It's Not So Bad: Director Bankruptcy Experience and Corporate Risk Taking

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Abstract

This paper examines whether directors' experiences influence corporate policy. Using a hand-collected dataset, we document that firms begin taking more risks when one of their directors experiences a corporate bankruptcy at another firm where they concurrently serve as a director. This increase is concentrated among directors experiencing shorter, less-costly bankruptcies, which also tend to not negatively affect directors' careers. The findings suggest directors, on average, lower their estimate of distress costs after experiencing a bankruptcy first-hand. Our findings also suggest that directors, particularly non-independent directors, influence firm policies not only in their monitoring role but also in their advisory capacity.

Keywords: directors, bankruptcy, risk, experience

JEL: G34, G41, G32, G33

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1 Introduction

Companies often emphasize a director's past experience as a key factor in their hiring decisions. For example, Alcoa seeks directors that have substantial real-life experience, including working through difficult times, and Colgate-Palmolive states that directors "must have the requisite intelligence, education, and experience to make a significant contribution to the deliberations of the Board of Directors."[1] Despite this focus on past experience, relatively little is known about whether directors' past experiences affect their performance on the board. Moreover, while the extant literature focuses on the two roles that boards play – advising and monitoring management (e.g., Fama and Jensen, 1983; Adams and Ferreira, 2007), evidence on directors' influence on either activity is difficult to come by. In this paper, we assess the importance of directors' experience and its potential to influence the advice they provide.

The specific experience we focus on is corporate bankruptcy. In particular, we identify directors that were on the board of firms that declare bankruptcy and evaluate whether this experience is associated with a shift in risk taking at other firms whose board the director sits in. A personal experience with a corporate bankruptcy will likely affect a director's views on both the probability and costs of default. While such an event will likely increase the director's estimate of default probability for a given level of risk, its effect on the director's beliefs about default costs are unclear. For example, a protracted, contentious bankruptcy that results in liquidation might confirm a director's view that default is costly, while a quick, pre-packaged bankruptcy that results in a successful return to normal operations could cause the director to lower her estimate of default costs.

To analyze the importance of a director's bankruptcy experience, we construct a novel dataset that identifies firms that share at least one director with a firm that files for bankruptcy.

[1] See https://hbr.org/2015/01/where-boards-fall-short and https://www.colgatepalmolive.com/en-us/about/governance/independent-board-candidate-qualifications. The 2015 Harvard Business Review article, "Where Boards Fall Short," notes that "Boards that combine deep relevant experience and knowledge with independence can help companies break through inertia and create lasting value."

To do this, we begin with a list of all large, public company bankruptcy filings in the United States during 1994-2013 from the Lopucki Bankruptcy Research Database. We then use BoardEx and hand-collect data from proxy statements to obtain information on the identities and employment details of all directors employed at these firms. Using this information, we are able to identify 718 firms that share at least one director with 261 bankrupt firms. For brevity, we refer to the 718 firms as the "treated" firms, and the bankruptcy events we identify are spread throughout our sample period.

We assess three sets of risk measures at the treated firms - corporate financial policies such as book value of leverage, cash holding, and equity issuance; outcomes of firm risk such as cashflow volatility, stock volatility and distress; and measures of acquisition activity. The motivation behind using acquisition activity as a risk measure stems from the prior evidence of managers engaging in diversifying acquisitions to reduce firm risk (for e.g. Amihud and Lev, 1981; May, 1995; Cai and Vijh, 2007; Acharya, Amihud, and Litov, 2011; Gormley and Matsa, 2011, 2016).

In our empirical analysis, we estimate changes in risk taking at the treated firms using a difference-in-differences (DID) specification. The first difference is between the treated firms and the control firms, which are either all other (non-bankrupt) firms in Compustat or firms that are observationally similar (along size, profitability, and industry dimensions) to the treated firms before the bankruptcy event. The second difference is between the period before and the period after the director's bankruptcy experience. In all specifications, we include firm fixed effects to ensure that the effects we estimate come from within-firm variation in the dependent variable, three-digit SIC industry-by-time fixed effects to control for time-varying, industry-level changes, and state-by-time fixed effects to control for economic conditions at the state level.

We find that, on average, treated firms *increase* risk following a director's experience with bankruptcy. We detect this increase across the different measures of risk and find it to be economically significant. Relative to the sample average, financial leverage at the

treated firms increases by 5.2% in the years following the bankruptcy filing relative to other firms. This result is at least partly driven by active financing choices as the treated firms issue less equity and hold 14.1% less cash relative to the sample average after a director experiences corporate bankruptcy at another firm. Reflecting the higher risk in the corporate financial policies, cash flow volatility, stock volatility, and distress events also increase for the treated firms. Finally, treated firms engage in relatively fewer acquisitions and specifically, fewer diversifying acquisitions following a director's bankruptcy experience.

The increase in risk taking at the treated firms, while surprising at first blush, is reasonable if the bankruptcy experience lowers a director's assessment of default costs. This is more likely to occur following a bankruptcy that is quick and painless as opposed to a bankruptcy that is protracted and painful. We test this conjecture using three alternate measures of bankruptcy costs. Our measures include the number of days the firm spends in bankruptcy, a dummy variable that identifies instances when the firm is liquidated following bankruptcy, and the stock price reaction during the three-day window surrounding the bankruptcy filing. Both direct and indirect bankruptcy costs should increase with the time spent in bankruptcy, and while there is some debate regarding the relative direct costs of liquidation versus restructuring, Bris, Welch, and Zhu, 2006 show that restructuring enhances recovery for creditors as opposed to liquidation.

Consistent with this possibility, we find that the increase in risk taking is concentrated among treated firms where a director experiences a bankruptcy with below median costs. We find less evidence of a change in firms' risk taking when their directors experience an expensive bankruptcy at another firm. This indicates that more costly bankruptcies do not result in a significant change in the director's assessment of the default costs.

Prior literature highlights that corporate bankruptcies impose costs on the directors in terms of fewer future directorships (Gilson, 1990). In light of this, our result of an increase in risk following a director's experience with bankruptcy at another firm is surprising.

To unravel this puzzle, we examine directors' careers in the years after they experience bankruptcy at a company in which they sit as a director. Consistent with Gilson (1990), we find that the average number of directorships declines following a bankruptcy. However, this decline is concentrated among the more costly bankruptcies; we find less evidence of a decline in directorships following less expensive bankruptcies suggesting that such bankruptcies impose fewer costs on directors' future career. This helps rationalize our results.

We also document heterogeneity in treated firms' subsequent risk taking based on a director's status. We find more evidence of an increase in risk-taking when non-independent directors experience bankruptcy at another firm, suggesting that our results are driven by directors changing their advice as managers are more likely to seek advice from non-independent directors (Adams and Ferreira, 2007; Adams, 2009). Additionally, we find less evidence of an increase in risk taking among firms where the non-independent director experiencing bankruptcy also holds an executive position at the treated firm. This latter finding is consistent with the possibility that the potential costs of distress are more salient for executives.

Our findings do not appear to be driven by a selective matching between directors and firms where risk-seeking directors are more likely to be employed at riskier firms. While such a matching could explain both the bankruptcy and a higher level of risk taking at other firms the director sits on, it cannot easily explain why the increase in risk taking at the treated firms only occurs after the bankruptcy at the director's other firm, particularly for directors experiencing less costly bankruptcies. Further, the firm fixed effects that we include in all specifications help control for all such time-invariant factors.

A more relevant concern is that a director's firms may be subject to a common shock and that this explains our findings. Two factors that help mitigate this concern, however, are that (1) 86% of our treated firms do not belong to the same 48 Fama-French industry as the bankrupt firm on which the director also serves and (2) our findings are largely

confined to instances where a director's other firm experiences a less costly bankruptcy. If the results are driven by common shocks, one would expect greater effects for more costly bankruptcies as these likely occur following larger shocks. Furthermore, we take a number of steps in our empirical analysis to control for the possibility of common shocks. For example, we include state-time and industry-time fixed effects to control for all time-varying shocks that operate at the state- and industry-level, and we show that our findings are similar when comparing treated firms to that of observationally-similar control firms. Our findings are also robust to excluding treated firms that are from industries that are either a large customer or a large supplier to the industry of the bankrupt firm, as identified using the Benchmark Input-Output (I-O) tables. Thus, our results are unlikely to be driven by common shocks to the supply chain either.

We make three important contributions. First, since Graham (2000), the capital structure literature has tried to rationalize the "under-leverage" puzzle. Given the marginal tax rate and the magnitude of the interest tax-shield benefits, firms appear to have less debt financing than typical capital structure models would predict. A number of non-mutually exclusive explanations have been proposed, including financial conservatism (Minton and Wruck, 2001), accessibility to debt financing (Faulkender and Petersen, 2006), sensitivity of default probabilities to leverage (Molina, 2005), and financial constraints (Devos, Dhillon, Jagannathan, and Krishnamurthy, 2012). Our results indicate that an over-estimation of bankruptcy costs by directors could contribute towards explaining the under-leverage puzzle.

Second, our findings contribute to the literature that illustrates the advisory role of directors. The prior literature on directors primarily focuses on their monitoring role (for e.g. Weisbach, 1988; Kaplan and Reishus, 1990; Byrd and Hickman, 1992; Ferris, Jagannathan, and Pritchard, 2003; Hauser, 2018)[2]. The exceptions include survey evidence presented in Adams (2009) and work that examines the role of board expertise and in-

[2]See Hermalin and Weisbach (2003); Adams, Hermalin, and Weisbach (2009) for surveys of the literature on boards of directors with a focus on the monitoring role of boards.

formation on firm performance (e.g. Guner, Malmendier, and Tate, 2008; Duchin, Matsusaka, and Ozbas, 2010). Given that expertise and information can aid both the advisory and monitoring activities, it is difficult for the literature to disentangle one from the other (Brickley and Zimmerman, 2010; Dass, Kini, Nanda, Onal, and Wang, 2013). We on the other hand, focus on a shock to the director's experience that may alter the advice she provides about risk, and we provide evidence that firms act on that advice, particularly from non-independent directors. While it is possible that bankruptcy also changes a director's monitoring intensity, it is difficult to envisage why this would increase the level of risk a firm takes, particularly when managers have an underlying preference to take on too little risk (Gormley and Matsa, 2016), or why a change in monitoring would be larger among the directors that experience less costly bankruptcies, which is where the observed increase in risk taking is concentrated.

Third, our paper contributes to a literature that examines the effect of personal experiences on economic outcomes (Choi, Laibson, Madrian, and Metrick, 2009; Malmendier and Nagel, 2011; Cameron and Shah, 2013; Callen, Isaqzadeh, Long, and Sprenger, 2014; Koudijs and Voth, 2016; Malmendier and Nagel, 2016; Knupfer, Rantapuska, and Sarvimaki, 2017) and CEO risk preferences (Malmendier, Tate, and Yan, 2011; Hutton, Jiang, and Kumar, 2014; Roussanov and Savor, 2014; Cain and Mckeon, 2016; Schoar and Zuo, 2017). Closest to our work is Dittmar and Duchin (2016), which examines the effect of a CEO's (and CFO's) past professional experience on firm risk taking. They find that firms take less risk when managed by CEOs who experienced distress in a past professional, non-director experience, whereas we find that firms take more risk when they have a director who recently experienced bankruptcy at another firm where they act as a director. The difference in findings may be due to a larger career penalty distress events impose on CEOs and other top executives as opposed to directors. If the distress event results in the executive losing her job and incurring large personal financial losses, then she is likely to internalize a higher cost than a director that does not experience a similar penalty. Thus,

similar to Bernile, Bhagwat, and Rau (2017), our paper highlights the importance of conditioning on the experienced cost of distress to understand its effect on future economic outcomes.

2 Empirical Framework & Data

2.1 Empirical Framework & Identification

We evaluate the effect of director bankruptcy experience on firm risk using a difference-in-differences (DID) framework. The first difference is between the treated firms (i.e. the firms that share at least one board member with a firm that files for bankruptcy) and the control firms (i.e., all other firms in Compustat). The second difference is between the period before and the period after bankruptcy of the "interlocked" firm, where we use interlocked here to refer to the firm that shares a director with the treated firm. Specifically, we estimate the following model:

$$y_{i,j,t} = \beta_0 \times Treated_i \times Post_t + \delta_i + \delta_{s,t} + \delta_{j,t} + \epsilon_{i,j,t} \quad (1)$$

where y is a measure of risk taking by firm i, industry j, in year t. *Treated* is a dummy variable that takes a value one for firms that share a director with a firm that declares bankruptcy, and *Post* is a dummy variable that takes a value one for the years following bankruptcy and zero otherwise. δ_i represents firm fixed effects that control for firm-level, time invariant characteristics. $\delta_{s,t}$ and $\delta_{j,t}$ are state-by-year and three-digit SIC industry-by-year fixed effects that control for time-varying state- and industry-level characteristics respectively. The inclusion of state-by-year and industry-by-year fixed effects ensures that our DID estimates are robust to shocks that operate at the state- and industry-level, respectively. For example, while the former will control for state-level business cycles, the latter will control for differential trends across the industries. Following prior literature

(e.g, Henderson and Ono, 2008), we identify a firm's state based on the location of its headquarters.

The identifying assumption in this DID framework is of parallel trends. That is, we assume that in the absence of bankruptcy of the interlocked firm, the outcome variables for the treated and control firms would trend in a parallel manner. While there is no way to test this assumption in the post-treatment period, we test this for the pre-treatment period by examining the difference in trends in outcome variables between treated and control firms before the bankruptcy filing.

Because the average treated firm in our sample might differ from the average Compustat firm on a number of observable dimensions, we repeat our tests within a matched sample of treated and observationally-similar control firms. Specifically, for every treated firm in our sample, we choose up to three control firms from among the non-bankrupt Compustat firms that are from the same three-digit SIC industry and size (total assets) decile as the treated firm, and that are closest to the treated firm in terms of size and profitability (ROA) in the year immediately prior to bankruptcy of the interlocked firm. We use the Mahalanobis distance to identify the closest match and match with replacement. This yields a total of 1,799 control firms for the 718 treated firms in our matched sample. The matched control sample is less than three times the number of treated firms because some treated firms lack three other control firms from the same three-digit SIC code and size decile and because some matched firms act as control firms for more than one treated firm. Using a matched sample helps support the parallel trends assumption because the control firms look similar to the treated firms prior to bankruptcy, and hence, absent bankruptcy, are more likely to have similar post-bankruptcy trends as the treated firms.

While the inclusion of firm fixed effects controls for all unobservable, time-invariant commonalities across the treated and control firms, including the average risk preferences of a firm's directors, a remaining threat to our estimates are common shocks that affect

both the firm that declares bankruptcy and the treated firm. The state-year and industry-year fixed effects will control for such shocks that operate at the state- and industry-level. Moreover, our cross-sectional tests that differentiate across bankruptcies based on their cost and the characteristics of the connected director will also help with the interpretation of our results as it is unclear why such common shocks would differentially affect firms based on these characteristics. Finally, we will do robustness tests to ensure that our results are not due to shocks that affect supply-chain networks.

2.2 Data Sources & Sample Construction

Using Lynn Lopucki Bankruptcy Research Database (BRD), we begin by identifying all large, public-company bankruptcy filings in the United States between 1994-2013.[3] This gives us a total of 745 unique firms that file for bankruptcy. We next use BoardEx and SEC's EDGAR database to obtain information on the identities and employment histories of the directors serving at each bankrupt firm at the time of filing. BoardEx, marketed by Management Diagnostic Limited, provides information on directors' employment history, including current primary employment and outside roles. Since BoardEx's coverage is limited before 2002, we are only able to find information on directors for 116 of the 745 bankrupt firms. Because of this, we complement the Boardex database by hand-collecting information on the directors of bankrupt firms from the last proxy statement (Def 14 form) filed before bankruptcy, as accessed from the EDGAR database, which begins in 1994. The proxies provide information on the identities of the directors, their age, recent employment history, and other concurrent positions. Using information from proxy statements, we are able to collect information on directors employed at the time of filing for 240 additional firms. Of these 356 firms for which we have information on their board of directors,

[3]Large public company bankruptcy cases are defined as cases where the debtor filed a form 10-K with the Securities Exchange Commission in the three years prior to bankruptcy and reported assets of more than $100 million (measured in 1980 dollars) on the last form 10-K filed before bankruptcy. The Lopucki BRD covers all such filings in the US since 1979 (Lopucki and Doherty, 2007), but we start our sample in 1994, which is when we have data on directors.

we are able to identify 261 firms that share a director with another public firm at the time of the bankruptcy filing and 718 firms that share a director with these 261 firms.

The 261 bankruptcy filings are staggered over the sample period. Figure 1 (Panel A) plots the year-wise distribution of bankruptcies of interlocked firms in our sample. Bankruptcies occur every year between 1994 and 2013 with the highest number during 2001, the year of the dotcom bust. The staggered bankruptcies over the 20-year period helps alleviate the concern that our results may be due to a particular economic event. It is worth noting that there aren't as many bankruptcies in our sample during the 2007-09 financial crisis because of a decline in the average number of directorships for individual directors. This results in a decline in the proportion of bankrupt firms that share a common director with other public firms during the latter half of the sample period. This is evident from Panel B wherein we present the year-wise distribution of all bankruptcies from the Lopucki database between 1994 and 2013. As can be seen, the number of bankruptcies peak during the 2007-09 financial crisis.

We obtain firm financial data from Compustat and exclude financials (SIC 6000 - 6999), utilities (SIC 4900 - 4999), and public administration/non-classifiable firms (SIC 9000 - 9999) from the sample. Our data on acquisitions comes from the Securities Data Company's (SDC) U.S. Mergers and Acquisitions Database, and stock price information is obtained from CRSP.

2.3 Sample Statistics & Quality of Match

We first report the industry distribution of the treated and bankrupt firms in Table 1. The treated firms in our sample are spread over 40 of the 48 Fama-French industries with the highest number belonging to Business Services, Communication, and Petroleum & Natural Gas industry groups. Over 86% of the treated firms belong to a different 48 Fama-French industry than their interlocked bankrupt firm. For most industries represented in the sample, none of the treated firms belong to the same industry as the corresponding

interlocked bankrupt firm. This reduces the concern that our subsequent estimates are biased by common industry shocks that simultaneously affect both the bankrupt firm and the treated firm.[4]

We next discuss the summary statistics for our sample and compare treated firms to control and Compustat firms in Table 2. The variables are grouped into two categories - matching variables (the variables used as covariates for matching) and outcome variables (the risk measures of interest). All variables are winsorized at the 1% and 99% levels and defined in the Appendix. While the values for treated and control samples are reported for the year immediately prior to treatment, the values for Compustat sample are for the entire sample period. The last two columns in the table report the differences between the mean characteristics of treated and control firms, and treated and Compustat firms respectively.

Along with matching on three-digit SIC industry and size decile, we use two other matching variables, $Log(Total\,Assets)$ and ROA, to account for firm size and profitability for the year prior to bankruptcy of an interlocked firm. The mean (median) value for $Log(Total\,Assets)$ among the treated firms is 6.52 (6.47) which corresponds to a book value of total assets of $678.6 million ($645.5 million). The median firm in our treated sample has an ROA of 11%. From the last two columns, we find that the average treated firm in our sample is larger and more profitable than the average Compustat firm but is statistically indistinguishable from an average control firm along these dimensions.

The next set of variables measure firm risk. Compared to an average Compustat firm, the average firm in our treated sample has higher leverage, holds similar cash amounts, and issues less equity. In the year before matching, the average treated firm is similar to the average control firm across these dimensions. Firms in our treated sample have lower stock volatility and distress risk than Compustat firms but as before, are similar to the

[4]While most industries don't share treated and corresponding interlocked firms, close to 48% of treated firms in the communication industry belong to the same industry as the interlocked bankrupt firm. In unreported analysis, we find that are results are robust to omitting communication industry from our sample.

firms in the control sample. Finally, an average firm in our treated sample is more likely to make an acquisition than both an average Compustat firm and an average control firm. To summarize while there is no uniform pattern in the ex ante level of risk taking between the treated and Compustat firms, the treated firms are similar to control firms across all dimensions except number of acquisitions.

A potential concern from this discussion is that the residual differences between the treated and control firms in their acquisition behavior may bias our estimates. To address this concern, we later conduct a robustness test where we expand our matching criteria to include the outcome variable as a matching covariate and repeat our main tests. We do this matching separately for each outcome variable and find similar results.

3 Empirical Results

3.1 Director Bankruptcy Experience and Firm Risk

We first examine the association between a firm's risk taking and the occurrence of a bankruptcy at an interlocked firm. To the extent the bankruptcy results in the director updating her beliefs about the costs of default, it is likely to affect the advice she provides other firms at which she is a director. This in turn may affect the extent of risk such firms take on. To evaluate this, we estimate the association between bankruptcy of an interlocked firm and *Leverage, Cash, Equity issuance, Distress, Expected Default Frequency, Cash Flow Volatility, Operating Assets Volatility, Stock Volatility* and the firm's acquisition behavior. We choose these outcomes to mirror the risk-taking measures analyzed in previous papers (e.g., Gormley and Matsa, 2016).

3.1.1 Leverage, Cash Holdings and Equity issuance

In column (1) of Table 3, our outcome variable is *Leverage,* and we estimate equation (1) within the matched sample and report the results. The estimate shows that, relative

to the matched control sample, treated firms experience an increase in *Leverage* in the years following the bankruptcy of an interlocked firm. Our estimate of 1 percentage point higher leverage among the treated firms is also economically significant as it corresponds to an increase that is 5.3% of the sample average for treated firms in the year prior to bankruptcy of an interlocked firm.

In column (2) our outcome variable is *Cash* and we find that following bankruptcy of an interlocked firm, cash holdings at the treated firms goes down relative to the control firms. In the years following bankruptcy of the interlocked firm, cash holdings at the treated firms decrease by 3.8 percentage points. This again is economically significant as it corresponds to 20% of the sample average of cash holding among the treated firms prior to bankruptcy of an interlocked firm.

Finally, in column (3), we investigate *Equity issuance*. This variable measures the difference between the cashflow from total equity issuance and repurchases scaled by the lagged book value of total assets. The estimates reported in column (3) show that treated firms issue approximately 2.1 percentage points less equity than the control firms in the years following the bankruptcy of an interlocked firm.

We repeat our analysis after including all non-treated, non-bankrupt, Compustat firms in the control sample in columns (4) through (6) and find similar results for *Leverage* and *Equity issuance,* but the estimate for *Cash* is no longer statistically significant. The similarity of findings is not surprising given our inclusion of both industry-year and state-year fixed effects, which ensures that we are comparing treated and untreated firms within the same industry and operating in the same state. While the treated firms are different that the typical Compustat firm in an unconditional sense (as shown in Table 2), these additional controls, along with the firm-level fixed effects, help control for such differences in our estimation.

As mentioned before, the underlying assumption in our DID estimation is that, if not for bankruptcy of the interlocked firm, the outcome variable for the treated and control

firms would follow parallel trends. We evaluate this assumption in Figure 2 by estimating a dynamic version of equation (1) where instead of $Post_t$ we include a set of dummy variables that identify the years relative to the year of bankruptcy and plot the coefficient estimates with *Leverage* as the outcome variable. The sample includes our treated firms and observationally-similar control firms. The horizontal axis represents years relative to the bankruptcy year and the vertical axis measures the magnitude of the coefficient estimates. We present the coefficient estimates in the four-year window around the year of bankruptcy (which is denoted by year 0) from a fully-saturated model where we set the base year as the year immediately before the bankruptcy by omitting the dummy variable for that year from the estimation. The vertical bars represent confidence intervals at 90% level. We find that none of the coefficient estimates for the pre-bankruptcy period are statistically significant. This shows that both the treated and control firms have parallel trends in *Leverage* during the pre-treatment period. The increase in *Leverage* begins only in the year of bankruptcy of an interlocked firm and continues to grow in the years afterward.

It is somewhat surprising that the increase in leverage begins in the year of bankruptcy. If the results are due to directors learning from the bankruptcy process, then one would expect a delay in the response. However, our subsequent tests reveal that our results are entirely driven by bankruptcies that resolve quickly. The median resolution time for these bankruptcies is 182 days. To the extent the board member is able to learn about the cost of the process earlier than this, the quick response we find may not be all that surprising. Furthermore, our results indicate that part of the increase in leverage is due to less equity issuance among the treated firms. Thus, to the extent the change is due to a passive lack of financing, rather than active rebalancing, the timing of the observed shift is also reasonable.

3.1.2 Volatility and Distress

The results reported in Table 3 show that following the bankruptcy of an interlocked firm, treated firms increase leverage and reduce cash holding and equity issuances relative to non-treated firms. If such actions increase firm risk, then we should be able to detect it using measures of overall firm risk, such as distress, default risk, and volatility. Table 4 reports our findings for these measures of overall risk.

In column (1), we use *Distress* as our dependent variable. This is a dummy variable that equals one when firms exit our sample because of bankruptcy, liquidation, or other performance-related reasons (as defined in Boualam, Gomes, and Ward (2015); Gormley and Matsa (2016)). We construct this variable using CRSP delisting codes. The estimate in column (1) shows that *Distress* for treated firms increases by 1.2 percentage points in the five years following bankruptcy relative to the control group of firms. The economic magnitude of the effect is large as only about 1% of Compustat firms experience distress, as measured using *Distress*, in an average year.

Column (2) reports results on *Expected default frequency*, which measures the likelihood of default based on Merton's distance to default measure (Bharath and Shumway (2008)). We find that *Expected default frequency* increases by 1.8 percentage points for treated firms following bankruptcy of an interlocked firm relative to the control firms. This increase is economically large as it corresponds to 28.1% of the sample mean of *Expected default frequency* for treated firms in the year prior to bankruptcy of the interlocked firm.

In columns (3) and (4), we test for changes in *Cash flow volatility* and *Operating assets volatility*, which are two measures of business risk taking used in Gormley and Matsa (2016). *Cash flow volatility* is defined as the annual standard deviation of the ratio of quarterly cash flow to book value of total assets. The reported estimate shows that *Cash flow volatility* increases by 1.1 percentage points relative to the control group following the bankruptcy, and this corresponds to 17.4% of the sample mean for the treated firms in the year prior to bankruptcy of an interlocked firm. *Operating assets volatility* is the product of

a firm's stock price volatility and the ratio of market value of equity to operating assets. It approximates the volatility of a firm's return on operating assets. We find that *Operating assets volatility* increases by 1.7 percentage points for treated firms relative to the control group during in the years following bankruptcy of an interlocked firm.

In column (5) we test for changes in *Stock volatility*, as measured using the standard deviation of daily stock returns over the previous 250 trading days. The estimates show that *Stock volatility* for treated firms increases by 0.2 percentage points as compared to the control firms in the years following the bankruptcy of an interlocked firm. This represents a 5% increase relative to the average of stock volatility for treated firms in the year prior to treatment.

We repeat our analysis for all variables after including all non-treated, non-bankrupt Compustat firms in the control sample in columns (6) through (10) and find similar results.

To evaluate any pre-trends in *Distress* between treated and control firms, we estimate equation (1) within the matched sample where we substitute $Post_t$ with a set of dummy variables that reference the year relative to the year of treatment and plot the coefficients in Figure 3. We find that the estimates for the pre-bankruptcy period are not statistically different from zero. This shows that there is no significant difference in trends in *Distress* between treated and control firms in the period before treatment. However, the plot shows that distress risk increases significantly beginning from one year following the bankruptcy of an interlocked firm.

3.1.3 Firm Acquisition

In our next set of tests we examine if a director's bankruptcy experience is associated with a change in corporate acquisition activity. A large literature in finance identifies acquisitions, and specifically diversifying acquisitions, as a way to reduce firm risk (for e.g. Amihud and Lev (1981); May (1995); Cai and Vijh (2007); Acharya et al. (2011); Gormley

and Matsa (2011, 2016)). If bankruptcy of an interlocked firm affects the firm's attitude towards risk, then it may also affect its likelihood of engaging in acquisitions.

To evaluate the effect on acquisitions, we obtain data from the SDC Mergers and Acquisitions database. Following previous research, we exclude acquisitions that meet any of the following five criteria: (1) the ratio of the deal size to market value of the acquirer's assets is less than 1%, (2) the acquiring firm controls more than 50% of the target prior to the announcement date or less than 100% after the acquisition was completed, (3) the ultimate parent of the acquirer and the target are the same (i.e., consolidations within holding companies or buybacks), (4) either the acquirer or the target is a financial firm, and (5) the deal was not completed within one thousand days of the announcement date. Following Gormley and Matsa (2016), we construct four variables to measure a firm's acquisition activity. These capture the number and value of all acquisitions and specifically diversifying acquisitions by a firm in a year. For a target firm, SDC lists a primary four-digit SIC code and up to nine other four-digit SIC codes that represent "any small sidelines the company is involved in" (Thomson Financial, 1999). An acquisition is defined as diversifying if the acquirer's primary SIC code does not match any of the SIC codes of the target. Our estimates for acquisitions are reported in Table 5.

We find that as compared to the matched control firms, treated firms undertake 0.13 less acquisitions per year following bankruptcy of an interlocked firm (Table 5, Column 1). As before, the economic magnitude of this effect is large as it corresponds to 19% of the average *Number of acquisitions* for treated firms in the year prior to bankruptcy of an interlocked firm. In column (2), we model *Any acquisition,* a dummy variable that identifies years in which a firm undertakes at least one acquisition. We find that treated firms are 2.1 percentage points less likely to announce an acquisition in a year following bankruptcy of interlocked firms relative to the control firms.

Next, we examine the effect of director bankruptcy experience on acquisition value which we calculate as the sum of value of all acquisition deals announced by the firm

in a given year normalized by lagged book value of total assets. Column (3) reports the results. The estimates show that the value of acquisitions decreases among treated firms by 4.8 percentage points in the years following the bankruptcy of an interlocked firm relative to the control group.

Finally, we analyze the *Number of diversifying acquisitions* in column (4) and find that they too decline following the bankruptcy of an interlocked firm. On average, treated firms undertake 0.05 less diversifying acquisitions per year after the bankruptcy of an interlocked firm relative to the control firms. This effect is economically significant as it corresponds to 14.9% of the sample mean for the treated firms in the year prior to treatment.

We repeat our analysis after including all non-treated, non-bankrupt Compustat firms in the control sample in columns (5) through (8) and find similar results.

As before, we evaluate any pre-trends in acquisition behavior between treated and control firms by estimating a dynamic version of equation (1) where we substitute $Post_t$ with a set of dummy variables that reference the year relative to the year of treatment and plot the coefficients in Figure 3. We find that the estimates for the pre-bankruptcy period are not statistically different from zero. This shows that there is no significant difference in trends in the acquisition behavior between treated and control firms before treatment. However, the plot shows that the number of acquisitions decline significantly beginning from one year following the bankruptcy of an interlocked firm.

3.2 Cost of Bankruptcy and Firm Risk

The results so far indicate that firms increase risk following the bankruptcy of an interlocked firm, which is consistent with the possibility that, on average, directors reduce their estimate of default costs following bankruptcy, which then affects the advice they provide other firms.

In this section, we assess this possibility by analyzing cross-sectional heterogeneity

in the association between director bankruptcy experience and firm risk. In particular, if directors' bankruptcy experiences are leading them to, on average, reduce their estimate of default costs, we would expect to find the observed decline in risk taking to be concentrated among directors that go through a relatively less painful bankruptcy. To test for this, we modify our empirical specification into the following form:

$$y_{i,j,t} = \beta_1 \times Treated_i \times Post_t \times Above + \beta_2 \times Treated_i \times Post_t \times Below + \delta_i + \delta_{s,t} + \delta_{j,t} + \epsilon_{i,j,t} \quad (2)$$

where *Above* (*Below*) is a dummy variable that takes a value of one if the cost of bankruptcy of the interlocked firm is above (below) sample median.

Bankruptcy costs include both direct and indirect costs. The former should include the out-of-pocket expenses related to the bankruptcy proceedings including filing, legal, and professional fees. The latter would include lost profits from foregone sales, the costs of asset sales at prices below the best use value (Eckbo and Thorburn (2008)), and distortions in investment and financing policies resulting from the bankruptcy process.

We use three different measures of bankruptcy costs - *Time in bankruptcy*, the number of days the firm spends in bankruptcy, *Liquidated*, a dummy variable that identifies instances when the firm is liquidated following bankruptcy, and the stock price reaction during the three-day window around the bankruptcy filing date. Both direct and indirect bankruptcy costs should increase with the time spent in bankruptcy (e.g., Altman (1984)).[5]Hence, in regressions where we use *Time in bankruptcy* as our measure of bankruptcy costs, we use *Above* to identify instances when the time in bankruptcy is above the sample median. Bris et al. (2006) show that the loss from bankruptcy in terms of asset values are greater when the firm is liquidated as opposed to restructured. Although they highlight that the direct costs are similar across the two modes of resolution. When we measure bankruptcy costs using *Liquidated*, *Above* is an indicator for liquidation after bankruptcy. Since the stock

[5]In contrast Covitz, Han, and Wilson (2006) argue for an optimal time in bankruptcy and argue for a non-linear relationship between costs and time.

price reaction should capture the total value impact of the bankruptcy announcement for the firm's shareholders, *Above* in estimations that use stock price reactions identifies instances when the stock returns around the bankruptcy announcement are below the sample median.

Table 6 reports the results of estimating equation (2) with *Above* and *Below* defined based on time in bankruptcy. From Column (1), we find that the increase in *Leverage* among treated firms occurs only when the interlocked firm spends less than median time in bankruptcy. *Leverage* for such treated firms increases by 1.7 percentage points following bankruptcy of the interlocked firm. We find little evidence that leverage for treated firms interlocked with firms that spend above median time in bankruptcy changes following the bankruptcy event. The difference between the two sets of interaction terms is economically large at 7.8% of the mean leverage for treated firms in the year immediately prior to the bankruptcy of an interlocked firm, and the difference is statistically significant (p-value = 0.094).

In column (2) we repeat our tests with *Distress* as the dependent variable and again find that the decline in distress is confined to the treated firms that are interlocked with firms that spend below median time in bankruptcy. As before, we find that the coefficient on $Treated_i \times Post_t \times Above$ is statistically different from that on $Treated_i \times Post_t \times Below$ where the difference is economically large and statistically significant. Finally, in columns (3) we model acquisition activity and find that the number of acquisitions decline only for the treated firms that are interlocked with bankrupt firms that spend less time in bankruptcy. Overall, these estimates show that our results are primarily driven by bankruptcies of interlocked firms that are resolved relatively quickly. Note that to conserve space we do not repeat our triple interaction tests with all our outcome variables.

In Table 7, we present our triple-interaction estimates wherein we employ *Liquidated* as our proxy for bankruptcy costs. Similar to the results in Table 6, we find that the evidence of an increase in risk-taking is strongest among bankruptcies that involve lower

costs, i.e., where the firm was not liquidated following bankruptcy. The difference between samples, however, is only statistically significant in one of the three estimations, and we do find some evidence of an increase in risk-taking among treated firms that have a director that experiences liquidation at another firm. The smaller difference between the two subsamples might suggest that *Liquidated* is not as good of a proxy for bankruptcy costs as *Time in bankruptcy.*

In Table 8, we present our triple-interaction estimates using the stock return following bankruptcy announcement of the interlocked firm as our measure of bankruptcy costs. Consistent with earlier results, we find that the increase in risk occurs only among the treated firms interlocked with a firm that experiences a less costly bankruptcy, as now measured using a below-median stock price decline following the bankruptcy announcement. However, the difference in point estimates across bankruptcy types is not statistically significant in any of the three specifications.

To summarize, the increase in risk among treated firms is concentrated among bankruptcies that are less expensive. These results support our hypothesis that the risk changes are a result of the advice provided by the director who experiences a bankruptcy firsthand, rather than some common shock to a directors' firms.

3.3 Bankruptcy and Directors' Career

Prior literature argues that directors suffer negative career outcomes when their firms file for bankruptcy (Gilson, 1990). Our results so far indicate that treated firms actually increase risk following bankruptcy of an interlocked firm, especially when the cost of bankruptcy is low. It would be counter-intuitive, however, for interlocked directors to encourage greater risk taking at their other firms when the initial bankruptcy adversely affects their career (e.g., loss of directorships at other firms). One possibility that will help reconcile these two sets of findings is if the adverse career outcomes largely happens only after costly bankruptcies. We now test for this possibility using the number of

directorships as our measure of directors' career outcomes.

In Table 9, our sample includes all the directors that experience bankruptcy, and the dependent variable is their total number of directorships. Restricting the sample to the year before and the year after the bankruptcy, we find evidence that is consistent with the existing literature. In particular, directors lose, on average, 24% of their directorships in the year following bankruptcy.

In columns (2) through (4), we differentiate the bankruptcies based on our proxies for the cost of bankruptcy. We find very strong evidence of a decline in directorships among the more expensive bankruptcies, i.e. the decline is significant if the firm spends more time in bankruptcy, or is liquidated following bankruptcy, or if the firm experiences below median stock price reaction during the bankruptcy filing announcement. In all three cases, the decline in directorships is statistically significant at the 1% level. We find less evidence that less costly bankruptcies are associated with a decline in directorships. While the coefficient is always negative, it is only statistically significant at the 10% level in one of the three specifications. Moreover, when we use stock returns as a proxy for bankruptcy costs (column (4)), the difference between below and above median bankruptcy costs is statistically significant, indicating that more costly bankruptcies are associated with a greater loss in directorships.

The weaker evidence of a career penalty following a less expensive bankruptcy helps rationalize the increase in risk that we observe in the treated firms.

3.4 Director Heterogeneity

In this section, we assess whether characteristics of the director experiencing bankruptcy are associated with the observed increase in risk taking at treated firms. To do this, we estimate triple-interactions similar to what was done in Section 3.2.

The source of director heterogeneity we analyze is whether the director experiencing bankruptcy at the interlocked firm is an 'independent' director, 'executive' director (i.e.,

a non-independent director that currently sits on the management team of the firm), or a 'gray' director (i.e., a non-independent director with some connection to the firm, like being a former employee). These three categories are mutually exclusive and span the set of possible classifications. This comparison helps shed light on the potential mechanism by which a director's experience matters: advice versus monitoring. In particular, if the observed increase in risk taking is driven by directors changing the advice they provide, then we might expect to observe the increase to be concentrated among treated firms where the director experiencing bankruptcy is non-independent (i.e., gray or executive directors). Non-independent directors are more likely to be connected to management and more likely to serve in an advisory role (Adams and Ferreira, 2007; Adams, 2009). But, if the observed increase in risk taking is driven by the director being distracted and engaging in less monitoring of the treated firm's management, then we might expect the increase in risk to be concentrated among firms where it is an independent director that experiences bankruptcy. Independent directors are generally thought to provide a stronger monitoring role (e.g., Fama and Jensen, 1983; Adams and Ferreira, 2007).

This heterogeneity also allows us to examine whether the expected costs of distress experienced by executives are different from that experienced by directors. If the personal costs of distress are higher for executives than directors, then affected directors that both sit on the board and serve on the executive team at the treated firm (i.e., executive directors) might be less likely to tolerate an increase in risk at the treated firm regardless of their recent bankruptcy experience. Distress at the treated firm would likely be more costly for directors that also serve as part of the executive team.

Consistent with a shift in the advice provided by directors and costs of distress being higher for executives, we find evidence that the observed increase in risk is concentrated among treated firms where it is a gray director that experiences bankruptcy. This is seen in Table 10. We find increases in leverage, reductions in distress, and fewer acquisitions among treated firms where a gray director experiences bankruptcy at an interlocked firm.

We do not, however, find significant evidence of such shifts in risk-taking when independent or executive directors experience bankruptcy. These findings are consistent with a shift in advice rather than a shift in monitoring, and with costs of distress being higher for executives than directors.

Our earlier findings also bolster the argument that a shift in advice, rather than monitoring, is the more plausible mechanism. Given managers' underlying preference to take on too little risk (Gormley and Matsa, 2016), it is unclear why a reduction in monitoring would result in an increase in risk taking by the treated firms. It is also unclear why a reduction in monitoring would be larger among the directors that experience less costly bankruptcies, as found in Section 3.2.

4 Robustness

In this section we perform a number of robustness tests.

Although over 86% of our treated firms do not belong to the same industry as their interlocked bankrupt firms, these firms could potentially be linked through supply chain networks and our results could be due to such links. To rule out this possibility, we begin by identifying supply-chain relationships between the industries of the treated and bankrupt firms. We gather information on industry trade from the Use table of the Benchmark Input-Output (I-O) tables published every five years by the Bureau of Economic Analysis (BEA). Our approach to identifying related industries follows Dass et al. (2013) and is as follows. Consider a pair of distinct I-O industries: industry i and industry j, where industry i (j) is the industry of the treated (bankrupt) firm. We would like a measure that captures the economic importance of industry j to industry i (and not the other way around) through being either a customer or a supplier. Let a% (b%) be the percentage output (input) of industry i that is used by (comes from) industry j. We classify industry j as "related" to industry i via the supply chain if the sum of a% and b% exceeds 0.1%. Note

that Dass et al. (2013) define firms to be related if the sum of a% and b% exceeds either 1%, 5% or 10%. We instead adopt a more conservative cut-off to avoid any semblance of linkage.

We repeat our tests within the subsample of treated (and corresponding control) firms that are unrelated to the bankrupt firm through supply-chain networks. Table 11 reports results for this sub-sample analysis. Column (1) shows that relative to the control firms, leverage for treated firms increases by 1.3 percentage points following bankruptcy of an interlocked firm. This is comparable to our baseline estimates of 1 percentage points reported in Table 3. In column (2), we find that *Distress* increases by 1.4 percentage points for treated firms following bankruptcy of an unrelated interlocked firm. The final column shows that the total number of acquisitions decline for firms following bankruptcy of an unrelated, interlocked firm. This qualitative and quantitative similarity of estimates from this sub-sample analysis to the baseline results suggests that our results are not due to common supply-chain networks.

Another potential concern may be that the residual differences between the treated and control firms in their acquisition behavior may bias our estimates (see Table 2). To address this concern, we expand our matching criteria to include the outcome variable in year t - 1 as a matching covariate and repeat our tests. We do this matching separately for each outcome variable and find similar results as reported in Table 12. Note that we do not simultaneously include all the outcome variables as covariates in our matching procedure because having too many matching covariates reduces the quality of the match.

5 Conclusion

CEOs and the business press argue that a director's past experience plays an important role in her effectiveness as a board member. In this paper, we evaluate the effect of a director's personal experience with corporate bankruptcy on risk taking in the other firms

they are directors in. We find that risk increases in firms that have a director with a recent bankruptcy experience. This increase is concentrated among directors associated with a less expensive bankruptcies. Such bankruptcies also have less of a negative effect on the directors' careers. We find little evidence of a change in risk taking among firms with directors that were associated with an expensive bankruptcy. Our results are robust to alternate empirical strategy and to a battery of robustness tests. Overall, our results suggest that, on average, directors reduce their assessment of default costs when they personally experience a corporate bankruptcy.

Our findings offer an important additional explanation for the long standing puzzle of why firms are under-leveraged given the large interest tax shield benefits. If directors consistently overestimate default costs, then they may exert influence on firms, via their advice and monitoring, to take on fewer risks. Our results also help understand how directors' past experiences may affect the advice they provide CEOs and thus add to the evidence of the advisory role of the board of directors. Finally, our results highlight the importance of conditioning on the experienced cost of a personal shock in evaluating its effect on an individuals' beliefs and preferences, and hence, economic outcomes.

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Appendix: Variable Definitions

- Above: Dummy variable that takes value of 1 for treated firms where time in bankruptcy or stock return around bankruptcy is greater than median value
- Acquisition Value: Sum of value of all acquisition deals made by the firm in a given year normalized by lagged value of total assets (Calculated as the sum of deal value from SDC database in a firm-year)
- After: Dummy variable that takes value of 1 for treated firms if the interlocked firm filed for bankruptcy after 2005
- Bankruptcy(i): Dummy variable that takes value of 1 for treated firms i years following bankruptcy of interlocked firm
- BankruptcyI: Dummy variable that takes value of 1 for treated firms during the year and one year following treatment (bankruptcy of interlocked firm)
- BankruptcyII: Dummy variable that takes value of 1 for treated firms during 2, 3 and 4 years following treatment (bankruptcy of interlocked firm)
- BankruptcyIII: Dummy variable that takes value of 1 for treated firms more than 4 years following treatment (bankruptcy of interlocked firm)
- Before: Dummy variable that takes value of 1 for treated firms if the interlocked firm filed for bankruptcy before 2005
- Below: Dummy variable that takes value of 1 for treated firms where time in bankruptcy or stock return around bankruptcy is lower than median value
- Cash: Cash holdings of the firm scaled by lagged value of total assets *(Compustat items: che/l1.at)*

- Cash Flow Volatility: Calculated from Compustat using the annual standard deviation of firms' quarterly ratio of cash flow to assets *(Compustat items:* $(oiadp - accruals)/at$*, where* $accruals = (act - l1.act) - (che - l1.che) - (lct - l1.lct) - (dlc - l1.dlc) - dp$*)*

- Distress: Dummy variable that takes value of 1 if firm's stock gets delisted due to performance related reasons in a given year (i.e. during the years when *CRSP item: dlstcd* takes a value between 400 & 700)

- Diversifying Acquisition Value: Sum of value of all diversifying acquisition deals made by the firm in a given year normalized by lagged value of total assets (Calculated as the sum of deal value for diversifying acquisitions from SDC database in a firm-year). Diversifying acquisitions are described in Section 3.1.3

- Earnings: Annual income before extra ordinary items scaled by lagged value of total assets *(Compustat items:* $ib/l1.at$*)*

- Emerged: Dummy variable that takes value of 1 for treated firms if the interlocked bankrupt firm emerges from bankruptcy and starts normal operations

- Equity Issuance: Difference between equity issuance minus equity repurchases scaled by lagged value of total assets *(Compustat items:* $(sstk - prstkc)/l1.at$*)*

- Leverage: The ratio of the sum of total long-term debt plus total debt in current liabilities *(Compustat items:* $dltt + dlc$*)* scaled by market value of total assets *(Compustat items:* $prcc\_f * cshpri + at - ceq$*)*

- Liquidated: Dummy variable that takes value of 1 for treated firms if the interlocked bankrupt firm was liquidated following bankruptcy filing

- Operating Asset Volatility: $Volatility * [E/(V - C)]$, where $[E/(V - C)]$ is calculated from Compustat using $(csho * prccf)/[lt + (csho * prccf) - ch]$.

- Number of Acquisitions: Total number of completed acquisitions in a firm year (Calculated using SDC data)

- Number of Diversifying Acquisitions: Total number of completed diversifying acquisitions in a firm year (Calculated using SDC data). Diversifying acquisitions are described in Section 3.1.3

- Pre-Bankruptcy: Dummy variable that takes value of 1 for treated firms more than 1 year before treatment (bankruptcy of interlocked firm)

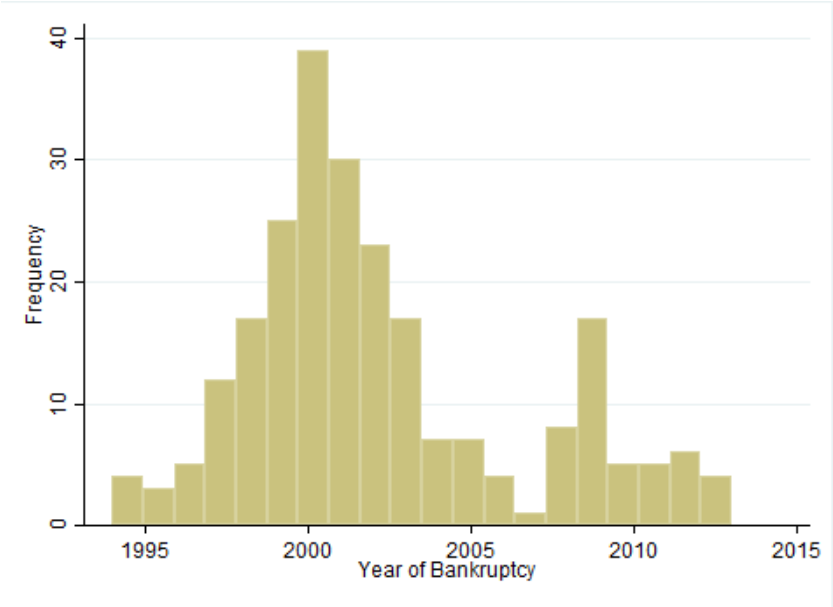
- Pre-Bankruptcy(-i): Dummy variable that takes value of 1 for treated firms i years before treatment (bankruptcy of interlocked firm)

- ROA: Earnings before interest, taxes, depreciation and amortization (EBITA) scaled by lagged value of total assets *(Compustat items: oibdp/l1.at)*

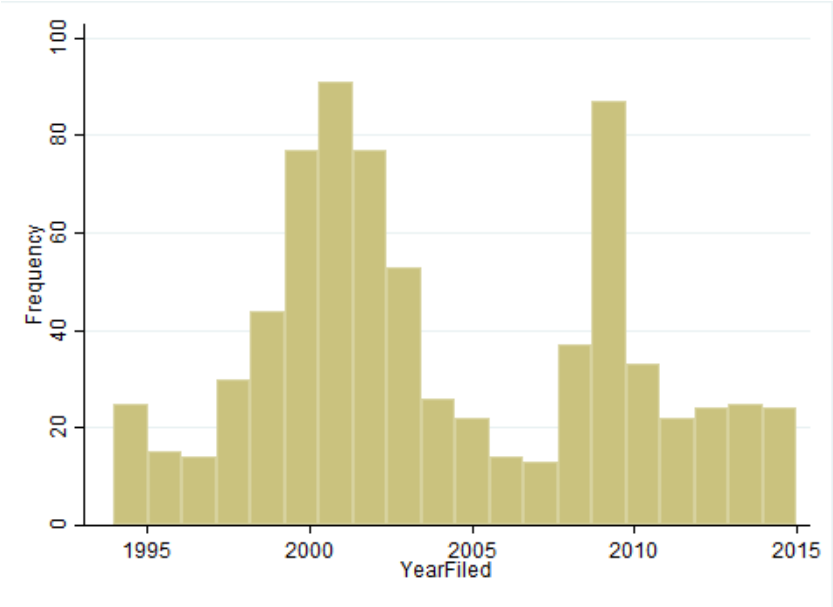
- Volatility: Standard deviation of daily stock returns calculated at yearly level

Figure 1: Year-wise distribution of bankruptcies

This figure plots the distribution of bankruptcies by year. Panel A plots bankruptcies for firms that have at least one interlocked firm while Panel B plots all bankruptcies.



Panel A: Interlocked bankruptcies



Panel B: All Bankruptcies

Figure 2: Dynamic Effects on Financial Policies

This figure plots the coefficients for the dynamic difference-in-differences regressions that estimate the effect of bankruptcy of an interlocked firm on leverage. The horizontal axis represents time in years relative to treatment while the vertical axis represents the estimates. Each point on the plot corresponds to the difference in outcome variable for treated firms between the given year and the mean during the year preceding bankruptcy relative to the same difference for control firms. The specification includes firm fixed effects, state×year fixed effects and industry×year fixed effects. Vertical bars represent 90% confidence intervals based on double-clustered standard errors at the firm and year level.

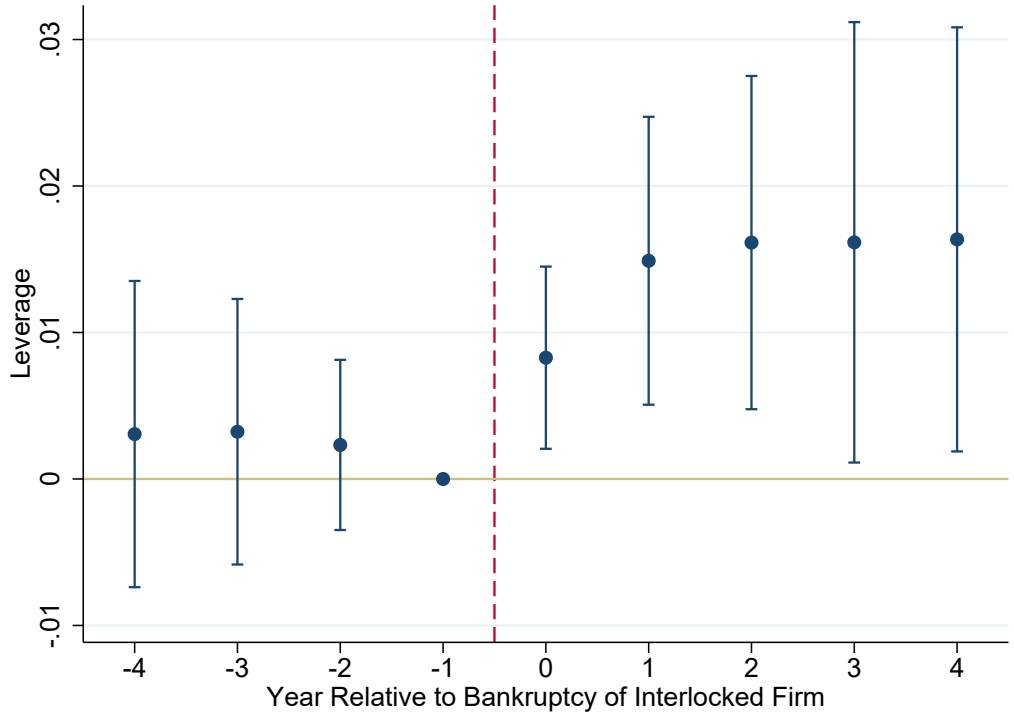


Figure 3: Dynamic Effects on Distress

This figure plots the coefficients for the dynamic difference-in-differences regressions that estimate the effect of bankruptcy of an interlocked firm on distress. The horizontal axis represents time in years relative to treatment while the vertical axis represents the estimates. Each point on the plot corresponds to the difference in outcome variable for treated firms between the given year and the mean during the year preceding bankruptcy relative to the same difference for control firms. The specification includes firm fixed effects, state×year fixed effects and industry×year fixed effects. Vertical bars represent 90% confidence intervals based on double-clustered standard errors at the firm and year level.

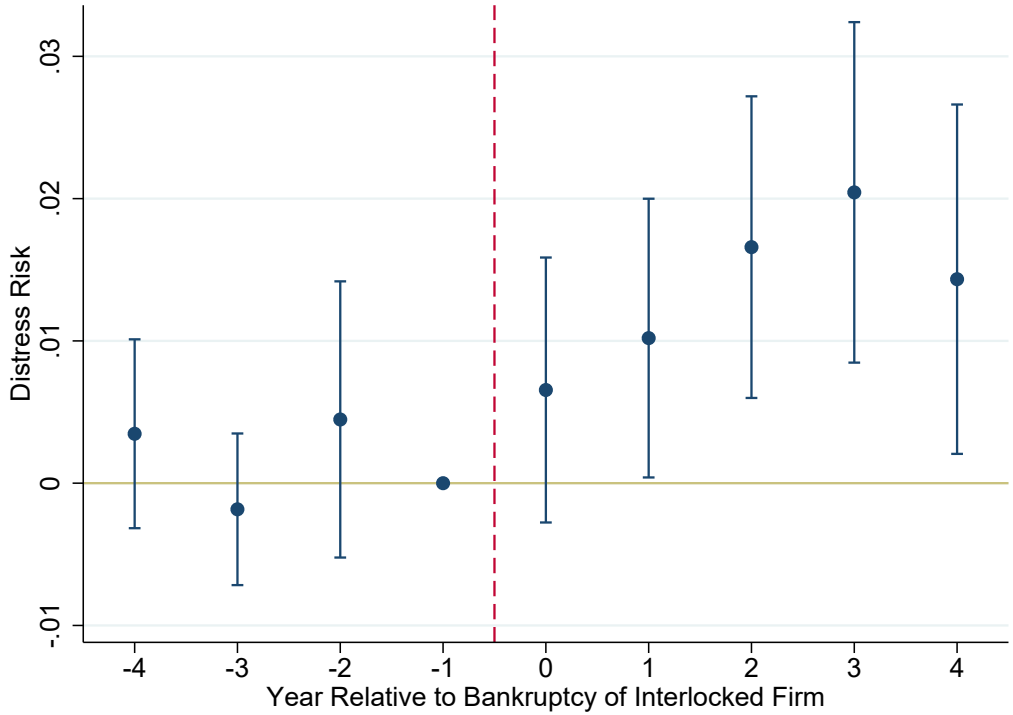


Figure 4: Dynamic Effects on Acquisitions

This figure plots the coefficients for the dynamic difference-in-differences regressions that estimate the effect of bankruptcy of an interlocked firm on number of acquisitions. The horizontal axis represents time in years relative to treatment while the vertical axis represents the estimates. Each point on the plot corresponds to the difference in outcome variable for treated firms between the given year and the mean during the year preceding bankruptcy relative to the same difference for control firms. The specification includes firm fixed effects, state×year fixed effects and industry×year fixed effects. Vertical bars represent 90% confidence intervals based on double-clustered standard errors at the firm and year level.

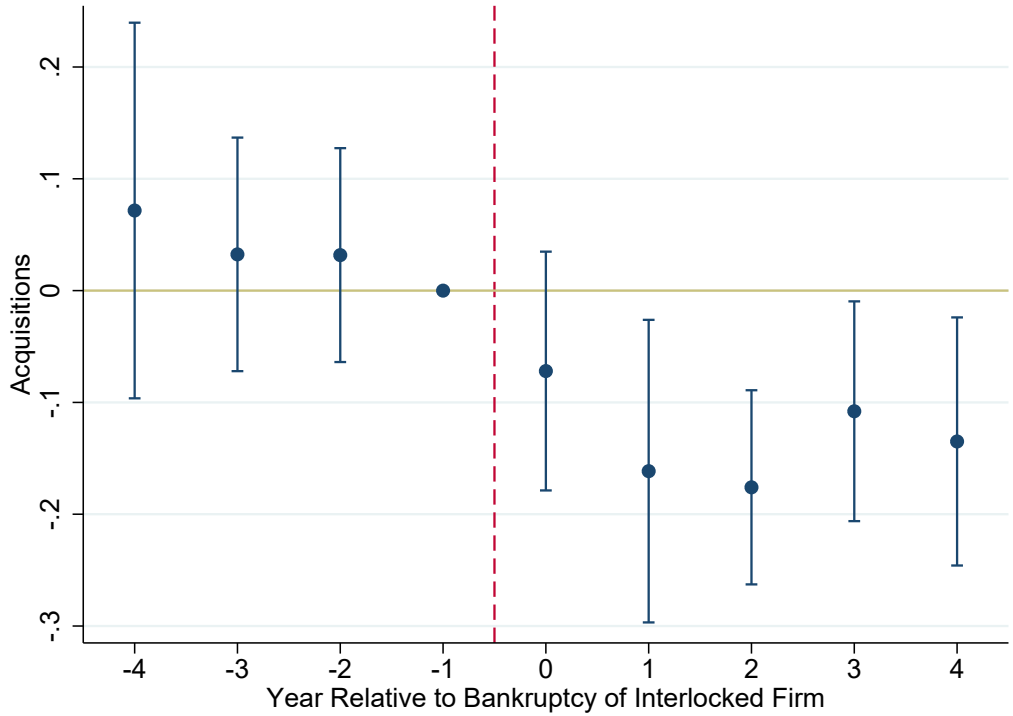


Table 1: Industry Classification of Firms With a Director at a Bankrupt Firm

This table reports the industry distribution of treated firms based on the Fama-French 48-industry classification.

Industry Name	Frequency	Percentage	% Same Industry as the Bankrupt Firm
Agriculture	3	0.42	0
Aircraft	3	0.42	0
Apparel	5	0.70	0
Automobiles & Trucks	12	1.67	16.67
Beer & Liquor	1	0.14	0
Business Services	126	17.55	14.50
Business Supplies	11	1.53	0
Candy & Soda	5	0.70	0
Chemicals	7	0.97	0
Communication	75	10.45	48
Computers	32	4.46	6.25
Construction	9	1.25	0
Construction Materials	6	0.84	0
Consumer Goods	11	1.53	18.18
Electrical Equipment	7	0.97	0
Electronic Equipment	59	8.22	8.47
Entertainment	13	1.81	0
Food Products	3	0.42	0
Healthcare	11	1.53	9.09
Machinery	22	3.06	4.55
Measuring and Control Equipment	10	1.39	0
Medical Equipment	14	1.95	0
Non-Metallic & Industrial Metal Mining	3	0.42	0
Other	4	0.56	50
Personal Services	5	0.70	0
Petroleum & Natural Gas	56	7.80	16.07
Pharmaceutical Products	31	4.32	6.45
Precious Metals	6	0.84	33.33
Printing & Publishing	3	0.42	0
Recreation	4	0.56	0
Restaurants, Hotels & Motels	19	2.65	10.53
Retail	42	5.85	28.57
Rubber & Plastic Products	7	0.97	0
Shipbuilding & Railroad Equipment	1	0.14	0
Shipping Containers	1	0.14	0
Steel Works	9	1.25	11.11
Textiles	2	0.28	0
Transportation	24	3.34	8.33
Utilities	37	5.15	0
Wholesale	19	2.65	15.79
Total	718	100.00	13.91

Table 2: Summary Comparison of Treated, Control and Compustat Firms

This table reports summary statistics for firm characteristics that compare treatment, control and Compustat. The values are reported for the year prior to treatment for the treated and control firms but for all time periods for non-treated compustat firms. The sample comprises 718 *Treated* firms, and up to thrice the number of control firms matched on industry, Log(Total Assets), and ROA for the year prior to treatment. The last two columns report the difference between treated and control firms, and treated and Compustat firms. *, ** and *** represent significance at 10%, 5% and 1% level respectively. All variables are defined in Appendix A.

	Treated Sample			Control Sample			Compustat Sample			Treated-Control	Treated-Compustat
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD		
Matching Variables											
Log(Total Assets)	6.52	6.47	1.97	6.41	6.37	1.87	5.55	5.27	2.03	0.113	0.975***
ROA	0.07	0.11	0.20	0.08	0.11	0.16	0.05	0.10	0.24	-0.009	0.024***
Outcome Variables											
Leverage	0.19	0.15	0.18	0.20	0.16	0.19	0.17	0.12	0.18	-0.009	0.023***
Cash	0.27	0.08	0.66	0.26	0.07	1.39	0.42	0.09	15.58	0.015	-0.15
Equity Issuance	0.03	0.00	0.19	0.04	0.00	0.16	0.06	0.00	0.19	0.013	-0.028***
Distress	0.01	0.00	0.10	0.01	0.00	0.07	0.01	0.00	0.09	-0.001	-0.003
Stock Volatility	0.04	0.03	0.04	0.03	0.03	0.02	0.03	0.03	0.03	0.000	0.001
Number of Acquisitions	0.68	0.00	1.46	0.41	0.00	1.49	0.25	0.00	0.87	0.275***	0.437***

Table 3: Director Bankruptcy Experience & Corporate Financial Policies

This table reports results from difference-in-differences regressions that estimate the effect of bankruptcy of an interlocked firm on corporate financial policies. We estimate the following regression equation for different dependent variables ($y_{i,t}$):

$$y_{i,j,t} = \beta_0 \times Treated_i \times Post_t + \delta_i + \delta_{s,t} + \delta_{j,t} + \epsilon_{i,j,t}$$

$Treated_i$ is a dummy variable that takes a value one for firms that share a director with a firm that declares bankruptcy, and $Post_t$ is a dummy variable that takes a value one for the years following bankruptcy and zero otherwise. δ_i represents firm fixed effects, $\delta_{s,t}$ represents state×year fixed effects and $\delta_{ind,t}$ represents industry×year fixed effects. Leverage is total debt over assets. Cash is cash and cash equivalents scaled by lagged value of total assets. Equity Issuance is the net equity issuance scaled by lagged value of total assets. Standard errors are double-clustered at firm and year level, and t-statistics are reported in parentheses. *, ** and *** represent significance at 10%, 5% and 1% level respectively.

	Matched Sample			Compustat Sample		
	Leverage	Cash	Equity Issuance	Leverage	Cash	Equity Issuance
	(1)	(2)	(3)	(4)	(5)	(6)
Treated$_i$×Post$_t$	0.010**	-0.038**	-0.020***	0.010***	-0.028	-0.014***
	(2.08)	(-2.09)	(-3.00)	(2.87)	(-0.93)	(-3.66)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
State× Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry× Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22226	22824	22241	102275	100885	102810
R^2	0.769	0.414	0.457	0.740	0.200	0.493

Table 4: Director Bankruptcy Experience, Distress Risk & Volatility

This table reports results from difference-in-differences regressions that estimate the effect of bankruptcy of an interlocked firm on distress risk and volatility measures. We estimate the following regression equation for different dependent variables ($y_{i,t}$):

$$y_{i,j,t} = \beta_0 \times Treated_i \times Post_t + \delta_i + \delta_{s,t} + \delta_{j,t} + \epsilon_{i,j,t}$$

$Treated_i$ is a dummy variable that takes a value one for firms that share a director with a firm that declares bankruptcy, and $Post_t$ is a dummy variable that takes a value one for the years following bankruptcy and zero otherwise. δ_i represents firm fixed effects, $\delta_{s,t}$ represents state×year fixed effects and $\delta_{ind,t}$ represents industry×year fixed effects. Distress is a dummy variable that takes a value of one during the year when the firm's stock gets delisted due to performance related reasons and zero otherwise. Expected Default Frequency captures the likelihood of default based on distance-to-default measure. Cash Flow Volatility is the volatility of quarterly ratios of cash flow to assets. Operating Asset Volatility is the volatility of daily operating asset returns. Stock Volatility is the volatility of daily stock returns. Standard errors are double-clustered at firm and year level, and t-statistics are reported in parentheses. *, ** and *** represent significance at 10%, 5% and 1% level respectively.

	Matched Sample					Compustat Sample				
	Distress	Expected Default Frequency	Cash Flow Volatility	Operating Assets Volatility	Stock Volatility	Distress	Expected Default Frequency	Cash Flow Volatility	Operating Assets Volatility	Stock Volatility
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Treated$_i$×Post$_t$	0.012***	0.018*	0.011***	0.017***	0.002*	0.008***	0.014***	0.005*	0.012***	0.001
	(3.34)	(1.81)	(2.44)	(3.24)	(1.89)	(2.38)	(2.55)	(1.79)	(3.36)	(1.26)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State× Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry× Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18931	10504	20993	15933	16032	80330	40518	96128	65830	66503
R^2	0.342	0.550	0.349	0.709	0.557	0.274	0.470	0.345	0.662	0.524

Table 5: Director Bankruptcy Experience & Acquisition Behavior

This table reports results from difference-in-differences regressions that estimate the effect of bankruptcy of an interlocked firm on acquisition behavior. We estimate the following regression equation for different dependent variables ($y_{i,t}$):

$$y_{i,j,t} = \beta_0 \times Treated_i \times Post_t + \delta_i + \delta_{s,t} + \delta_{j,t} + \epsilon_{i,j,t}$$

$Treated_i$ is a dummy variable that takes a value one for firms that share a director with a firm that declares bankruptcy, and $Post_t$ is a dummy variable that takes a value one for the years following bankruptcy and zero otherwise. δ_i represents firm fixed effects, $\delta_{s,t}$ represents state×year fixed effects and $\delta_{ind,t}$ represents industry×year fixed effects. Any Acquisition Indicator is a dummy variable that takes a value of one during the year that the firm makes an acquisition and zero otherwise. Acquisition Value is the total value of all acquisitions made in a year scaled by lagged value of total assets. Number of acquisitions is the total number of acquisitions completed by a firm in a given year. Number of Diversifying Acquisitions captures the number of acquisitions where target firms belong to a different industry than the acquirer. Standard errors are double-clustered at firm and year level, and t-statistics are reported in parentheses. *, ** and *** represent significance at 10%, 5% and 1% level respectively.

	Matched Sample				Compustat Sample			
	Number of Acquisitions	Any Acquisition Indicator	Acquisition Value	Number of Diversifying Acquisitions	Number of Acquisitions	Any Acquisition Indicator	Acquisition Value	Number of Diversifying Acquisitions
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treated$_i$×Post$_t$	-0.137***	-0.021**	-0.048***	-0.051*	-0.163**	-0.028**	-0.066*	-0.050
	(-3.31)	(-2.07)	(-2.42)	(-1.74)	(-2.62)	(-2.21)	(-1.75)	(-1.12)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State× Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry× Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24629	24629	26408	24629	102810	102810	102810	102810
R^2	0.508	0.493	0.156	0.471	0.457	0.420	0.144	0.410

Table 6: Heterogeneity by Bankruptcy Costs - Time in Bankruptcy

This table reports results from regressions that estimate the heterogeneous effects of bankruptcy of an interlocked firm on corporate risk taking based on time spent in bankruptcy. We estimate the following regression equation for different dependent variables ($y_{i,t}$):

$$y_{i,j,t} = \beta_1 \times Treated_i \times Post_t \times Above + \beta_2 \times Treated_i \times Post_t \times Below + \delta_i + \delta_{s,t} + \delta_{j,t} + \epsilon_{i,j,t}$$

$Treated_i$ is a dummy variable that takes a value one for firms that share a director with a firm that declares bankruptcy, and $Post_t$ is a dummy variable that takes a value one for the years following bankruptcy and zero otherwise. Above (Below) is a dummy variable that takes a value of one for firms whose interlocked firms spent more (less) time under bankruptcy than a median bankruptcy in the sample. δ_i represents firm fixed effects, $\delta_{s,t}$ represents state×year fixed effects and $\delta_{ind,t}$ represents industry×year fixed effects. Leverage is total debt over assets. Distress is a dummy variable that takes a value of one during the year when the firm's stock gets delisted due to performance related reasons and zero otherwise. Number of acquisitions is the total number of acquisitions completed by a firm in a given year. Standard errors are double-clustered at firm and year level, and t-statistics are reported in parentheses. *, ** and *** represent significance at 10%, 5% and 1% level respectively.

	Leverage	Distress	Number of Acquisitions
	(1)	(2)	(3)
Treated$_i$×Post$_t$×*Above*	0.002	0.005	0.017
	(0.83)	(1.08)	(0.27)
Treated$_i$×Post$_t$×*Below*	0.017**	0.018***	-0.332***
	(2.20)	(3.88)	(-3.10)
Firm FE	Yes	Yes	Yes
State× Year FE	Yes	Yes	Yes
Industry× Year FE	Yes	Yes	Yes
Observations	22226	18931	24629
R-squared	0.769	0.342	0.509
p-value of difference	0.094	0.089	0.012

Table 7: Heterogeneity by Bankruptcy Costs - Liquidated vs Emerged

This table reports results from regressions that estimate the heterogeneous effects of bankruptcy of an interlocked firm on corporate risk taking based on the outcome of the bankruptcy. We estimate the following regression equation for different dependent variables ($y_{i,t}$):

$$y_{i,j,t} = \beta_1 \times Treated_i \times Post_t \times Emerged + \beta_2 \times Treated_i \times Post_t \times Liquidated + \delta_i + \delta_{s,t} + \delta_{j,t} + \epsilon_{i,j,t}$$

$Treated_i$ is a dummy variable that takes a value one for firms that share a director with a firm that declares bankruptcy, and $Post_t$ is a dummy variable that takes a value one for the years following bankruptcy and zero otherwise. Liquidated (Emerged) is a dummy variable that takes a value of one for firms whose interlocked firms were (not) liquidated following bankruptcy. δ_i represents firm fixed effects, $\delta_{s,t}$ represents state×year fixed effects and $\delta_{ind,t}$ represents industry×year fixed effects. Leverage is total debt over assets. Distress is a dummy variable that takes a value of one during the year when the firm's stock gets delisted due to performance related reasons and zero otherwise. Number of acquisitions is the total number of acquisitions completed by a firm in a given year. Standard errors are double-clustered at firm and year level, and t-statistics are reported in parentheses. *, ** and *** represent significance at 10%, 5% and 1% level respectively.

	Leverage	Distress	Number of Acquisitions
	(1)	(2)	(3)
Treated$_i$×Post$_t$×*Liquidated*	0.005	0.007**	-0.007*
	(1.52)	(2.28)	(-1.84)
Treated$_i$×Post$_t$×*Emerged*	0.012*	0.012***	-0.270***
	(1.78)	(2.78)	(-2.44)
Firm FE	Yes	Yes	Yes
State× Year FE	Yes	Yes	Yes
Industry× Year FE	Yes	Yes	Yes
Observations	22226	18931	24629
R-squared	0.769	0.342	0.508
p-value of difference	0.399	0.670	0.091

Table 8: Heterogeneity by Bankruptcy Costs - Stock Returns Around Date of Filing

This table reports results from regressions that estimate the heterogeneous effects of bankruptcy of an interlocked firm on corporate risk taking based on stock returns around bankruptcy filing. We estimate the following regression equation for different dependent variables ($y_{i,t}$):

$$y_{i,j,t} = \beta_1 \times Treated_i \times Post_t \times Above_i + \beta_2 \times Treated_i \times Post_t \times Below_i + \delta_i + \delta_{s,t} + \delta_{j,t} + \epsilon_{i,j,t}$$

$Treated_i$ is a dummy variable that takes a value one for firms that share a director with a firm that declares bankruptcy, and $Post_t$ is a dummy variable that takes a value one for the years following bankruptcy and zero otherwise. Above (Below) is a dummy variable that takes a value of one for firms whose interlocked firms experienced higher (lower) stock returns around bankruptcy filing than a median bankruptcy in the sample. δ_i represents firm fixed effects, $\delta_{s,t}$ represents state×year fixed effects and $\delta_{ind,t}$ represents industry×year fixed effects. Leverage is total debt over assets. Distress is a dummy variable that takes a value of one during the year when the firm's stock gets delisted due to performance related reasons and zero otherwise. Number of acquisitions is the total number of acquisitions completed by a firm in a given year. Standard errors are double-clustered at firm and year level, and t-statistics are reported in parentheses. *, ** and *** represent significance at 10%, 5% and 1% level respectively.

	Leverage	Distress	Number of Acquisitions
	(1)	(2)	(3)
Treated$_i$×Post$_t$×*Above*	0.010	0.010	-0.144
	(0.97)	(1.32)	(-1.48)
Treated$_i$×Post$_t$×*Below*	0.010**	0.016***	-0.183**
	(2.00)	(3.80)	(-2.27)
Firm FE	Yes	Yes	Yes
State× Year FE	Yes	Yes	Yes
Industry× Year FE	Yes	Yes	Yes
Observations	22226	18931	24629
R-squared	0.769	0.342	0.508
p-value of difference	0.851	0.641	0.772

Table 9: Bankruptcy & Directors' Career : Number of Directorships

This table reports results from regressions estimating the effect of bankruptcy of a firm on number of directorships held by it's directors. We estimate the following single difference regression equation with 'number of directorships' as the dependent variable ($y_{i,t}$):

$$y_{i,t} = \beta_1 \times Post\ Bankruptcy \times Above + \beta_2 \times Post\ Bankruptcy \times Below + \delta_t + \epsilon_{i,t}$$

Post Bankruptcy is a dummy variable that takes a value of one following bankruptcy, *Above* (*Below*) is a dummy that takes a value of one for bankruptcies where the cost of bankruptcy was higher (lower) than the median cost of bankruptcy in the sample. The measure used for bankruptcy cost is reported as the cross-sectional variable in each column. We estimate this model for two time periods - year before and after bankruptcy. t-statistics are reported in parentheses, and *, ** and *** represent significance at 10%, 5% and 1% level respectively.

	Number of Directorships			
	(1)	(2)	(3)	(4)
Post bankruptcy$_t$	-0.180**			
	(-2.14)			
Post bankruptcy$_t \times$*Above*		-0.235**		-0.310**
		(-2.33)		(-1.96)
Post bankruptcy$_t \times$*Below*		-0.098		-0.140
		(-0.91)		(-1.14)
Post bankruptcy$_t \times$*Liquidated*			-0.301***	
			(-2.73)	
Post bankruptcy$_t \times$*Emerged*			-0.080	
			(-0.81)	
Cross-Sectional Variable		Time in Bankruptcy	Bankruptcy Outcomes	Stock Returns Around Filing
Filing Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	1218	1218	1218	1218
R-squared	0.032	0.033	0.035	0.032
p-value of difference		0.267	0.078	0.359

Table 10: Heterogeneity by Type of Director

This table reports results from regressions that estimate the heterogeneous effects of bankruptcy of an interlocked firm on corporate risk taking based on the type of director they share. We estimate the following regression equation for different dependent variables ($y_{i,t}$):

$$y_{i,j,t} = \beta_1 \times Treated_i \times Post_t \times Independent_i + \beta_2 \times Treated_i \times Post_t \times Executive_i + \beta_3 \times Treated_i \times Post_t \times Gray_i + \delta_i + \delta_{s,t} + \delta_{j,t} + \epsilon_{i,j,t}$$

$Treated_i$ is a dummy variable that takes a value one for firms that share a director with a firm that declares bankruptcy, and $Post_t$ is a dummy variable that takes a value one for the years following bankruptcy and zero otherwise. Independent (Executive) is a dummy variable that takes a value of one for firms who share at least one independent (executive) board of director with firms filing for bankruptcy. Gray is a dummy variable that takes a value of one for firms that neither share an independent nor executive director with firms filing for bankruptcy. δ_i represents firm fixed effects, $\delta_{s,t}$ represents state×year fixed effects and $\delta_{ind,t}$ represents industry×year fixed effects. Leverage is total debt over assets. Distress is a dummy variable that takes a value of one during the year when the firm's stock gets delisted due to performance related reasons and zero otherwise. Number of acquisitions is the total number of acquisitions completed by a firm in a given year. Standard errors are double-clustered at firm and year level, and t-statistics are reported in parentheses. *, ** and *** represent significance at 10%, 5% and 1% level respectively.

	Leverage	Distress	Number of Acquisitions
	(1)	(2)	(3)
Treated$_i$×Post$_t$×*Independent*	0.01	0.007*	0.076
	(1.57)	(1.72)	(1.09)
Treated$_i$×Post$_t$×*Executive*	-0.014	0.016	-0.127
	(-0.44)	(0.86)	(-0.67)
Treated$_i$×Post$_t$×*Gray*	0.013**	0.014***	-0.279***
	(1.98)	(2.56)	(-3.21)
Firm FE	Yes	Yes	Yes
State× Year FE	Yes	Yes	Yes
Industry× Year FE	Yes	Yes	Yes
Observations	22226	18931	24629
R-squared	0.769	0.342	0.508
p-value of difference (Independent - Gray)	0.685	0.349	0.007
p-value of difference (Executive - Gray)	0.457	0.928	0.482

Table 11: Robustness: Supply-Chain Relationships

This table reports results from difference-in-differences regressions that estimate the effect of bankruptcy of an interlocked firm belonging to a non-related industry on different risk measures. Non-related industries are identified as industries on which the supply chain dependence for treated firms is below 0.1%. We estimate the following regression equation for different dependent variables ($y_{i,t}$):

$$y_{i,j,t} = \beta_0 \times Treated_i \times Post_t + \delta_i + \delta_{s,t} + \delta_{j,t} + \epsilon_{i,j,t}$$

$Treated_i$ is a dummy variable that takes a value one for firms that share a director with a firm that declares bankruptcy, and $Post_t$ is a dummy variable that takes a value one for the years following bankruptcy and zero otherwise. δ_i represents firm fixed effects, $\delta_{s,t}$ represents state×year fixed effects and $\delta_{ind,t}$ represents industry×year fixed effects. Leverage is total debt over assets. Distress is a dummy variable that takes a value of one during the year when the firm's stock gets delisted due to performance related reasons and zero otherwise. Number of acquisitions is the total number of acquisitions completed by a firm in a given year. Standard errors are double-clustered at firm and year level, and t-statistics are reported in parentheses. *, ** and *** represent significance at 10%, 5% and 1% level respectively.

	Leverage	Distress	Number of Acquisitions
	(1)	(3)	(5)
$Treated_i \times Post_t$	0.013**	0.014***	-0.126**
	(1.98)	(3.24)	(-2.13)
Firm FE	Yes	Yes	Yes
State× Year FE	Yes	Yes	Yes
Industry× Year FE	Yes	Yes	Yes
Observations	20866	17618	23227
R-squared	0.769	0.350	0.514

Table 12: Robustness: Using Alternative Matching Criteria

This table reports results from difference-in-differences regressions that estimate the effect of bankruptcy of an interlocked firm on different risk measures for different samples that are constructed using the respective outcome variable as a matching co-variate. We estimate the following regression equation for different dependent variables ($y_{i,t}$):

$$y_{i,j,t} = \beta_0 \times Treated_i \times Post_t + \delta_i + \delta_{s,t} + \delta_{j,t} + \epsilon_{i,j,t}$$

$Treated_i$ is a dummy variable that takes a value one for firms that share a director with a firm that declares bankruptcy, and $Post_t$ is a dummy variable that takes a value one for the years following bankruptcy and zero otherwise. δ_i represents firm fixed effects, $\delta_{s,t}$ represents state×year fixed effects and $\delta_{ind,t}$ represents industry×year fixed effects. Leverage is total debt over assets. Distress is a dummy variable that takes a value of one during the year when the firm's stock gets delisted due to performance related reasons and zero otherwise. Number of acquisitions is the total number of acquisitions completed by a firm in a given year. Standard errors are double-clustered at firm and year level, and t-statistics are reported in parentheses. *, ** and *** represent significance at 10%, 5% and 1% level respectively.

	Leverage	Distress	Number of Acquisitions
	(1)	(3)	(5)
Treated$_i$×Post$_t$	0.015***	0.012***	-0.175***
	(3.03)	(3.32)	(-2.88)
Firm FE	Yes	Yes	Yes
State× Year FE	Yes	Yes	Yes
Industry× Year FE	Yes	Yes	Yes
Observations	21756	18956	24658
R-squared	0.761	0.348	0.512