefore, we also hand-collect all divorce records for teachers in our sample who file for bankruptcy. Using this information we construct a second indicator variable which is equal to one for a teacher-year observation if the teacher files for divorce in the school year. Following the inclusion of both control variables in the second specification of Panel A, *1(bankruptcy)* increases slightly in both magnitude (coefficient of -1.37) and statistical power (t-stat$=-3.11$). Thus, there is

13. Unless explicitly noted, regressions are estimated with heteroscedasticity-robust standard errors clustered by teacher throughout the paper.

no empirical evidence that the result is being driven by either of these plausible omitted variables.

Recall, the previous specifications include district-year fixed effects to alleviate concerns that local economic conditions are influencing test scores, through a deterioration of students' home lives, and the likelihood of a teacher filing for bankruptcy. Nonetheless, if teachers live disproportionately close to the campus where they teach, then it is plausible that the financial distress of a teacher is correlated with that of the families of her students. Thus, any measured effect of a teacher's bankruptcy could be the result of a student underperforming when her family experiences financial distress. To address this concern, we construct a campus-level measure of local financial distress. Specifically, we first construct a panel set of the total number of bankruptcies filed per ZIP code–school year. We then standardize the time-series by ZIP code to account for differences in population and economic health across areas. For each campus, we then assign the bankruptcy index time-series of the nearest ZIP code as a measure of the local economic conditions of the campus's students. The inclusion of the local bankruptcy index in the third specification leaves the coefficient of *1(bankruptcy)* virtually unchanged. The specification continues to indicate that percentage of students in a grade who meet state determined math standards falls by 1.37% (t-stat=-3.11) if their teacher files for bankruptcy in the school year. This effect remains relatively unchanged at -1.43% (t-stat=-3.21) in the fourth specification when including controls for time-varying teacher characteristics such as pay, experience, and age. Finally, the fifth specification also includes controls for differences in student demographics such as the percentage of students classified as minorities, female, at-risk, or gifted and talented. The effect of *1(bankruptcy)* remains stable at -1.40% (t-stat=-2.93) following their inclusion.

Panel B of Table 2 turns to the effect on the reading comprehension portion of the test in the remaining specifications. In contrast to the mathematics scores, the results indicate that there is no statistically significant effect of a teacher's financial distress on her students' reading scores.

[INSERT TABLE 2 HERE]

The previous results attempt to alleviate concerns that our results are being driven by an omitted variable, specifically health-motivated bankruptcies and divorce, with the inclusion of additional controls for each. Alternatively, Internet Appendix Table IA.1 excludes all observations for an individual in our sample who experiences a divorce or is classified as a health-motivated bankruptcy. All results remain virtually unchanged. In addition, to ensure that our results are not sensitive to the $1,500 threshold we set when classifying health-motivated bankruptcies we vary this medical expense cutoff in Internet Appendix Table IA.2. The results are stable across thresholds ranging from $50 and $2,500. Finally, our main sample is restricted to school districts with a minimum of five reported bankruptcies over our full sample to ensure that our results are not driven by extremely small districts.[14] Internet Appendix Table IA.3 varies this threshold across different values ranging from one to 25 bankruptcies. The table verifies that the results presented in Table 2 are not sensitive to this classification.[15]

While the results in Table 2 suggest an impact of financial distress on labor productivity, they remain silent regarding the mechanism behind the effect. One possible channel by which financial distress affects labor productivity is the significant time commitment associated with the act of filing for bankruptcy. As with many major legal proceedings, the act of filing for Chapter 7 or Chapter 13 bankruptcy consists of multiple meetings with lawyers and advisors, a significant amount of paperwork which must completed, in addition to other time-consuming activities. This *time taxation* results in fewer hours which, arguably, would have been spent on teaching-related tasks in the absence of financial distress. In particular, if present, this *time taxation* should be particularly pronounced in the immediacy of bankruptcy.

14. Note, this bankruptcy count is constructed from *all* bankruptcy filings in the district rather than only those associated with teachers.

15. Finally, in untabulated results, we repeat our analysis using raw student test scores instead of passing rates as the dependent variable, confirming the previous results.

Alternatively, the decreased productivity may be due to some type of psychological factor, such as emotional distress, experienced when entering financial distress. It is plausible that the onset of such a factor decreases the attentiveness of a worker, causing a decrease in work performance. The empirical specifications presented in Table 2 restricts the effect of a teacher's financial distress to her students' test scores in the same school year as the bankruptcy filing. In contrast, as opposed to the *time taxation* explanation, if bankruptcy is the result of years of debt accumulation, this emotional distress cost should not be solely concentrated in the immediacy of bankruptcy, but instead should be prevalent in the years surrounding the bankruptcy filing. To help differentiate these two alternatives, we now shift focus to the time-series dynamics of distress.

Specifically, we turn to the labor productivity of the teachers in our sample in the years surrounding the bankruptcy filing date. To examine the time-series effects of financial distress, we begin with the final specification in Table 2 regarding student performance on the math portion of the TAKS test (Specification 5). We then augment this specification with additional lead and lagged values of *1(bankruptcy)*. Figure 2 reports the results of these lead and lagged explanatory variables. Reported are the coefficient estimates, with their corresponding 95% confidence intervals. The figure indicates that the effect of a teacher's financial distress on her students' test scores is not confined to the year of the bankruptcy filing. Instead, students underperform on the standardized test in the two years before the bankruptcy filing as well as in the year following the filing date.[16] Additionally, the magnitude of the effect of *1(bankruptcy)* on student test scores increases dramatically (from -1.40% in Table 2) to -2.14% (t-stat$=-3.66$). This effect constitutes a decrease of 2.62% relative to the unconditional mean percentage of students who meet state-determined standards. Recall that the specifications considered in Table 2 include teacher-level fixed effects. Thus, the effect on student test scores in the filing year is attenuated toward zero when failing to control for the underperformance of a teacher's students in the years surrounding

16. Note, the effect on test scores in the year before the bankruptcy filing is not statistically significant at traditional levels, but has a p-value of 0.163.

the bankruptcy filing.

[INSERT FIGURE 2 HERE]

Thus, while the coefficient of −2.14% in the year of bankruptcy is likely attributable to a combination of both emotional distress and time taxation explanations, the sizeable effects of financial distress on student performance from the two years before bankruptcy to the year after bankruptcy is consistent with emotional distress also being an important driver of our results. However, we admit that it is still possible that a financially distressed worker must spend time on activities related to their financial situation before and following the filing of bankruptcy.

III. Cross-sectional Effects

An additional feature of our data is the ability to observe test scores of particular subpopulations of all students. To this end, we now examine whether there is cross-sectional variation in the effect of bankruptcy on student performance.

III.A. Effects on vulnerable students

We begin by estimating the same regression specifications as in Table 2 using the percentage of students who meet state-mandated standards for mathematics as the dependent variable. However, rather than examining the full population of students, we instead consider only the subpopulation of students classified by the state as being at-risk. The results are presented in Columns 1 through 3 of Table 3. The coefficient estimates for *1(bankruptcy)* range from −3.49% to −3.67%, all statistically significant at the 5% level. This is equivalent to a sizeable decrease between 5.66% and 6.00% relative to the average percentage of at-risk students in our sample who meet the math standards.

Vulnerable students require relatively greater attention from teachers. Therefore, the previous results are consistent with workers' financial distress having a particularly pronounced

impact on their productivity for more complex or labor-intensive tasks. Additionally, a stronger effect of teacher distress on vulnerable students has important implications for policy. Recent legislation suggests that this subpopulation of students is of particular interest to policymakers. For example, the recently passed Every Student Succeeds Act (ESSA) includes several programs specifically designed to support at-risk children.

Columns 4 through 6 of Table 3 perform a similar exercise when considering only the subpopulation of students classified by the state as being gifted and talented. In contrast to the previous result, note that the coefficients on *1(bankruptcy)* are statistically distinguishable from zero.

In sum, the results in Table 3 show that the propagation of a teacher's financial distress to student performance is exacerbated for the most vulnerable students in the general population. In contrast, the effect of financial distress appears to be muted when focusing on above-average students.

[INSERT TABLE 3 HERE]

III.B. Effects across development levels

Recall that the standardized tests that comprise our sample are administered to all students in grades 3 through 8. Prior literature has shown that the impact of education on the lifelong welfare of students is especially pronounced at younger ages. Chetty et al. (2011) find that students randomly assigned to a more experienced teacher in kindergarten experience a 6.9% increase, on average, in income at age 27. However, the existing literature yields little guidance as to whether financial distress should have a stronger effect, or any effect at all, on the testing scores at younger student ages. Therefore, we now test whether there is a differential effect of a teacher's bankruptcy across students at different stages of their development to help gauge the overall impact of teacher distress on social welfare. Specifically, we define the dummy variable *1(young)* to take the value of 1 if an individual teaches in grades 3 to 5, and 0 otherwise. We estimate OLS regressions in which the dependent vari-

able is the percentage of students who meet state-mandated standards for mathematics and the independent variable of interest is the interaction between *1(bankruptcy)* and *1(young)*. Thus, if younger students are more negatively affected than older students by a teacher's financial distress, then the coefficient on the interaction term should load negatively in the specifications. In contrast, if older students are more negatively affected, the coefficient of interest should be positive.

Table 4 shows that the coefficient on *1(bankruptcy)*×*1(young)* is statistically indistinguishable from zero in all specifications. These results indicate that there are no significant differences in the effect of a teacher's bankruptcy across students for the size-year age range examined.

[INSERT TABLE 4 HERE]

IV. Alternative Hypotheses

The results presented thus far show that a teacher's financial distress has a negative impact on his or her students' performance. In this section, we seek to further understand the direction of this relationship.

IV.A. Teacher quality and bankruptcy

Is filing for bankruptcy associated with a teacher's quality? Recall that all specifications exploit within-teacher variation, so this question is irrelevant from an identification standpoint if teacher quality is time-invariant. Nonetheless, the question is still interesting in that the variation in our tests are driven by teachers who ultimately file for bankruptcy. Thus, if such teachers are generally of lower quality, the observed effect on a student's testing performance may not generalize to the representative teacher in our sample.

Table 5 presents the results of OLS regressions in which the dependent variable is *1(bankruptcy)*, and the explanatory variable of interest is the 3-year lag of the percentage

of students who meet state-mandated standards for mathematics.[17] The intuition behind this test is to use student performance as a proxy for teacher's quality. The results presented in the table indicate no statistically significant relation between the prior test scores of a teacher's students and her future likelihood of filing for bankruptcy. These results are consistent with a teacher's quality being unrelated to her financial distress, so the results of our main tests are not being driven by variation generated from the most poorly performing teachers.

[INSERT TABLE 5 HERE]

IV.B. Turnover

The results presented up to this point are consistent with the financial distress of a worker negatively affecting the productivity of his or her labor. Additionally, the results of Table 5, and the inclusion of worker fixed effects throughout, mitigate concerns of worker quality being positively correlated with the propensity of a worker to experience financial distress. Nonetheless, the possibility remains that an unobservable variable is driving both the likelihood of experiencing financial distress and the productivity of a worker's labor. For example, consider a scenario in which a worker suffers a negative health shock and is hospitalized. The resulting medical costs increase the likelihood of the individual experiencing financial distress. Additionally, it is plausible that the productivity of the worker's labor also decreases as a result of the health-related shock. Although we control for all workers from our sample who have medical expenses listed as a significant source of debt to address this specific example, the possibility remains that other omitted variables are driving the results presented thus far.

We seek to partially examine this possibility by turning to the relation between the financial distress of a worker and the extensive margin of her labor output. If an unobserved shock correlated with financial distress makes it more difficult for a worker in our sample to

17. Teacher controls, district–year fixed effects, and teacher fixed effects are included as reported.

be physically present, we would expect financial distress to predict future turnover. Specifically, we examine whether the action of filing for personal bankruptcy predicts a lack of employment by a Texas public school in the future for the teachers in our sample. Although we cannot formally test for and exclude the possibility of an omitted variable, such a test yields insight into the possibility that an unobserved factor results in financial distress and also increases the likelihood of a worker being unable to perform her job in the future.

We begin by examining the relation that a teacher's filing for personal bankruptcy has on her likelihood of being employed as a public school teacher in the state of Texas in the following year using a Cox proportional hazard model. We define *failure* as a teacher not appearing in the following year's employment records. While one limitation of our employment data is the relatively short time horizon of the sample (i.e., 1999–2011), the data also contain each teacher's number of years of experience teaching in the public school system. For each individual, we define the beginning of a spell and thus the time of being at risk of failure (i.e., omission from the following year's employment records) from the point at which they were first employed as a public school teacher (based on their reported years of experience), rather than beginning each spell in the first school year in which we observe employment. The results are reported in Panel A of Table 6. Reported are hazard ratios with robust z-statistics in parentheses.

[INSERT TABLE 6 HERE]

The first specification shows no statistically significant relation between a teacher filing for bankruptcy and her exit from the sample in the following year. The coefficient of *1(bankruptcy)* continues to lack statistical significance following the inclusion of teacher characteristics and demographics in the second specification. Interestingly, the coefficient of *student pass* indicates that a one standard deviation increase in the standardized test scores of a teacher's class decreases the teacher's hazard rate by 3.5% (z-stat=-4.31). Note that, while this result is consistent with performance-sensitive turnover, it is also consistent with the voluntary exit of a teacher following student underperformance. Ingersoll (2003)

documents a 46% attrition rate for teachers within the first five years of service. We cannot distinguish between these competing hypotheses in the current setting. Additionally, the likelihood of a teacher exiting the sample is negatively correlated with pay.

The first two specifications indicate that no statistically distinguishable relation exists between a teacher filing for bankruptcy and her labor market participation. However, the financial distress of an individual is likely correlated with local economic conditions. One possible alternative is that deteriorating economic conditions in an individual's local area increases her likelihood of participating in the labor market, thus offsetting the effect of an omitted variable which drives both bankruptcy filing and labor market participation in a subset of the sample. For this reason, we include the same measure of local bankruptcy activity as that of Table 2 to control for local economic conditions in the third specification. The third specification indicates that while an increase in local bankruptcy activity is associated with a decrease in the likelihood of a teacher exiting the labor market, the coefficient of *1(bankruptcy)* continues to be statistically insignificant. Finally, this result remains unchanged after adding school year fixed effects to the third specification.

Overall, the results in Panel A of Table 6 fail to show an association between an individual's financial distress and the extensive margin of her labor supply. In contrast, another plausible alternative is that the action of filing for bankruptcy increases the mobility of a labor market participant.[18] Any increase in the probability of a teacher transitioning between locations during the school year, as a result of this increased mobility, would likely have an adverse effect on the test scores of her former students. Therefore, we modify the empirical framework used in Panel A and redefine *failure* as either a transition between campuses or an exit from the sample. The results following this change are presented in Panel B of Table 6. Overall, the results across the different specifications for each explanatory variable are relatively consistent between the two panels. There continues to be no statistically significant relation between a teacher filing for bankruptcy and continued labor market participation in

18. An increase in a worker's mobility could be the result of (a) a decrease in local financial commitments or (b) an increase in social pressure resulting from the bankruptcy filing, among other possible channels.

her current teaching position.

Overall, the results of Table 6 suggest that our findings are not being driven by an omitted variable related to a teacher's continued service at her current position.

V. Conclusion

This paper highlights the considerable impact that the financial distress of a worker has on his or her labor productivity. Using detailed data from the public school system in Texas, we show that students perform significantly worse in the years surrounding their teacher's declaration of bankruptcy. This result is not driven by heterogeneity in teacher quality correlated with the likelihood of financial distress or the student's economic environment.

Labor is a key input of aggregate production, and thus an important determinant of economic growth. Yet, recent literature that studies labor outcomes in recessionary periods has focused primarily on the role that reduced consumption plays on unemployment (Mian, Rao, and Sufi 2013; Mian and Sufi 2014). We compliment these works by examining the effect of personal bankruptcy on workers' output. Overall, our results indicate that household financial distress can have important consequences for the economy. The financial distress experienced by workers in a recessionary period may serve as an amplification that results in a further deterioration of local economic conditions.

Additionally, the context of our results have specific implications for the education system. Our findings are consistent with the proposition that the actions of teachers have a substantial impact on the testing ability of their students, especially when students are more vulnerable. Finally, our results highlight the direct impact of an individual's financial decisions on others: The credit mismanagement of a teacher imposes a negative externality on other members of the community through adverse effects on their children's education.

References

Aaronson, Daniel, Lisa Barrow, and William Sander, 2007, Teachers and student achievement in the chicago public high schools, *Journal of Labor Economics* 25, 95–135.

Agarwal, Sumit, Gene Amromin, Itzhak Ben-David, Souphala Chomsisengphet, Tomasz Piskorski, and Amit Seru, 2016, Policy intervention in debt renegotiation: Evidence from the Home Affordable Modification Program, *Journal of Political Economy, forthcoming* .

Agarwal, Sumit, Gene Amromin, Souphala Chomsisengphet, Tomasz Piskorski, Amit Seru, and Vincent Yao, 2015, Mortgage refinancing, consumer spending, and competition: Evidence from the Home Affordable Refinancing Program, Working paper.

Barro, Robert J., 2001, Human capital and growth, *American Economic Review* 91, 12–17.

Bernstein, Shai, Timothy McQuade, and Richard R. Townsend, 2016, The consequences of household shocks on employee innovation, Working paper.

Campbell, John Y., Stefano Giglio, and Parag Pathak, 2011, Forced sales and house prices, *American Economic Review* 101, 2108–2131.

Chetty, Raj, John N Friedman, Nathaniel Hilger, Emmanuel Saez, Diane Whitmore Schanzenbach, and Danny Yagan, 2011, How does your kindergarten classroom affect your earnings? evidence from project star, *Quarterly Journal of Economics* 126, 1593–1660.

Dobbie, Will, Paul Goldsmith-Pinkham, and Crystal Yang, 2015, Consumer bankruptcy and financial health, Working paper.

Dobbie, Will, and Jae Song, 2015, Debt relief and debtor outcomes: Measuring the effects of consumer bankruptcy protection, *American Economic Review* 105, 1272–1311.

Fryer, Roland G, 2013, Teacher incentives and student achievement: Evidence from new york city public schools, *Journal of Labor Economics* 31, 373–407.

Graff Zivin, Joshua, and Matthew Neidell, 2012, The impact of pollution on worker productivity, *American Economic Review* 102, 3652–3673.

Hanushek, Eric A., and Dennis D. Kimko, 2000, Schooling, labor-force quality, and the growth of nations, *American Economic Review* 90, 1184–1208.

Hanushek, Eric A, and Steven G Rivkin, 2006, Teacher quality, *Handbook of the Economics of Education* 2, 1051–1078.

Harris, Douglas, and Tim Sass, 2011, Teacher training, teacher quality and student achievement, *Journal of Public Economics* 95, 798–812.

Himmelstein, David U., Deborah Thorne, Elizabeth Warren, and Steffie Woolhandler, 2009, Medical bankruptcy in the United States, 2007: Results of a national study, *The American Journal of Medicine* 122, 741–746.

Ingersoll, Richard M., 2003, Is there really a teacher shortage?, *Center for the Study of Teaching and Policy* .

Jackson, C Kirabo, 2013, Match quality, worker productivity, and worker mobility: Direct evidence from teachers, *Review of Economics and Statistics* 95, 1096–1116.

Lavy, Victor, 2009, Performance pay and teachers' effort, productivity, and grading ethics, *American Economic Review* 99, 1979–2011.

Lazear, Edward P, 2000, Performance pay and productivity, *American Economic Review* 90, 1346–1361.

Maturana, Gonzalo, and Jordan Nickerson, 2016, Teachers teaching teachers: The role of networks on financial decisions, Working paper.

Mian, Atif, Kamalesh Rao, and Amir Sufi, 2013, Household balance sheets, consumption, and the economic slump, *Quarterly Journal of Economics* 128, 1687–1726.

Mian, Atif, and Amir Sufi, 2014, What explains the 2007–2009 drop in employment?, *Econometrica* 82, 2197–2223.

Pham, Michel T., 2007, Emotion and rationality: A critical review and interpretation of empirical evidence, *Review of General Psychology* 11, 155.

Rockoff, Jonah E., 2004, The impact of individual teachers on student achievement: Evidence from panel data, *American Economic Review* 94, 247–252.

Strauss, John, 1986, Does better nutrition raise farm productivity?, *Journal of Political Economy* 297–320.

Weisberg, Daniel, Susan Sexton, Jennifer Mulhern, and David Keeling, 2009, The widget effect: Our national failure to acknowledge and act on differences in teacher effectiveness., *Education Digest: Essential Readings Condensed for Quick Review* 75, 31–35.

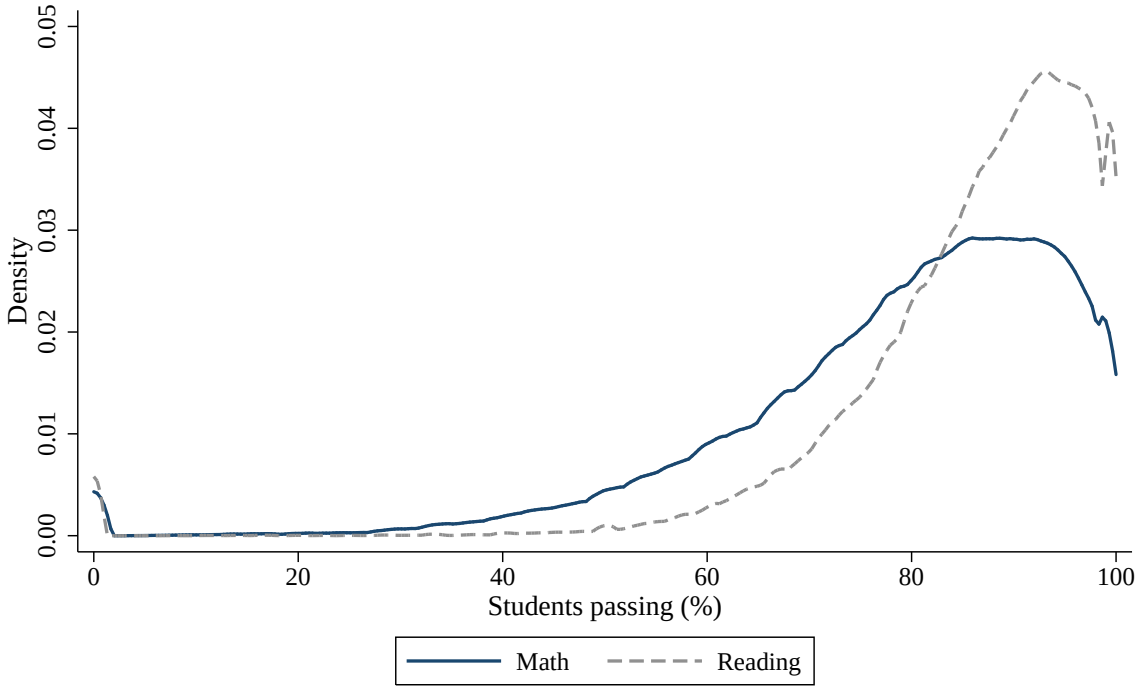

Figure 1. Kernel densities for the percentage of students passing

This figure presents the kernel densities for the percentage of students in each campus-grade achieving a passing score in mathematics (solid line) and reading comprehension (dashed line).

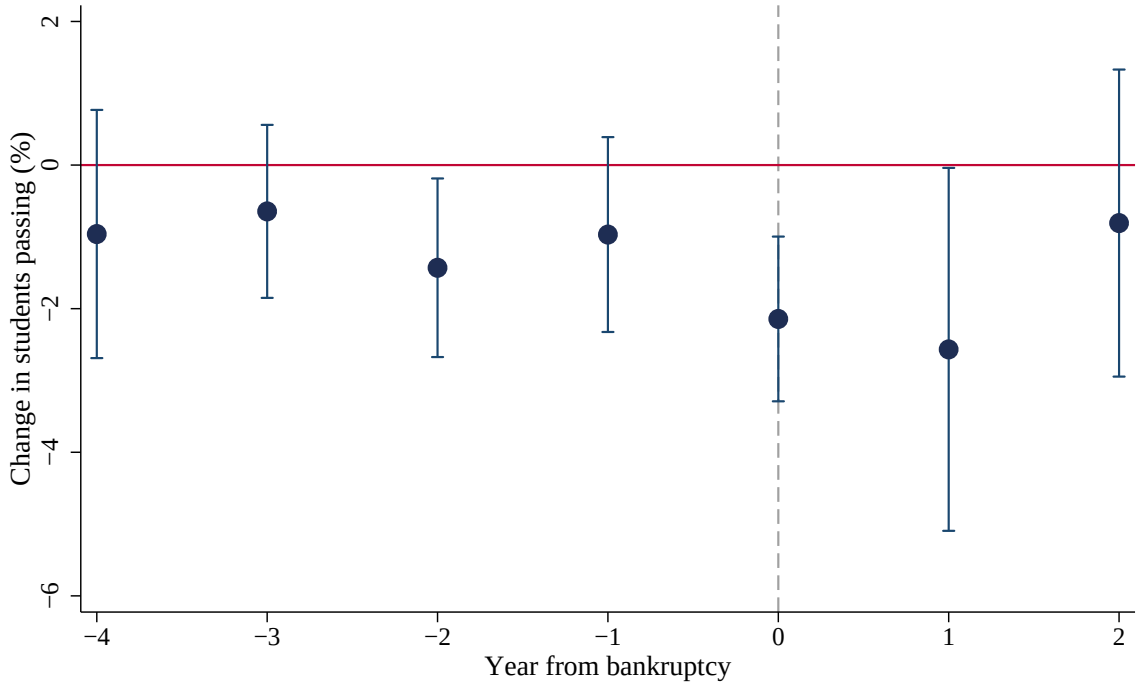

Figure 2. Time series effects of teacher's financial distress on student performance

This figure presents OLS coefficient estimates (along with their 95% confidence intervals) for the effects of a teacher's financial distress on student performance through time. The dependent variable is the percentage of students who meet state-mandated standards for mathematics, and the main variables of interest are different lead/lags of *1(bankruptcy)*, a dummy variable that takes the value of 1 for a teacher in a given school year if she files for bankruptcy from September of the school year to the following August, and 0 otherwise. Divorce and medical bankruptcy controls, a local bankruptcy control, teacher-level controls, student cohort-level controls, district-year fixed effects, and teacher fixed effects are also included in the regression. Confidence intervals are based on heteroscedasticity-robust standard errors clustered by teacher.

Table 1. Summary statistics

Panel A: Teacher/Cohort characteristics

	Mean	SD	p25	Median	p75
Bankruptcy					
1(bankruptcy) (%)	0.23	4.8	0.0	0.0	0.0
Teacher Characteristics					
Pay ($)	44,763	8,748	39,125	44,400	49,784
1(graduate degree) (%)	23.6	42.4	0.0	0.0	0.0
Experience (Yrs.)	11.1	9.4	3.0	8.0	17.0
Age (Yrs.)	42.1	11.3	32.0	41.0	51.0
Cohort characteristics					
Percent minority	45.5	31.0	17.9	38.9	72.6
Percent female	50.4	30.2	24.1	46.3	78.0
Percent at risk	32.9	19.9	17.5	30.8	45.9
Percent gifted	11.3	9.3	5.6	9.8	15.0

Panel B: Standardized test scores

	Mean	SD	p25	Median	p75
Percent pass math	81.6	15.1	74.4	84.8	92.7
Percent pass reading	88.1	11.6	83.3	90.8	96.0
Percent pass math (at risk)	61.7	24.6	48.0	65.5	80.0
Percent pass math (gifted)	82.6	36.7	96.0	100.0	100.0

This table describes the final sample. Panel A shows summary statistics of teacher and cohort characteristics and panel B shows summary statistics of the standardized test scores. The percentage of students who meet state-mandated standards for mathematics is also decomposed based on the population of students classified by the state as being *at-risk* and on the population of students classified by the state as being *gifted and talented*. The operator $1(\cdot)$ denotes a dummy variable.

Table 2. Effect of teacher's financial distress on student performance

Panel A: Mathematics

	(1)	(2)	(3)	(4)	(5)
1(bankruptcy)	-1.256***	-1.370***	-1.370***	-1.434***	-1.400***
	(-2.91)	(-3.11)	(-3.11)	(-3.21)	(-2.93)
Div & Med-bankruptcy controls	n	y	y	y	y
Local bankruptcy control	n	n	y	y	y
Teacher controls	n	n	n	y	y
Cohort controls	n	n	n	n	y
N	260,750	260,750	260,750	255,474	255,474
R^2	0.72	0.72	0.72	0.72	0.73

Panel B: Reading

1(bankruptcy)	-0.534	-0.648	-0.648	-0.651	-0.584
	(-0.99)	(-1.17)	(-1.17)	(-1.14)	(-0.96)
Div & Med-bankruptcy controls	n	y	y	y	y
Local bankruptcy control	n	n	y	y	y
Teacher controls	n	n	n	y	y
Cohort controls	n	n	n	n	y
N	261,019	261,019	261,019	255,743	255,725
R^2	0.66	0.66	0.66	0.66	0.67

This table shows OLS regressions in which the dependent variable is the percentage of students who meet state-mandated standards for mathematics (Panel A) and reading comprehension (Panel B), and the main variable of interest is *1(bankruptcy)*, a dummy variable that takes the value of 1 for a teacher in a given school year if she files for bankruptcy from September of the school year to the following August, and 0 otherwise. Divorce and medical bankruptcy controls, a local bankruptcy control, teacher-level controls, and student cohort-level controls are included as reported. All regressions include district–year fixed effects and teacher fixed effects. Reported t-statistics in parentheses are heteroscedasticity-robust and clustered by teacher. ***p<0.01, **p<0.05, *p<0.1.

Table 3. Effect of teacher's financial distress on student performance by vulnerability

	At-risk			Gifted		
	(1)	(2)	(3)	(4)	(5)	(6)
1(bankruptcy)	-3.508**	-3.674**	-3.487**	1.327	1.531	2.200
	(-2.28)	(-2.32)	(-2.31)	(0.78)	(0.87)	(1.38)
Div & Med-bankruptcy controls	y	y	y	y	y	y
Local bankruptcy control	y	y	y	y	y	y
Teacher controls	n	y	y	n	y	y
Cohort controls	n	n	y	n	n	y
N	257,916	252,663	252,663	243,278	238,330	238,330
R^2	0.58	0.58	0.60	0.62	0.62	0.69

This table shows OLS regressions in which the dependent variable is the percentage of students who meet state-mandated standards for mathematics, and the main variable of interest is *1(bankruptcy)*, a dummy variable that takes the value of 1 for a teacher in a given school year if she files for bankruptcy from September of the school year to the following August, and 0 otherwise. The dependent variable in the regressions in the left panel considers the population of students classified by the state as being *at-risk* and the dependent variable in the regressions in the right panel considers the population of students classified by the state as being *gifted and talented*. Divorce and medical bankruptcy controls, a local bankruptcy control, teacher-level controls, and student cohort-level controls are included as reported. All regressions include district-year fixed effects and teacher fixed effects. Reported t-statistics in parentheses are heteroscedasticity-robust and clustered by teacher. ***p<0.01, **p<0.05, *p<0.1.

Table 4. Effect of teacher's financial distress on student performance by age

	(1)	(2)	(3)
1(bankruptcy)	-1.001*	-1.731***	-1.825***
	(-1.84)	(-2.86)	(-2.73)
1(young)	3.058***	3.019***	3.183***
	(14.54)	(14.20)	(15.39)
1(bankruptcy)x1(young)	0.805	0.560	0.778
	(1.05)	(0.72)	(0.95)
Div & Med-bankruptcy controls	y	y	y
Local bankruptcy control	y	y	y
Teacher controls	n	y	y
Cohort controls	n	n	y
N	260,750	255,474	255,474
R^2	0.72	0.72	0.73

This table shows OLS regressions in which the dependent variable is the percentage of students who meet state-mandated standards for mathematics, and the main variable of interest is *1(bankruptcy)×1(young)*, the interaction of a dummy variable that takes the value of 1 for a teacher in a given school year if she files for bankruptcy from September of the school year to the following August, and 0 otherwise, and a dummy variable that takes the value of 1 if the teacher teaches grades 3 to 5, and 0 otherwise. Divorce and medical bankruptcy controls, a local bankruptcy control, teacher-level controls, and student cohort-level controls are included as reported. All regressions include district-year fixed effects and teacher fixed effects. Reported t-statistics in parentheses are heteroscedasticity-robust and clustered by teacher. ***p<0.01, **p<0.05, *p<0.1.

Table 5. Past student performance and teacher bankruptcy

	(1)	(2)	(3)
Student pass $[t-3]$	0.097	0.033	0.018
	(0.77)	(0.13)	(0.07)
Div & Med-bankruptcy controls	y	y	y
Local bankruptcy control	y	y	y
Teacher controls	n	n	y
District–year FE	y	y	y
Teacher FE	n	y	y
N	84,353	75,432	74,919
R^2	0.04	0.32	0.32

This table shows OLS regressions in which the dependent variable is *1(bankruptcy)*, a dummy variable that takes the value of 1 for a teacher in a given school year if she files for bankruptcy from September of the school year to the following August, and 0 otherwise, and the main variable of interest is the 3-year lag of the percentage of students who meet state-mandated standards for mathematics. Divorce and medical bankruptcy controls, a local bankruptcy control, teacher-level controls, student cohort-level controls, district-year fixed effects, and teacher fixed effects are included as reported. Reported t-statistics in parentheses are heteroscedasticity-robust and clustered by teacher. ***p<0.01, **p<0.05, *p<0.1.

Table 6. Turnover

Panel A: Failure defined as a teacher exiting the TEA records

	(1)	(2)	(3)	(4)
1(bankruptcy)	1.195	1.174	1.169	1.144
	(1.13)	(1.05)	(1.02)	(0.88)
Student pass	0.992	0.965***	0.964***	0.969***
	(-0.94)	(-4.31)	(-4.39)	(-3.77)
Pay		0.849***	0.849***	0.847***
		(-15.96)	(-15.97)	(-15.67)
1(graduate degree)		1.134***	1.133***	1.129***
		(6.33)	(6.31)	(6.09)
Age		0.963***	0.963***	0.963***
		(-30.62)	(-30.65)	(-30.96)
Div & Med-bankruptcy controls	y	y	y	y
Teacher demographics controls	n	y	y	y
Local bankruptcy control	n	n	y	y
Year FE	n	n	n	y
N	153,324	153,324	153,324	153,324

Panel B: Failure defined as a teacher transition between campuses or exiting the TEA records

	(1)	(2)	(3)	(4)
1(bankruptcy)	1.125	1.149	1.144	1.157
	(0.83)	(1.03)	(1.01)	(1.14)
Student pass	0.969***	0.948***	0.947***	0.949***
	(-5.50)	(-9.04)	(-9.28)	(-8.76)
Pay		0.946***	0.947***	0.949***
		(-7.01)	(-6.93)	(-6.60)
1(graduate degree)		1.125***	1.124***	1.123***
		(7.56)	(7.52)	(7.46)
Age		0.982***	0.982***	0.982***
		(-25.73)	(-25.70)	(-25.74)
Div & Med-bankruptcy controls	y	y	y	y
Teacher demographics controls	n	y	y	y
Local bankruptcy control	n	n	y	y
Year FE	n	n	n	y
N	130,758	130,433	130,433	130,433

This table shows hazard ratios of Cox Proportional Hazard model regressions. In Panel A, we *failure* as a teacher not appearing in the following year's employment records. If a teacher was employed before the beginning of the sample, we use the teacher's years of experience to compute the spell lengths. In Panel B, we also consider the possibility that a teacher transitions to another campus. The table displays hazard ratios for *1(bankruptcy)*, a dummy variable that takes the value of 1 for a teacher in a given school year if she files for bankruptcy from September of the school year to the following August, and 0 otherwise, *1(student pass)*, the percentage of students who meet state-mandated standards for mathematics (standardized), the teacher's pay (standardized), and *1(graduate degree)*, a dummy variable that takes the value of 1 for a teacher if she has a graduate degree, and 0 otherwise. Divorce and medical bankruptcy controls, a local bankruptcy control, teacher-level controls, and year fixed effects are included as reported. Reported z-statistics in parentheses are heteroscedasticity-robust. ***p<0.01, **p<0.05, *p<0.1.

Real Effects of Financial Distress of Workers: Evidence from Teacher Spillovers

Internet Appendix

Table IA.1. Main results excluding divorces and medical bankruptcies

Panel A: Mathematics

	(1)	(2)	(3)	(4)
1(bankruptcy)	-1.360***	-1.360***	-1.430***	-1.394***
	(-3.00)	(-3.00)	(-3.10)	(-2.80)
Local bankruptcy control	n	y	y	y
Teacher controls	n	n	y	y
Cohort controls	n	n	n	y
N	260,429	260,429	255,153	255,153
R^2	0.72	0.72	0.72	0.73

Panel B: Reading

	(1)	(2)	(3)	(4)
1(bankruptcy)	-0.623	-0.623	-0.626	-0.565
	(-1.07)	(-1.07)	(-1.03)	(-0.87)
Local bankruptcy control	n	y	y	y
Teacher controls	n	n	y	y
Cohort controls	n	n	n	y
N	260,698	260,698	255,422	255,404
R^2	0.66	0.66	0.66	0.67

This table repeats the estimation in Table 2 with the only difference that those teacher-year observations identified as medical bankruptcies or where divorces occurred are excluded from the sample.

Table IA.2. Sensitivity of the main results to medical expenses thresholds

Panel A: Mathematics

	Medical expenses threshold		
	\$50	\$500	\$2,500
	(1)	(2)	(3)
1(bankruptcy)	-1.402***	-1.415***	-1.268***
	(-2.90)	(-2.94)	(-2.62)
Div & Med-bankruptcy controls	y	y	y
Local bankruptcy control	y	y	y
Teacher controls	y	y	y
Cohort controls	y	y	y
N	255,474	255,474	255,474
R^2	0.73	0.73	0.73

Panel B: Reading

	Medical expenses threshold		
	\$50	\$500	\$2,500
	(1)	(2)	(3)
1(bankruptcy)	-0.550	-0.552	-0.511
	(-0.88)	(-0.90)	(-0.85)
Div & Med-bankruptcy controls	y	y	y
Local bankruptcy control	y	y	y
Teacher controls	y	y	y
Cohort controls	y	y	y
N	255,725	255,725	255,725
R^2	0.67	0.67	0.67

This table repeats the estimation in Table 2 using different definitions for the health-motivated bankruptcy indicator. Specifically, the \$1,500 threshold is replaced by thresholds of \$50, \$500, and \$2,500.

Table IA.3. Sensitivity of the main results to the number of bankruptcies threshold

Panel A: Mathematics

	Minimum number of bankrupcies per district required				
	Zero	One	10	15	25
	(1)	(2)	(3)	(4)	(5)
1(bankruptcy)	-1.313***	-1.313***	-1.338***	-1.540***	-1.269**
	(-2.86)	(-2.86)	(-2.74)	(-2.98)	(-2.25)
Div & Med-bankruptcy controls	y	y	y	y	y
Local bankruptcy control	y	y	y	y	y
Teacher controls	y	y	y	y	y
Cohort controls	y	y	y	y	y
N	354,932	354,932	225,477	202,205	181,173
R^2	0.74	0.74	0.73	0.74	0.74

Panel B: Reading

	Minimum number of bankrupcies per district required				
	Zero	One	10	15	25
	(1)	(2)	(3)	(4)	(5)
1(bankruptcy)	-0.667	-0.667	-0.468	-0.799	-0.649
	(-1.17)	(-1.17)	(-0.71)	(-1.17)	(-0.85)
Div & Med-bankruptcy controls	y	y	y	y	y
Local bankruptcy control	y	y	y	y	y
Teacher controls	y	y	y	y	y
Cohort controls	y	y	y	y	y
N	355,549	355,549	225,692	202,351	181,291
R^2	0.67	0.67	0.67	0.68	0.68

This table repeats the estimation in Table 2 in different samples that result from varying the minimum requirement for the number of bankruptcies in the district. Specifically, the threshold of 5 bankruptcies is replaced by thresholds of 0, 1, 10, 15, and 25 bankruptcies.