Three essays on corporate finance

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2016

Selvam, S. (2016). Three essays on corporate finance. Doctoral thesis, Nanyang Technological University, Singapore.

<https://hdl.handle.net/10356/69280>

<https://doi.org/10.32657/10356/69280>

**NANYANG
TECHNOLOGICAL
UNIVERSITY**

THREE ESSAYS ON CORPORATE FINANCE

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NANYANG BUSINESS SCHOOL
2016

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A thesis submitted to Nanyang Technological University in
fulfillment of the requirement for the degree of Doctor of
Philosophy

2016

Acknowledgements

I would like to express profound gratitude to my supervisor, Professor Jun-koo Kang for his tireless mentoring and guidance, without which this thesis would not be possible. I consider myself lucky to have undertaken this journey under his auspices. His patience and meticulousness inspire me to work harder.

I would also like to thank my committee, Professor Angie Low, Professor Gao Huasheng, and Professor Zhang Huai for their insightful comments, constant encouragement, and valuable time that helped shape this thesis. I would like to thank all the other professors in the Banking and Finance Division, interacting with whom has been a great learning experience.

I would like to acknowledge the financial and academic support of the Nanyang Business School Ph.D. program. I appreciate the help rendered by the Ph.D. Program Office, especially Ms. Quek Bee Hua, Ms. Amarnisha Mohamed, and Ms. Karen Barlaan.

I dedicate this dissertation to my wife, daughter and parents, who have been pillars of strength in helping me navigate in this journey as a doctoral student.

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Introduction

In essay one, we examine how employee layoffs, actions that lower a firm's social performance, affect stakeholder wealth and post-layoff contract terms with stakeholders. We find that although layoff-performance sensitivity is similar between firms with high and low corporate social responsibility (CSR) performance, high CSR firms' shareholders, bondholders, and suppliers realize more negative layoff announcement returns than those of low CSR firms. High CSR firms also experience greater deterioration of supplier relationships and larger increases in loan rates and covenant numbers post layoffs. The results suggest that a firm's commitment to fair stakeholder treatment affects its value and future stakeholder relationships.

In essay two, we examine restructuring activities of family and non-family firms during the 2007 to 2009 economic crisis. Using hand-collected data on restructuring activities, we find that family firms are less likely to engage in ineffective downsizing and ineffective CEO turnover activities than non-family firms. These results are more pronounced for family firms managed by founding family CEOs. Family firms are also less likely to enter into unrelated businesses. Despite family firms' reluctance to downsize, those that choose to do so during the crisis experience more positive stock market reactions to downsizing announcements and outperform in the post-crisis period. Our findings show that in response to the crisis, family firms undertake restructuring actions that improve firm value, suggesting that corporate ownership is an important factor that influences firms' restructuring decisions.

In essay three using major industry-level tariff reductions as the measure of customer industry competition, I examine the effect of such competition on customer-supplier trading relationships. I find that customers facing stiff competition strengthen their relationships with existing suppliers by increasing product purchases from the suppliers and maintaining post-

tariff longer relationship duration, allowing the suppliers to improve their post-tariff performance. These results are concentrated in suppliers that have stronger pre-tariff relationship ties and those that are financially constrained. However, the increased purchases from financially constrained suppliers affect customer performance negatively in the post-tariff period. Overall, these results suggest that increased customer competition has both intended and unintended consequences for their trading relationships and their future performance.

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**Essay one: How Do Changes in Firms' Social Performance Affect
Stakeholder Wealth and Future Contract Terms with Stakeholders?
Evidence from Employee Layoffs**

Abstract

We examine how employee layoffs, actions that lower a firm's social performance, affect stakeholder wealth and post-layoff contract terms with stakeholders. We find that although layoff-performance sensitivity is similar between firms with high and low corporate social responsibility (CSR) performance, high CSR firms' shareholders, bondholders, and suppliers realize more negative layoff announcement returns than those of low CSR firms. High CSR firms also experience greater deterioration of supplier relationships and larger increases in loan rates and covenant numbers post layoffs. The results suggest that a firm's commitment to fair stakeholder treatment affects its value and future stakeholder relationships.

Keywords: Corporate social responsibility, Employee layoff, Firm value, Stakeholder wealth, Contract term, Supplier, Bank Loan

JEL Classification: G21, G32, G34, M51

I. Introduction

Is a firm's commitment to treating its stakeholders fairly in shareholders' economic interest? This question is critical given the importance of stakeholders in understanding the increasing role of corporate social responsibility (CSR) as a core component of the firm's strategy and operations.¹ Although a growing number of studies examine whether a firm's CSR affects its value, most of these studies focus mainly on tests of the relation between the firm's CSR performance and its accounting or stock performance from the shareholders' point of view,² paying little attention to how a firm's commitment to treating its stakeholders, an important aspect of its CSR performance, affects stakeholder wealth and its future stakeholder relationships.³

In this study we fill this gap in the literature by examining how such a commitment affects the wealth of shareholders and stakeholders and future contract terms with stakeholders. To the extent that a firm builds its perception of socially responsible performance through its commitment to treating its stakeholders fairly, the firm's strong reputation for maintaining such a commitment is likely to be an important way to improve its CSR performance and thus should significantly affect firm value and future stakeholder relationships. To test this view, we use employee layoffs as an empirical setting for the change in a firm's social performance about treating its stakeholders and its pre-layoff investment in CSR as a measure of how fairly it treats its stakeholders. We then investigate how the effects of employee layoffs on the wealth of shareholders and stakeholders and post-layoff contract terms are different between firms with high and low CSR performance.

¹ Reflecting the growing importance of CSR, CSR spending by the firms and the number of firms that publish CSR records have dramatically increased over the last decade. For example, according to the *Giving in Numbers: 2015* published by CECF, total amounts of CSR contributions by all 271 companies participated in 2014 survey, including 62 of the largest 100 companies in the *Fortune* 500, are more than \$18.5 billion. A 2013 study by Ernst and Young further shows that 95% of the Global 250 firms issue sustainability reports.

² For studies that examine the relation between CSR and firm performance, see, for example, Cochran and Wood (1984), Aupperle, Carroll, and Hatfield (1985), Waddock and Graves (1997), McWilliams, Siegel, and Teoh (1999), Teoh, Welch, and Wazzan (1999), McWilliams and Siegel (2000), Margolis and Walsh (2001), Jiao (2010), Lev, Petrovits, and Radhakrishnan (2010), Deng, Kang, and Low (2013), Flammer (2013), and Luo et al. (2015).

³ Only few studies examine the effect of CSR on non-shareholder stakeholder wealth. Goss and Roberts (2011) study the effect of firm CSR on bank loan rates and Deng, Kang, and Low (2013) investigate the impact of acquiring firms' CSR performance on the wealth of their bondholders and target customers and suppliers.

Employee layoffs are considered one of the most significant events that affect a firm's stakeholder (i.e., employee) welfare. Prior literature views employee layoffs as the events in which firms behave opportunistically to maximize shareholder wealth at the expense of employees, one of a firm's most important stakeholders (e.g., Shleifer and Summers (1988), Dial and Murphy (1995), Hallock (2009)). For example, Shleifer and Summers (1988) argue that acquirers in hostile takeovers redistribute wealth from stakeholders to shareholders through opportunistic behavior, such as laying off employees. Dial and Murphy (1995) who examine the turnaround at General Dynamics in the 1990's argue that reneging on implicit contracts with employees during restructuring leads to loss of reputation that makes it costly for firms to enter into similar contracts in the future. Hallock (2009) further argues that when firms make long-term commitment to their employees (e.g., avoiding layoffs and cushioning wages), employees show high loyalty towards the firms. Consistent with these arguments, the management literature uses the term "psychological contract" to describe employee beliefs and interpretation of a promissory contract with employers. This literature views layoffs as reneging on the promise of long term job security by employers, thus constituting a breach of psychological contracts (Robinson (1996), Morrison and Robinson (1997), Pugh, Skarlicki, and Passell (2003), Turnley et al. (2003)).

There are two competing views about how a firm's engagement in employee layoffs affects the wealth of its shareholders and stakeholders as well as post-layoff terms of contracts with stakeholders. The first view is that all else being equal, employee layoffs make stakeholders perceive the firm as being less committed to its stakeholders, which imposes significant costs to both firms and non-employee stakeholders and thus negatively affects post-layoff contract terms (the "*relationship deterioration*" hypothesis). The competing view is that employee layoffs result in wealth transfer from employees to shareholders and non-employee stakeholders and thus help firms make their relationships with non-employee stakeholders more sustainable, leading to favorable changes in post-layoff contract terms (the "*relationship improvement*" hypothesis).

The relationship deterioration hypothesis is built on the stakeholder theory of CSR, which posits that to maximize firm value, managers should incorporate the interests of all the stakeholders in their

decision making process (Donaldson and Preston (1995), Jensen (2001)). Since stakeholders participate in firm operations and significantly contribute to productions, to improve firm performance, stakeholder management is essential, which forms the fulcrum of stakeholder theory (Russo and Perrini (2010)). This hypothesis is also consistent with contract theory and the theory of firm that view a firm as a nexus of contracts between shareholders and other stakeholders (Coase (1937), Alchian and Demsetz (1972), Jensen and Meckling (1976), Cornell and Shapiro (1987), Hill and Jones (1992)). According to these theories, a firm's reputation for treating their stakeholder fairly is important to maximize firm value to maintain durable future contracts with its stakeholders. Such reputation ameliorates the hold-up problem since it encourages stakeholders to make more relationship-specific investments (Klein, Crawford, and Alchian (1978)). For example, if stakeholders view that the firm commits itself to honoring its relationship with stakeholders, employees may be more willing to learn a firm-specific skill with low transferability outside the firm, suppliers may be more willing to make large relationship-specific investments that are unique to customers, and creditors may be more willing to be lenient in setting loan spreads and other contract terms. In contrast, if the firm undertakes an action that is deemed unfair to a stakeholder, such an action can lead to a loss of firm reputation and increase the costs of maintaining and establishing explicit and implicit contracts, thereby adversely affecting firm value. For example, to the extent that firms develop their reputation through their fair stakeholder relationships, employees of firms that treat stakeholders poorly may demand higher monetary compensation (Roberts and Dowling (2002)), customers may pay a lower price for such firms' products and services (Fisman, Heal, and Nair (2006)), suppliers may give lower credit terms because they do not expect to be paid punctually (Ng, Smith, and Smith (1999)), and creditors may want higher spreads and more strict covenants on their loans (Graham, Li, and Qiu (2008)). These high costs arising from non-cooperative behavior among stakeholders should decrease firm performance and shareholder wealth, and in turn deteriorate future stakeholder relationships.

These arguments suggest that employee layoffs, particularly those by firms that invested more in CSR performance (hereafter, high CSR firms) prior to layoffs, impose significant costs to both layoff

firms and their stakeholders and thus lead to post-layoff deterioration in contract terms. Large investment in CSR activities increases stakeholder perception on firms' reputation for keeping their promises associated with the implicit contracts with their relevant stakeholders, making their relationships with stakeholders more valuable (Cornell and Shapiro (1987)). Thus, a firm's high pre-layoff CSR performance is expected to induce stakeholders to contribute more resources and effort to the firm and accept less favorable terms when making contracts. However, when this firm engages in employee layoffs and thus lowers its social image, other stakeholders may fear that the firm may also be less trustworthy in honoring its relationships with them. In other words, since ex-ante, high CSR firms are perceived to have higher reputation for treating their stakeholders fairly than low CSR firms, non-employee stakeholders may view layoff announcements by high CSR firms as more surprising negative events and interpret such events as a signal that the firm now has weakened incentives to honor its commitment associated with stakeholder relationships. This change in stakeholder perception on a firm's social performance reduces stakeholders' willingness to support the firm's operations, leading to a reduction in shareholder wealth and deterioration in future stakeholder relationships. Since stakeholders of high CSR firms have already made significant relationship-specific investments that are largely governed by reputational concerns of the firm (Klein, Crawford, and Alchian (1978)), the breach of trust by high CSR firms also makes such investments less valuable, reducing stakeholder wealth.

Thus, the relationship deterioration hypothesis predicts that *all else being equal*, the valuation effects of layoff announcements for shareholders and non-employee stakeholders are more negative for high CSR firms than for low CSR firms. It also predicts that compared with non-employee stakeholders (i.e., bondholders and suppliers) of low CSR layoff firms, those of high CSR layoff firms are more likely to tighten their post-layoff contract terms with the firms to minimize risk associated with weakened stakeholder relationships.

In contrast, the relationship improvement hypothesis posits that non-employee stakeholders of the layoff firms view layoffs as a way to strengthen firm-stakeholder relationships because layoffs save corporate resources by reducing payments to employees, improve employee productivity, and increase

firm performance through efficient restructuring, thereby creating a potential wealth transfer from employees to shareholder and other stakeholders (Shleifer and Summers (1988)). The benefits that non-employee stakeholder can obtain from the layoffs are expected to be greater in high CSR firms than in low CSR firms because these stakeholders have prior beliefs that high CSR firms treat them better than low CSR firms and thus they perceive layoffs by high CSR firms as more a relationship-enhancing action. Moreover, to the extent that high CSR firms have spent more resources for employee welfare than low CSR firms prior to layoffs, any reduction in workforce is expected to lead to greater potential resource savings, which further benefit non-employee stakeholders. These large potential benefits for non-employee stakeholders should increase their willingness to support the firm's operations, which ultimately improves shareholder wealth.

Thus, the relationship improvement hypothesis predicts that the layoff announcements elicit positive valuation effects for both shareholders and non-employee stakeholders and *ceteris paribus*, such positive valuation effects are more pronounced for high CSR firms than for low CSR firms. This hypothesis also predicts that subsequent to layoffs, non-employee stakeholders of high CSR firms change their contract terms more favourably than those of low CSR firms.

We test these two competing hypotheses using a sample of 486 layoff announcements by firms in the S&P 1500 Index over the period 2003 to 2013. We measure a firm's pre-layoff CSR performance using its CSR score reported in the MSCI ESG KLD STATS DATA SET (KLD database), which is the most extensive database available for evaluating the firm's CSR activity.⁴

We find strong evidence in support of the relationship deterioration hypothesis. Specifically, we find that although high and low CSR firms are equally likely to engage in layoffs following poor performance, shareholders of high CSR layoff firms experience more negative abnormal returns around layoff announcement dates than those of low CSR layoff firms after controlling for firm

⁴ The KLD database has been extensively used in prior CSR literature including Heinkel, Kraus, and Zechner (2001), Hong and Kacperczyk (2009), Cooper, Gulen, and Ovtchinnikov (2010), Hong and Kostovetsky (2012), Kim, Park, and Wier (2012), Deng, Kang, and Low (2013), Di Giuli and Kostovetsky (2014), and Krüger (2015).

performance and other firm and layoff characteristics:⁵ a one-standard deviation increase in the layoff firm's adjusted CSR score decreases its cumulative abnormal return (-1, 1), CAR (-1, 1), by 0.51%. Given that the mean CAR (-1, 1) for the full sample is -0.51%, this valuation effect is economically large and significant. We perform several tests on firm performance around the layoffs to alleviate the concern that more negative CARs for high CSR layoff firms than for low CSR layoff firms are due to high CSR layoff firms' poorer pre-layoff performance and post-layoff unfavorable financial prospects. First, we find that high CSR layoff firms have higher operating performance and Tobin's q than low CSR layoff firms prior to layoffs. They also have lower leverage and are less financially constrained (as measured by Hadlock-Pierce (2010) index) than low CSR layoff firms prior to layoffs. Second, the changes in the frequency of credit ratings downgrades (analysts' earnings (EPS) forecasts) from year -1 to year 4, where year 0 is the layoff announcement year, are not significantly different between high and low CSR firms. In addition, we find no significant difference in post-layoff operating performance within four years of the layoffs. Third, we find that the changes in industry median sales growth, industry performance, credit rating performance, and employee productivity in both pre-layoff and post-layoff periods are not significantly different between industries of high CSR layoff firms and those of low CSR layoff firms. Finally, we find no significant difference in announcement returns between rivals of high CSR and those of low CSR layoff firms including CARs of rivals, their bondholders, and their suppliers, suggesting that lower announcement returns for high CSR layoff firms than low CSR layoff firms are not likely due to more negative industry shock in their industries. Overall, these results suggest that more negative CARs for high CSR layoff firms than for low CSR layoff firms are unlikely to be driven by their worse pre-layoff financial difficulties and poorer post-layoff prospects and their industries' worsening performance or negative shock. To further address potential biases associated with the endogenous nature of social performance, we use two-stage least square (2SLS) regressions in which we use the passage of state constituency statute and state democratic ranking in the U.S. as the instrumental variables for a firm's

⁵ Previous studies show that shareholders of layoff firms typically experience negative abnormal returns around layoff announcement dates (e.g., Worrell, Davidson, and Sharma (1991), Hallock (1998)), possibly due to negative information conveyed by layoffs such as declining demand for layoff firms' products and services and their financial distress.

CSR performance and find that our result does not change. We discuss how these variables satisfy relevance and exclusion conditions of instrumental variables in Section IV. We also use the promulgation of a 2009 Presidential memorandum on government purchasing from contractors as a quasi-natural experiment. Lack of competition and steady nature of government contracts provide firms that contract with the government with weak incentives to treat their stakeholders well. However, the 2009 memorandum that emphasizes on competition for contractors provides an exogenous shock to the way contractors treat their stakeholders, by increasing uncertainty of future contracts. Therefore, using a difference-in-difference specification, we exploit the passage of this memorandum to examine how the change in a firm's commitment to treating its stakeholders fairly affects layoff announcement returns. We find that prior to the passage of the memorandum, layoff firms that are not government contractors (i.e., firms that treat their stakeholders fairly) experience more negative layoff announcement returns than those that are government contractors. However after its passage, layoff firms that are government contractors have lower layoff announcement returns than layoff firms that are not government contractors, suggesting that when firms decide to engage in layoffs despite an improvement in incentives to treat their stakeholders well, the market reacts more negatively to these firms.

Turning to stakeholder wealth effects around firms' layoff announcements, we find that suppliers and bondholders of high CSR layoff firms experience more negative announcement returns than those of low CSR firms. These results are more pronounced when the suppliers' relationships with the layoff firm are ex-ante weak such as when they operate in nondurable goods industries (Titman (1984), Titman and Wessels (1988), Cremers, Nair, and Peyer (2008)), or when their sales fractions to the layoff firm are low. The results are also more pronounced when bondholders are subject to greater hold-up problems such as when their bonds are of longer duration.

We find that after the layoffs, high CSR firms' relationship duration with suppliers becomes shorter than that of low CSR firms, particularly when suppliers operate in nondurable goods industries

or when their pre-layoff sales dependence on the layoff firms is lower.⁶ Moreover, our difference-in-difference tests using a matched sample of layoff and non-layoff firms show that following the layoffs, banks charge higher loan rates and impose more covenants for high CSR layoff firms than matched non-layoff firms. These results suggest that when banks witness high CSR borrowers' layoffs, they perceive these events as future relationship deterioration with other stakeholders and thus adjust their lending terms more tightly to reflect increased borrower hold-up risk.

Finally, following the layoffs, high CSR layoff firms are more likely to undertake actions to rebuild stakeholder confidence than non-layoff control firms such as cutting CEO salary more and refraining from further reduction of the workforce. Previous studies show that executive compensation increases following layoffs (Dial and Murphy (1995), Hallock (1998)). Thus, our result for high CSR firms' lower post-layoff CEO compensation suggests that these firms try to rebuild their relationships with stakeholders by potentially signaling that they are willing to share the pain of the difficult measure with top executives.

Our study contributes to the literature in several important ways. First, our study contributes to contract theory and the stakeholder theory by showing how a firm's breach of trust prompts the changes in post-breach terms in contracts with its stakeholders. Previous studies find that during hostile takeovers, the breach of trust can benefit shareholders at the expense of other stakeholders. For example, during hostile takeovers, shareholder wealth increases by termination of employee pension plans (Ippolito and James (1992)), layoffs of target employees (Bhagat, Shleifer, and Vishny (1990)), and concession from the unions (Rosett (1990)). Similarly, during leveraged buyouts, shareholders gain but pre-buyout bondholders lose, especially when they have weaker covenant protection (Asquith and Wizman (1990)). These studies show that incoming management teams prefer to breach firms' promises with stakeholders to reduce firm liability, thereby increasing shareholder wealth. We extend this literature by focusing on a breach of trust that is not precipitated by changes in control. We show that employee layoffs hurt both shareholders and non-employee stakeholders as evidenced by the

⁶ While our main hypotheses yield the same predictions for both large customers and suppliers of layoff firms, we do not perform tests using large customers of layoff firms since the number of layoff firms (low CSR layoff firms) with large customers that are reported in the COMPUSTAT Segment Customer database is only 54 (18).

negative effects of layoff announcements on the wealth of both parties. We further show that non-employee stakeholders that perceive the layoff firm as being less committed to its stakeholders adjust their future contract terms accordingly to minimize risk associated with weakened stakeholder relationships.

Second, our study extends the layoff literature by examining the impact of layoff firms' CSR performance on layoff announcement returns. Prior studies identify several determinants of layoff announcement returns.⁷ For example, Worrell, Davidson, and Sharma (1991) show that layoffs due to firms' poor financial performance elicit more negative abnormal stock returns than layoffs due to restructuring or consolidation. In addition, Hallock (1998) finds that permanent layoffs have more negative announcement returns compared with temporary layoffs and Elayan et al. (1998) show that the size of layoffs, employee productivity, and firm performance (return on equity) and industry are important determinants of layoff announcement returns. However, no study to date has investigated how layoff firms' past social performance affects the wealth of their shareholders.

Third, our paper is the first layoff study that examines the valuation effects for stakeholders, thus broadening the perspective of the study to a nexus of contract setting, where the interests of shareholders and stakeholders interact with each other. We show that layoffs by high CSR firms increase incentive conflicts between shareholders and non-employee stakeholders and hurt their future relationships, and as a result, non-employee stakeholders realize significant wealth losses around the layoff announcement date.

The paper proceeds as follows. Section II describes the samples and CSR measures, and provides summary statistics for key variables. Section III investigates whether layoff-performance sensitivity is different between high and low CSR firms. Section IV examines the valuation effects of employee layoffs for shareholders and non-employee stakeholders and Section V examines how employee layoffs affect post-layoff terms in contracts with non-employee stakeholders. In Section VI, using a

⁷ Other studies examine the likelihood of downsizing actions including employee layoffs and show that firms are more likely to engage in downsizing actions when they are highly levered (Smith (1990)), when they are acquired by other firms, involved in management buyouts, or engaged in value destroying diversification strategies (Li (2013), Ofek (1993)), and when they perform poorly and have high leverage or bank ownership (Kang and Shivdasani (1997), Denis and Kruse (2000)). Heinkel, Kraus, and Zechner (2001) further show that firms' propensity to engage in restructuring activities following poor operating performance is independent of the level of activity in the market for corporate control.

propensity score matched approach, we investigate post-layoff changes in CEO compensation and operating performance. Section VII reports results from robustness tests. Section VIII summarizes and concludes the paper.

II. Samples, Measures of CSR, and Summary Statistics

A. Samples

To construct our sample, we start with the universe of S&P 1500 firms over the period 2003 to 2013 in Compustat Index Constituents. We start the sample from 2003 due to the availability of CSR index in KLD database. We delete firms for which CSR ratings are not available in the KLD database, firms with missing stock return data in the Center for Research in Security Prices (CRSP), firms with missing financial data in Compustat, and firms in regulated industries (SIC codes between 4900 and 4999 and between 6000 and 6999). We obtain information on each firm's layoffs by extensively searching *Factiva*. Specifically, we use the following keywords to locate information on a firm's employee layoffs: 'layoff(s)', 'downsize,' 'fired,' and 'dismissal.' In addition, we search the state-level Worker Adjustment and Retraining Notification (WARN) Act filings to further identify layoff events.⁸ We omit layoffs that are due to temporary workforce reduction or temporary production suspension as these layoffs are likely to reflect short-term demand slowdown. We also exclude layoff announcements that are part of previously announced broader workforce reduction plans since these announcements are already anticipated and thus unlikely to provide new information to the market. Our final sample comprises 486 layoff announcements.

We use the Trade Reporting and Compliance Engine (TRACE) and Compustat Segment Level Customer databases to identify a layoff firm's bondholders and suppliers, respectively.⁹ To examine

⁸ The WARN Act of 1988 is a federal law that requires firms with at least 100 employees to give a 60-days advance notification of plant closings and mass layoffs of employees to representatives of affected workers. In addition, a number of states have the state-level WARN Act layoff notice laws that sometimes are stricter than the federal law (e.g., California). We examine these state-level filings to identify firms that engage in layoffs. We then search *Factiva* to obtain information on the exact announcement dates of these layoffs.

⁹ According to the Financial Accounting Standards Board (FASB) Statement No. 131, a public firm in the U.S. must disclose information pertaining to customers to whom 10% or more of its total sales are made. We match

whether layoff announcements affect post-layoff contract terms with banks, we merge the list of layoff firms with the list of firms covered in Loan Pricing Corporation's (LPC's) DealScan database. Our final samples consist of 1,658 bonds, 3,471 public suppliers, and 1,218 bank loans.

B. Measures of CSR

We measure a firm's CSR performance using CSR scores reported in the KLD database.¹⁰ KLD evaluates firms' CSR performance along seven major dimensions (corporate governance, community, diversity, employees, environment, and human rights and product) where each dimension is associated with positive (i.e., strength) and negative (i.e., concern) indicators. We compute a raw CSR score as the difference between the simple arithmetic sum of the strength indicators and that of the concern indicators across all the categories. However, since KLD has changed the number of strength and concern indicators for seven dimensions over the years (Manescu (2009)), to overcome the weighting bias, we create an adjusted CSR score to measure firm CSR performance. Specifically, following Deng, Kang, and Low (2013), we normalize the raw CSR score by dividing the strength and concern scores for each dimension by the respective number of strength and concern indicators (*Adjusted CSR*).

C. Summary Statistics

Panel A of Table I reports the distribution of our layoff sample events according to year and industry. The frequency of layoffs is high in 2003 (67 events), 2006 (60 events), and 2009 (60 events) but relatively equally distributed in the remaining eight years. A breakdown of the sample by industry shows that employee layoffs occur mainly in the manufacturing sector (80.86%) followed by the service (7.61%) and transportation & communication (5.97%) sectors.

the list of layoff firms with the list of public customers covered in the database and identify suppliers whose information on sales to the layoff firm is available.

¹⁰ The KLD database covers more than three thousand firms that comprise the Russell 3000 since 2003 and is based on a variety of sources including company filings, more than 14,000 daily global media sources, government data, and nongovernmental organization data.

Panel B of Table I provides summary characteristics for our sample layoff firms. We divide the firms into two groups according to the sample median of the adjusted CSR score. We find that compared with low CSR firms, high CSR firms have higher operating performance (industry-adjusted ROA), higher future growth opportunity (Tobin's q), lower leverage, higher R&D intensity, higher sales per employee, and lower institutional block ownership. They are also younger, and operate in competitive (lower Herfindahl index) and growing (greater change in lagged industry employments) industries. The results that high CSR layoff firms have higher industry-adjusted ROAs and Tobin's q than low CSR layoff firms suggest that their poorer pre-layoff operating performance or lack of post-layoff future growth opportunities may not be the main reason that they engage in layoffs.¹¹ We also find that layoffs by high CSR firms tend to be larger in size. All these differences between high and low CSR firms are significant at the 5% level or better.

In Panel C of Table I, to further examine the differences in pre-layoff firm characteristics between high and low CSR firms, we compare the changes in firm performance, credit rating performance, and employee productivity prior to layoffs (from year -2 to year -1 and from year -3 to year -1) between these two types of firms. We find that high CSR layoff firms experience significantly less deterioration in stock performance and credit ratings both from year -2 to year -1 and from year -3 to year -1 than low CSR firms. We also find that the mean change in total factor productivity and the median change in operating profit per employee from year -2 to year -1 are significantly higher for high CSR firms than for low CSR firms. However, the changes in ROA and sales per employees prior to layoffs are not statistically distinguishable between high and low CSR layoff firms. Overall, these results suggest that high CSR layoff firms do not experience declining firm performance and employee productivity than low CSR firms prior to the layoffs.

In untabulated tests, to examine whether industry characteristics are different between high and low CSR layoff firms, we compare the changes in industry medians (using all firms in the same four-digit SIC code excluding the layoff firm) of sales growth, industry performance, credit rating

¹¹ In untabulated tests, we find that high CSR firms are less financially constrained and hold more cash than low CSR firms. For example, the mean (median) Hadlock-Pierce (2010) index for high CSR firms is -0.745 (-0.555) while that for low CSR firms is -0.456 (-0.171). The mean (median) ratio of cash to total assets for high CSR firms is 0.151 (0.128) while that for low CSR firms is 0.087 (0.068).

performance, and employee productivity during the pre-layoff (from year -2 to year -1 and from year -3 to year -1) and post-layoff periods (from year +1 to year +2 and from year +1 to year +3). Except for the industry median cumulative stock return, which is consistently lower in high CSR layoff firms' industries than in low CSR layoff firms' industries both before and after the layoff, we find no significant difference in other measures of industry performance, credit rating performance, and employee productivity between these two industries. In fact, the changes in industry median sales growth, return on assets, log (sales per employee), and log (operating profit per employee) are significantly higher in high CSR layoff firms' industries than in low CSR layoff firms' industries, especially in the post-layoff period. Thus, we do not observe any significantly more negative perspectives for high CSR layoff firms' industries than for low CSR layoff firms' industries. Using all firms in the same three-digit SIC code to calculate the changes in industry medians leads to similar inferences.

III. CSR and Employee Layoff-Performance Sensitivity

In this section, to examine whether the likelihood of undertaking layoffs depends on a firm's past CSR activities, we examine whether layoff-performance sensitivity is different between high and low CSR firms. Previous studies find that downsizing-performance sensitivity is influenced by leverage (Ofek (1993)) and bank ownership (Kang and Shivdasani (1997)). In columns (1) through (3) of Table II, we estimate logit regressions in which the dependent variable is an indicator that takes the value of one if a firm engages in a layoff (identified from *Factiva*) in a given year, and zero otherwise. Our key independent variables of interest are *Adjusted CSR*, past performance (*Past 1 year return* and *Return on assets*), and their interaction term. Thus, the coefficient on the interaction term shows whether high and low CSR firms are different in engaging in employee layoffs in response to poor performance. The regressions also include several firm, governance, and industry characteristics that are identified as important determinants of employee layoffs in prior literature (Kaplan (1989), Ofek (1993), Cascio, Young, and Morris (1997), Kang and Shivdasani (1997), Hanka (1998), Denis and Kruse (2000), Baumol, Blinder, and Wolff (2003), Perry and Shivdasani (2005), Li (2013)). Specifically, we include

firm size, age, Tobin's q , leverage, R&D intensity, sales per employee, risk measured by the standard deviation of past one year daily stock returns, institutional block ownership, board size, and the proportion of independent directors on the board. We also include industry competition measured by Herfindahl index and the growth in industry employment measured by a lagged change in industry employment. Finally, we include year fixed effects to control for potential time trends and industry fixed effects (at the two-digit SIC code level) to control for industry effects. The Appendix provides a detailed description of the construction of these variables.

In column (1), we find that the coefficient on *Adjusted CSR* is insignificant while the coefficient on *Past 1 year return* is negative and significant at the 1% level, suggesting that the likelihood of employee layoffs increases with poor stock performance. In column (2), we include the interaction term between *Adjusted CSR* and *Past 1 year return* and find its coefficient to be insignificant. In column (3), we use the interaction term between *Adjusted CSR* and *Return on assets* and find that its coefficient is insignificant.¹² Thus, both high and CSR firms are equally likely to engage in layoffs if they perform poorly.

In columns (4) through (9), to alleviate the concern that layoff information obtained from news media underestimates the extent of employee layoffs, we use employee data reported in Compustat to construct layoff variables. In columns (4) through (6) (columns (7) through (9)), we use as the dependent variable an indicator that takes the value of one if the number of employees is reduced more than 3% (10%) during a fiscal year, and zero otherwise. We find that the results do not change. Estimating the regressions with a LPM leads to the same inference.

In untabulated tests, to gauge the economic magnitude of the effect of a firm's past performance and CSR activities on the likelihood of layoffs, we compute the estimated probabilities of layoffs using the logit specification in Table II while holding all variables at their median values (except for the *Adjusted CSR* indicator) and varying firm performance variables from the 25th to the 75th percentile. We find that for both high and low CSR firms, the estimated probability of layoffs is

¹² In untabulated tests, we replace industry fixed effects with firm fixed effects and estimate the regression using a linear probability model (LPM). This approach mitigates the concern that omitted time-invariant firm characteristics simultaneously affect firms' CSR performance and layoff activities. The results do not change.

consistently higher when the industry-adjusted stock return (industry-adjusted return on assets) is at the 25th percentile than it is at the 75th percentile. However, the difference in the estimated probability between high and low CSR firms in the respective percentile levels is very small. For example, decreasing the industry-adjusted stock return from the 75th to 25th percentile increases the probability of layoffs for high CSR firms from 0.34% to 0.98% and for low CSR firms from 0.39% to 1.04%, respectively. The results are qualitatively similar when we use Compustat employee data to construct our layoff variables as in Table II.

IV. Valuation Effects of Layoff Announcements

To distinguish between the relationship deterioration hypothesis and the relationship improvement hypothesis, in this section we examine the announcement returns of layoff firms' shareholders and non-employee stakeholders (i.e., bondholders and suppliers). We focus on bondholders and suppliers because price-level data is available about these stakeholders. Moreover, prior studies show that there exist conflicts of interest between bondholders and shareholders (e.g., asset substitution and excessive dividend payments) and thus bondholders have strong incentives to specify ex ante contractual provisions to mitigate such conflicts (Jensen and Meckling (1976)). These features allow us to examine how the borrower's layoff of its employees is perceived by bondholders and affects bondholder wealth. Similarly, since explicit contracts are too costly and inflexible, customer-supplier relationships are governed mainly by implicit contracts, which often leads to contractual frictions, allowing trading partners to breach their partner's trust and indulge in opportunistic behavior when it is profitable (Shleifer and Summers (1988), Fee, Hadlock, and Thomas (2006)). These characteristics of customer-supplier relationships allow us to examine how a customer's employee layoff, a sign of weakening in stakeholder relations, affects its and suppliers' incentives to continue their relationships and supplier wealth.

A. Univariate Tests

To examine abnormal returns for layoff firms' shareholders, we use the market model. We estimate market model parameters using days -210 to -11 relative to the announcement date. We use the CRSP value-weighted return as a proxy for the market return. Daily abnormal stock returns are cumulated to obtain the cumulative abnormal return (CAR) from day t_1 before the layoff announcement date to day t_2 after the layoff announcement date.

Panel A of Table III shows the CARs for layoff firms' shareholders over several different event windows. We report the results for the full sample as well as those for the subsamples of high and low CSR layoff firms. The mean and median CARs (-5, -2) for the full sample of layoff firms as well as those for the subsamples of high and low CSR layoff firms are not significant, suggesting that there is no information leakage about the layoffs prior to the announcements. In contrast, the mean and median CARs (-1, 1) for the full sample are significant -0.51% and -0.20%, respectively. These results are consistent with those in previous studies that show significant negative abnormal returns for shareholders around the layoff announcement date (Worrell, Davidson, and Sharma (1991), Hallock (1998), Chen et al. (2001)). The subsample analysis shows that these negative CARs are driven entirely by layoff announcements by high CSR firms. The mean and median CARs (-1, 1) for high CSR layoff firms are -0.83% and -0.42%, respectively, both of which are significant at the 1% level. In contrast, the corresponding CARs for low CSR layoff firms are small in magnitudes and insignificant. The tests of mean and median differences between high and low CSR layoff firms reject the null hypothesis of equality. We find similar results for the median CAR (-1, 0).

While these results are generally consistent with the relationship deterioration hypothesis, they are also consistent with an alternative explanation that high CSR firms have poorer past performance or weaker future prospects than low CSR firms. However, this explanation is unlikely to drive our results since as shown in Panels B and C in Table I, high CSR firms do not have poorer performance, credit ratings, and employee productivity prior to layoffs than low CSR firms. Nevertheless, to further rule out this alternative explanation, in untabulated tests, we split our sample into two subgroups according to the same median industry-adjusted ROA (industry-adjusted Tobin's q). Within each subsample, we further divide the firms into high and low CSR layoff firms according to the corresponding sample

median adjusted CSR. We find that high CSR firms in subsamples of high and low industry-adjusted ROA (industry-adjusted Tobin's q) have negative mean CARs (-1, 1) of -0.48% (-0.61%) and -1.20% (-1.14%), respectively, all of which are significant at the 5% level. The median CARs (-1, 1) show a similar pattern. In contrast, low CSR firms in both subsamples have insignificant mean and median CARs (-1, 1). Thus, the difference in CARs between high and low CSR firms in Panel A of Table III is unlikely to be driven by any difference in their performance. We find similar results when we divide our sample according to the sample median industry-adjusted past stock returns.

Panel B of Table III shows the CARs for the bondholders of the layoff firms. To estimate bond CARs, we follow Bessembinder, Maxwell, and Venkataraman (2006) and Baran and King (2010).¹³ Since the layoff firms usually have multiple bonds traded around layoff announcement dates, apart from calculating individual bond CARs, we also calculate portfolio bond CARs by equally (value-) weighting individual bond CARs of each announcement.¹⁴ We find that the mean (median) individual bond CAR for the full sample is 0.18% (0.23%), which is significant at the 1% level. Thus, bondholders are better off when firms engage in layoffs. The subsample analysis shows that this value-increasing effect of layoffs on bondholders is mainly evident for bondholders of low CSR firms: the mean individual bond CAR (-1, 1) for low CSR firms is a significant 0.57%, while the corresponding CAR for high CSR firms is a significant -0.11%. The difference in mean CARs (-1, 1) between these two groups of firms is significant at the 1 % level. Although the median CARs (-1, 1) show a similar pattern, they are significantly positive for both high and low CSR firms (0.11% compared with 0.36%), suggesting that the distribution of CARs (-1, 1) for high CSR firms is highly skewed. The mean and median equally and value-weighted portfolio bond CARs (-1, 1) are insignificant for high CSR firms but they are also positive and significant for low CSR firms. The differences in mean portfolio bond CARs (-1, 1) between the two groups are significant at the 10%

¹³ Specifically, we obtain intraday bond trading data from the TRACE database. We delete trades under \$100,000, canceled trades, corrected trades, and commission trades. Using the volume weighted daily price for each bond, we compute individual bond abnormal returns by subtracting the return of the equally weighted control portfolio of all bonds that have the same issuer S&P rating as the layoff firm from the raw return of the layoff firm's bond.

¹⁴ We use issue proceeds of the bond, not the market value of the bond, as a weight in computing value-weighted bond portfolio CARs since the information on the exact number of bond outstanding is usually unavailable. Issue proceeds are obtained from the Mergent FISD database and available for the majority of our sample bonds.

level. Thus, bondholders view layoffs by high CSR firms as non-positive events, while they view those by low CSR firms as the events that help enhance their wealth.

Panel C of Table III shows the CARs for suppliers of the layoff firms. Individual supplier CARs are computed using the market model. As layoff firms typically have multiple suppliers, to avoid the potential concern about the cross-sectional dependence of returns for individual suppliers of the same layoff firm in estimating the CARs, we also compute equally and value-weighted supplier portfolio returns. We find that the mean (median) individual supplier CAR (-1, 1) for the full sample is -0.21% (-0.18%), significant at the 5% (1%) level, suggesting that customer layoffs have a significant negative effect on suppliers. The subsample analysis shows that these negative effects of customer layoffs on supplier value are mainly driven by the subsample of high CSR customers. While the mean (median) supplier CAR (-1, 1) for the subsample of high CSR firms is a significant -0.33% (-0.34%), that for the subsample of low CSR firms is an insignificant -0.09% (-0.03%). The difference in median supplier CARs (-1, 1) between high and low CSR layoff firms is significant at the 10% level. We find similar results for the mean and median equally weighted supplier portfolio CARs (-1, 0), albeit the differences in these CARs (-1, 1) between high and low CSR layoff firms are not significant. Value-weighted supplier portfolio CARs (-1, 0) and CARs (-1, 1) for both subgroups are insignificant and their magnitudes are smaller than those of equally weighted supplier portfolio CARs (-1, 0) and CARs (-1, 1). Thus, relative to larger suppliers, smaller suppliers suffer more from their customers' layoffs, further supporting the relationship deterioration view.

An alternative explanation for the lower observed announcement returns for high CSR layoffs firms than low CSR counterparts is that layoffs by the former reveal more negative industry information about future prospects than those by the latter. To rule out this alternative explanation, we examine the valuation effects of layoff announcements on rival firms and their stakeholders. Specifically, we define rivals as firms in the same three-digit SIC code as the layoff firm and examine equally weighted and value-weighted portfolio CARs of rivals, their bondholders, and their suppliers, respectively. We also examine individual CARs of rivals, their bondholders, and their suppliers, respectively, while restricting the sample to those rivals whose assets and ROA are within one-third of

the layoff firms' assets and ROA. In all these tests, we find that the announcement returns for shareholders, bondholders, and suppliers of high CSR layoff firms' rivals are not significantly different from those of shareholders, bondholders, and suppliers of low CSR layoff firm's rivals. In fact, when examining individual bondholder returns of the rivals, we find that high CSR layoff firms' rivals have significantly higher announcement returns than low CSR layoff firms' rivals. These results suggest that lower announcement returns for high CSR layoff firms than low CSR layoff firms are unlikely driven by more negative industry shock in high CSR layoff firms' industries.

Overall, the results in Table III show that shareholders and suppliers suffer when high CSR firms engage in layoffs, while there are no such negative valuation effects when low CSR firms engage in layoffs. Bondholders of high CSR firms also, on average, either suffer value losses or realize no value increases, while those of low CSR firms experience significant value gains. These results generally support the relationship deterioration hypothesis.

B. Regressions of CARs (-1, 1) for Layoff Firms' Shareholders

B.1. OLS Regressions

To further examine the validity of the two competing views, we first estimate ordinary least square (OLS) regressions of stock CARs (-1, 1) for layoff firms on *Adjusted CSR* and control variables. We use the same controls as those used in Table II. In addition, following Elayan et al. (1998), we include the size of the layoff measured as the ratio of the number of employees laid off to the total number of employees (*Layoff size*). The results are reported in column (1) of Table IV. We report *t*-statistics in parentheses that are based on standard errors adjusted for heteroskedasticity (White (1980)) and allow for clustering at the firm level. We find that the coefficient on *Adjusted CSR* (-0.714) is negative and significant at the 1% level. The coefficient estimate of -0.714 implies that all else being equal, a one-standard deviation increase in the adjusted CSR score (0.798) of the layoff firm decreases its CAR (-1, 1) by 0.57%. Given that the mean CAR (-1, 1) for the full sample is -0.51%, this valuation effect is economically large and significant.

B.2. Endogeneity Tests: 2SLS Regressions

Although inclusion of an extensive list of control variables in the regressions mitigates potential omitted variables bias in estimating the relation between a firm's CSR performance and layoff valuation effects for shareholders, it does not address potential endogeneity bias caused by unobservable omitted variables that affect both a firm's CSR investment and its value. For example, firms with certain managerial characteristics could be those that undertake value-enhancing layoffs and, at the same time, invest more resources in CSR activities. It is also possible that a firm's ability to engage in efficient downsizing may be correlated with both its CSR performance and firm value.

To address these concerns, we perform 2SLS regressions. We use constituency statute and blue state rank of U.S. states as the instruments for a firm's CSR performance. *Constituency statute* is an indicator that takes the value of one if the layoff firm is incorporated in a state that passes a constituency statute and zero otherwise.¹⁵ Constituency statutes require directors to consider nonshareholder constituencies when making business decisions and thus allow directors to take into account the interests of various stakeholders (e.g., employees, customers, suppliers, the environment, local community, etc.) in such decisions (Adams and Ferreira (2007)).¹⁶ Flammer and Kacperczyk (2015) employ the passage of constituency statutes as an exogenous shock to firm's CSR performance for examining the effect of stakeholder orientation on innovation and find that enactment of these statutes leads to a significant increase in firm innovation. Thus, we expect the constituency statute to satisfy the relevance requirement of the instrumental variables.

Our second instrumental variable, *blue state rank*, measures the ranking of the emphasis on social responsibility actions in the state in which the layoff firm's headquarters is located, which ranges between 1 and 50. We measure the ranking of each state according to how it is democratically aligned based on historical presidential voting, congressional composition, and control of state legislature. A

¹⁵ Data on constituency statute are obtained from Flammer and Kacperczyk (2015).

¹⁶ Prior to the passage of constituency statutes, fiduciary duties of executive officers and directors dictate that they act in accordance with shareholders' interests alone and thus discourage them to incorporate the interests of different stakeholders in their decision making.

lower ranking indicates a more democratic state.¹⁷ Di Giuli and Kostovetsky (2014) find that firms located in democratically aligned states invest more in CSR activities and consequentially have better CSR performance. Thus, democratic rank of the states is also expected to satisfy the relevance requirement of the instrumental variables.

However, neither the enactment of state-level statutes in the state of incorporation of the layoff firm nor the political leaning of the headquarter state of the layoff firm are likely to be influenced by firm decisions. Therefore, these instruments are unlikely to affect layoff announcement returns other than through the CSR channel, thus satisfying the instrumental variables' exclusion restriction.

The 2SLS regressions results are reported in columns (2) and (3) of Table IV. In column (2), we report results from the first-stage regression in which the dependent variable is *Adjusted CSR* and the instrumental variables are *Constituency statute* and *blue state rank*. We use the same control variables as those used in column (1).

We find that these instrumental variables are significantly related to the endogenous variable with a predicted sign. The *p*-values for the first-stage Cragg-Donald (1993) instrument relevance test are less than 0.01, rejecting the null hypothesis of weak instruments.

In column (3) of Table IV, we estimate the second-stage regression of the CAR (-1, 1) on the predicted values of *Adjusted CSR* and control variables. We find a significantly negative coefficient on predicted *Adjusted CSR*, suggesting that the valuation effect of layoff announcements is more negative when layoff firms have higher pre-layoff CSR performance. The *p*-value for the test of overidentifying restrictions is greater than 0.15, indicating that our two instrumental variables pass the Sargan (1958) overidentification test. Therefore, our finding that shareholders of high CSR firms suffer more from layoff events than those of low CSR firms is robust to controlling for potential endogeneity bias.

B.3. Endogeneity Tests: Difference-in-difference Regressions

¹⁷ Data on democratic rank of the states are obtained from <http://thehill.com/blogs/ballot-box/house-races/221721-how-red-or-blue-is-your-state> (October 2014) published by the Hill. The Hill looks at current and historical voting trends in all 50 states (Washington D.C. not included) to find the most secure Republican and Democratic strongholds.

To further address the potential endogeneity of a firm's CSR performance, we use the promulgation of a 2009 Presidential memorandum ("Government Contracting: Memorandum for the Heads of Executive Departments and Agencies") that is aimed to increase competition in the award of government contracts as a quasi-natural experiment and perform difference-in-differences tests.¹⁸ Contracting with the government tend to provide the firms with regular and repeated business, thus allowing the contractors to face little or no competition in contract awards. Moreover, government agencies also tend to hold their spending constant during recessionary periods in order to help the economy, further insuring their contractors against economic downturns while allowing them to pursue growth opportunities when the economy rebounds. Therefore, government contractors have weaker incentives to treat their stakeholders well or to adopt stakeholder friendly policies. However, the 2009 memorandum mandates that government agencies reduce their aggregate award of new non-competitive contracts by at least 10% as well as the length of non-competitive contracts. It also takes measures to solicit more bids for each contract. These new requirements represent an exogenous shock to firms that are engaged as government contractors by exposing their future contracts to competition, thereby triggering them to improve stakeholder relationships in order to compete better in the competitive government contracting market.

To perform difference-in-differences tests, we use stock CARs (-1, 1) for layoff firms as the dependent variable and include *Government contractor*, *Post*, and their interaction term as key explanatory variables of interest in the regressions. *Government contractor* is an indicator that takes the value of one if the layoff firm has been a supplier to a federal, state, or local government in the previous fiscal year in the Compustat Segment Level Customer database, and zero otherwise. *Post* is

¹⁸ According to the legislative attorney's report on Competition in Federal Contracting (<https://fas.org/sgp/crs/misc/R40516.pdf>), "The March 4, 2009 Presidential memorandum called for the Director of the Office of Management and Budget to develop detailed guidance to govern the appropriate use and oversight of sole-source and other types of non-competitive contracts and to maximize the use of full and open competition and other competitive procurement processes. This guidance was issued on October 27, 2009, and calls for agencies to focus on requirements development and outreach to potential vendors; use performance-based acquisitions and commercial solutions; evaluate alternative competition strategies for larger and more complex requirements; use strategic sourcing; ensure consistent maximization of competition at the task and delivery order level; give maximum practicable consideration to small businesses; limit the length of any noncompetitive contracts; ensure price reasonableness in non-competitive contracts; regularly assess contractor performance under non-competitive contracts; engage with the marketplace to determine how barriers to competition can be removed; and analyze the agencies' largest spend categories." Overall these measures significantly escalate competition for new contract awards, thereby affecting the sustainability of government business for the existing contractors.

an indicator that takes the value of one if the layoff announcement is made after the promulgation of the memorandum and subsequent guidance on government contracting (October 27, 2009), and zero otherwise.

The results are reported in columns (4) and (5) of Table IV. We report t -statistics in parentheses that are based on standard errors adjusted for heteroskedasticity (White (1980)) and allow for clustering at the firm level. We use the same control variables as those used in column (3). In column (4), we include *Government contractor*, *Post*, and other controls and find that the coefficient on *Government contractor* is positive and significant, suggesting that layoff announcements by firms that treat their stakeholders fairly (i.e., firms that are not government contractors) are viewed less favorably by the market. In column (5), we find that the coefficient on the interaction term between *Government contractor* and *Post* is negative and significant at the 5% level, suggesting that when firms decide to engage in layoffs despite an improvement in their incentives to treat stakeholders well, their shareholders react more negatively to such layoff announcements. Therefore, our finding that shareholders of firms that treat stakeholders well suffer more from layoff announcements than those that treat stakeholders poorly is robust to controlling for potential endogeneity bias.

C. Regressions of CARs (-1, 1) for Layoff Firms' Stakeholders

C.1. OLS regressions of Bondholder CARs

In this subsection, to better understand the cross-sectional variation in bondholder CARs of the layoff firms, we estimate OLS and difference-in-differences regressions of bondholder CARs (-1, 1) on layoff firms' pre-layoff social performance and control variables.

The results are reported in Table V. In columns (1) and (2), the dependent variable is the equally weighted portfolio bond CAR (-1, 1) and the key independent variable of interest is *Adjusted CSR (indicator)* that takes the value of one if *Adjusted CSR* is above the sample median, and zero

otherwise. Following the previous studies, we control for S&P issuer rating,¹⁹ a high yield indicator that takes the value of one if S&P issuer rating is below BBB-, and zero otherwise (Klock, Mansi, and Maxwell (2005)), macroeconomic variables including term spreads and credit spreads (Gebhardt, Hvidkjaer, and Swaminathan (2005), Bessembinder, Maxwell, and Venkataraman (2006); Klock, Mansi, and Maxwell (2005)), firm characteristics including firm size, Tobin's q , leverage, and ROA (Klock, Mansi, and Maxwell (2005), Baran and King (2010)), and layoff characteristics used in Table IV. The regression also controls for year and industry fixed effects. The t -statistics reported are based on standard errors adjusted for heteroskedasticity (White (1980)) and allow for clustering at the firm level. We find that the coefficient on *Adjusted CSR (indicator)* is negative and significant, suggesting that bondholders suffer more when firms with high CSR performance undertake employee layoffs, supporting the relationship deterioration hypothesis.

In columns (3) through (5), we use individual bond CARs (-1, 1) as the dependent variable. We replace issuer-level bond characteristics used in columns (1) and (2) with individual bond characteristics including years to maturity, log (issue proceeds), an indicator for bond covenants that takes the value of one if the bond has any covenants, and zero otherwise, coupon rates, an indicator for multiple bond issues that takes the value of one if a layoff firm has more than one bond traded around the layoff announcement date, and zero otherwise (Asquith and Wizman (1990), Klock, Mansi, and Maxwell (2005), Francis et al. (2010)), and bond credit rating. We obtain bond rating information from the Mergent FISD database. To alleviate the potential cross-sectional dependence concern when using returns for different individual bonds of the same layoff firm in the regression, we cluster the standard errors at the event level (Froot (1989)).

In columns (3) and (4), we find that the coefficient on *Adjusted CSR (indicator)* is negative and significant. The coefficient estimate of -1.661 for *Adjusted CSR (indicator)* in column (4) suggests that bondholders of high CSR firms experience a 1.66% lower abnormal return than bondholders of low CSR firms when firms announce employee layoffs. Given that the mean individual bond CAR (-1, 1) for the full sample is 0.18%, this value loss is economically large and significant. In column (5), we

¹⁹ We convert the alphabetical rating to the cardinal scale and the rating class number that ranges from 1 to 22 (Klock, Mansi, and Maxwell (2005)), with 22 being the highest credit rating.

include the interaction term between *Adjusted CSR (indicator)* and years to maturity as an additional explanatory variable. The coefficient on the interaction term is negative and significant at the 10% level while the coefficient on *Adjusted CSR (indicator)* loses its significance. Thus, bondholders of high CSR firms suffer particularly more when their post-layoff relationships with layoff firms are expected to last longer. Overall, these results further support the relationship deterioration hypothesis.

C.2. OLS Regressions of Supplier CARs

Next, we estimate OLS regressions of CARs (-1, 1) for a layoff firm's suppliers on *Adjusted CSR (indicator)* and control variables. The results are reported in Table VI. The dependent variable is the equally-weighted portfolio supplier CAR (-1, 1). The control variables used in the regressions are the same as those used in Table IV.

In column (1), we use the full sample. We find that although the coefficient on *Adjusted CSR (indicator)* is negative, it is not significant. In columns (2) through (8), we report results by subsamples. We divide the suppliers according to the importance of the trading relationships between layoff firms and suppliers: whether suppliers operate in durable goods industries (SIC codes between 3400–3900) and whether their sales to the layoff firms are higher than the sample median. Previous studies suggest that firms are more likely to abide by their implicit contracts and maintain bilateral trading relationships when a supplier's post-sale product support is important (Titman (1984)), or when relationship breakup costs are high (Williamson (1985)). For example, the customer-supplier relationships are likely to be more important and valuable when customers use very specialized inputs produced by suppliers (e.g., durable goods) in their production, which makes it costly for suppliers and customers to switch their trading partners.²⁰ Similarly, when trading partners expect to realize large losses on termination of their major trading relationship such as when suppliers' sales to the customer account for a significant portion of their sales, trading partners are expected to have strong incentives to maintain their relationship to minimize relationship breakup cost. These arguments suggest that suppliers with a stronger trading relationship are less likely to be adversely affected by

²⁰ Kale and Shahrur (2007) argue that suppliers in durable goods industries are more likely to make high levels of relationship-specific investments.

the customer's layoff announcement since relationship terminations are very costly for both trading partners and replacing these suppliers with new suppliers is difficult and time-consuming. Thus, the relationship deterioration hypothesis predicts that the negative effect of a customer's layoff announcement on supplier wealth is more pronounced for the suppliers of a high CSR firm that operate in nondurable goods industries or those of a high CSR firm that have less sales dependence on the firm.

Columns (2) and (3) report results using subsamples of equally weighted portfolio of suppliers that belong to the durable and nondurable goods industries, respectively. We find that the coefficient on *Adjusted CSR (indicator)* for a subsample of suppliers in nondurable goods industries is -1.997, which is significant at the 1% level, while that on *Adjusted CSR (indicator)* for a subsample of suppliers in durable goods industries is an insignificant 0.472. Thus, among suppliers that operate in nondurable goods industries, those of high CSR layoff firms realize, on average, an economically significant 2.00% lower CAR (-1, 1) than those of low CSR layoff firms. Given that the mean equally weighted portfolio supplier CAR (-1, 1) for the subsample of suppliers in nondurable goods industries is -0.14%, this number is economically large and significant.

In columns (4) and (5), we divide our sample suppliers into those of high and low sales fractions to the layoff firm according to the sample median sales fraction and reestimate the regression separately for these two subgroups. Again, we find that the negative effect of a customer's layoff announcement on supplier wealth is concentrated amongst suppliers with a weaker relationship with the layoff firm: the coefficient on *Adjusted CSR (indicator)* is negative and significant only among suppliers having a low sales fraction to the layoff firm.

In columns (6) through (8), we further divide the sample suppliers into three subgroups according to the strength of their trading relationships with layoff firms: strongest relationship (suppliers that are in durable goods industries and have high sales dependence on layoff firms), moderately weak relationship (suppliers that either are in nondurable goods industries or have low sales dependence on layoff firms)), and weakest relationship (suppliers that are in nondurable goods industries and have low sales dependence on layoff firms). We find that the coefficient on *Adjusted CSR (indicator)* is

negative and significant for suppliers with moderately weak and weakest relationships with the layoff firms (columns (7) and (8)), while that on *Adjusted CSR (indicator)* is positive and significant for suppliers with the strongest relationships with the layoff firms (column (6)). The differences in coefficients on *Adjusted CSR (indicator)* between the subgroups of suppliers with strong trading relationships and those of suppliers with weak trading relationships (columns (2) versus (3), columns (4) versus (5), columns (6) versus (7), and columns (6) versus (8)) are all significant at the 5% level or better.²¹ These results support the relationship deterioration hypothesis. The results also suggests that suppliers of a high CSR layoff firm that are important to the layoff firm's business benefit from its layoff, which supports the relationship improvement hypothesis.²²

Overall, the regression results in Tables IV, V and VI are consistent with the univariate evidence in Table III and lend further support to the relationship deterioration hypothesis. However, when suppliers have maintained strong trading relationships with layoff firms, the market perceives layoffs as value-increasing events for the suppliers, supporting the relationship improvement hypothesis. These results suggest that stakeholders' perception of the firm's continued commitment to treat them fairly is important for shareholder and stakeholder value maximization.

V. Post-layoff Changes in Contract Terms

In this section, to further distinguish between the relationship deterioration hypothesis and the relationship improvement hypothesis, we examine the effects of employee layoffs on post-layoff contract terms with suppliers and creditors and test whether these effects are different across firms with high and low pre-layoff CSR performance.

A. Post-layoff Terms with Suppliers

²¹ In untabulated tests, we include CARs (-1, 1) for layoff firms as an additional explanatory variable and find that in most of regressions, it has a positive and significant coefficient.

²² In untabulated tests, we perform OLS regressions of individual supplier CARs (-1, 1), which allows us to control for additional variables including supplier firm characteristics and pre-layoff relationship duration that may affect supplier CARs. We find qualitatively similar results as those in Table VI.

We first examine the effect of layoffs on the post-layoff trading relationships between suppliers and layoff firms. We focus on post-layoff relationship duration and post-layoff changes in supplier sales made to the layoff firms. We employ a Cox proportional hazard model to examine the post-layoff relationship duration in which the dependent variable is the supplier firm's hazard (probability) at time t that the relationship with its customer will be terminated within a certain time interval, given that the relationship has survived until the beginning of the interval. Each customer-supplier relationship is treated as a single observation in the regression and all control variables are measured as of the fiscal year prior to the layoff announcement date.

The regression results are reported in Table VII. The coefficients reported are the hazard ratios²³ along with z -statistics that are calculated based on standard errors adjusted for heteroskedasticity (White (1980)) and allow for clustering at the event level. In column (1) that uses the full sample in estimating the regression, we find that adjusted CSR of the layoff firm is not significantly related to post-layoff relationship duration. In columns (2) through (8), we use subsamples of supplier firms classified according to the strength of their trading relationships with the layoff firms and estimate the regression separately for the subsamples. We find that the coefficient on *Adjusted CSR* is positive and significant at the 10% level or better only among suppliers with a weak relationship with the layoff firms (columns (3), (5), (7) and (8)). Thus, weak suppliers of a high CSR layoff firm that suffer significantly more negative CARs around the layoff announcement date also experience ex-post weakening of their trading relationships with the layoff firm.

As a second test, we use changes in the percent of a supplier's sales made to the layoff firm to further capture post-layoff changes in the strength of the trading relationships. The results using OLS regression are reported in Table VIII. The dependent variables are the change in the fraction of suppliers' sales made to layoff firms from year -1 to year 0, from year -1 to year +1, and from year -1 to year +2, respectively, where year 0 is the layoff announcement year. We report t -statistics in parentheses based on standard errors adjusted for heteroskedasticity (White (1980)) and allow for clustering at the event level. In columns (1) through (3), we use the full sample of suppliers in

²³ Since the regression model is based on the hazard function, a positive coefficient on the explanatory variable means that an increase in the explanatory variable leads to a shorter relationship duration.

estimating the regressions. We find that the coefficient on *Adjusted CSR (indicator)* is negative and significant at the 1% level in columns (2) and (3). In columns (4) through (6) ((7) through (9)), we reestimate the regressions in columns (1) through (3) separately for the subsample of suppliers in durable (nondurable) goods industries. We find that the coefficient on *Adjusted CSR (indicator)* is negative and significant at the 5% level or better among suppliers in nondurable goods industries irrespective of time periods to measure the post-layoff changes in sales dependence. The coefficient on *Adjusted CSR (indicator)* among suppliers in durable goods industries is also significantly negative but only when the change is measured from year -1 to year +2. Moreover, its magnitude (-0.029) is only about one fifth of that of the corresponding coefficient among suppliers in nondurable goods industries (-0.135).

To overcome concerns about the endogenous nature of a firm's CSR performance, we perform a propensity-score matching approach using nearest neighborhood matching and compare post-layoff contract terms of layoff firm-supplier pairs with matched non-layoff firm-supplier pairs. Specifically, we match a customer-supplier pair where the customer engages in layoffs with a customer-supplier pair where the customer does not engage in layoff. We estimate the probability (i.e., propensity score) of customers engaging in layoffs by regressing an indicator for layoffs on customer characteristics including *Adjusted CSR*, size, leverage, Tobin's q , return on assets, standard deviation of daily returns, log (sales per employee), log (number of suppliers), and industry fixed effects (two-digit SIC level), relationship characteristics including supplier's fraction of sales to its customer and past relationship duration of the customer-supplier pair, supplier characteristics including size and industry fixed effects (two-digit SIC level), and year fixed effects. We then match, without replacement, a customer-supplier pair where the customer engages in layoffs with a customer-supplier pair where the customer do not engage in layoffs that has the closest propensity score. Our sample consists of 834 customer-suppliers pairs (417 treated customer-supplier pairs and 417 control customer-supplier pairs). In untabulated tests, we compare the mean values of the matching variables between treated and control pairs and find that none of the matching variables are significantly different between the two groups.

Table IX shows the mean supplier relationship duration in the post-layoff period for the propensity-score matched sample firms. Within the layoff firm-supplier pairs, we find that the relationship duration for the pairs involving high CSR layoff firms are significantly lower than that for the pairs involving low CSR layoff firms when suppliers have lower sales dependence on high CSR layoff firm or when suppliers belong to nondurable goods industries as well as have lower sales dependence on high CSR layoff firm. However, within the matched non-layoff firm-supplier pairs, we do not find any significant difference among these subgroups. The differences in post-layoff relationship duration between the treated pairs involving high CSR layoff firms and the control pairs involving high CSR non-layoff firms are significant when suppliers belong to nondurable goods industries and when they have lower sales dependence on their customers. Therefore, supplier relationships with high CSR firms that engage in employee layoffs are likely to be short-lived in the post-layoff period compared to those with high CSR firms that do not engage in employee layoffs, especially when the suppliers belong to nondurable goods industry or have low sales dependence on customer firms.

In untabulated tests, we also examine the mean change in suppliers' sales dependence on the customer in treated and control customer-supplier pairs from year -1 to year +1, where year 0 is the year of a layoff announcement. Within the layoff firm-supplier pairs, we find that sales dependence of the suppliers who belong to the pairs involving high CSR layoff firms is significantly lower than sales dependence of the suppliers who belong to the pairs involving low CSR layoff firms when suppliers operate in nondurable goods industries. However, this difference in sales dependence is not significant for suppliers in the matched non-layoff firm-supplier pairs. The differences in post-layoff changes in sales dependence between suppliers in the treated pairs involving high CSR layoff firms and those in the control pairs involving high CSR non-layoff firms is also insignificant.

Overall, the results in Tables VII, VIII, and IX show that suppliers of high CSR layoff firms, especially weaker suppliers, experience significant deterioration in post-layoff relationships. These results, together with those reported in Tables III and VI, strongly support the relationship deterioration hypothesis.

B. Post-layoff Terms with Creditors

In this subsection we examine whether the effects of employee layoffs on post-breach contract terms between the firms and the creditors are different between firms with high and low social performance. We focus on two most important terms in loan contract, loan rates and covenants that protect the lenders from borrowers' opportunistic behavior. By requiring the borrowers to undertake or refrain from certain actions, covenants also restrict borrowers from engaging in risky investment, thereby reducing asset substitution problems (Jensen and Meckling (1976)). Thus, when the lenders receive unexpected negative information about the borrowers, they have strong incentives to increase loan rates and impose strict covenants to reflect the borrowers' new revealed riskiness (Graham, Li, and Qiu (2008), Goss and Roberts (2011)). To examine how the creditors perceive the employee layoffs by their client firms and react differently between high and low CSR firms, we perform difference-in-difference tests: we compare the differences in loan spreads over LIBOR (all-in-drawn loan spreads) and the numbers of financial and general covenants between high and low CSR firms during the pre- and post-layoff periods (two years prior to the layoff announcement to two years after the layoff announcement). To the extent that borrowers' layoffs signal that the borrowers are less keen to treat their stakeholders fairly, the relationship deterioration hypothesis suggests that after the layoffs, banks charge higher loan rates or impose a larger number of covenants for high CSR firms than for low CSR firms.

To test these predictions, we regress loan contract terms on *Adjusted CSR (indicator)*, *Post layoff* (indicator that takes the value of one for loan observations in the post-layoff period, and zero otherwise), and their interaction. We also control for several firm and loan characteristics and macroeconomic conditions to alleviate the concern that our results may be driven by differences in these variables. Following previous studies (Graham, Li, and Qiu (2008), Chava, Livdan, and Purnanandam (2009), Nini, Smith, and Sufi (2009), Engelberg, Gao, and Parsons (2012), Chan, Chen, and Chen (2013)), we control for firm size, Tobin's q , leverage, profitability, current ratio, tangibility, and credit rating. We also control for loan amount, maturity, loan spread (used only in covenant

regressions), the number of covenants (used only in loan spread regressions), credit spread, term spread, and loan type and purpose fixed effects. We further control for *Layoff size*. Finally, we include industry-year and firm fixed effects (industry fixed effects) to control for time trends and omitted unobservable time-invariant firm characteristics. Our key explanatory variable of interest is the interaction term between *Adjusted CSR (indicator)* and *Post layoff*.

The results are presented in Panel A of Table X.²⁴ In columns (1) and (2), the dependent variable is the all-in drawn spread. In column (1), we include industry fixed effects and other controls and in column (2), we replace industry fixed effects with industry-year fixed effects and firm fixed effects. We find that the coefficient on the interaction term is positive and significant, suggesting that banks charge higher loan rates on high CSR firms than on low CSR firms after the layoff.

In columns (3) and (4), the dependent variable is an indicator for the presence of financial covenants in the loan contract. We use an OLS model to estimate the regressions. We find that the coefficient on the interaction term is positive and significant at the 5% level or better. In columns (5) and (6), we reestimate the regressions in columns (3) and (4) with a Poisson regression in which the dependent variable is the number of financial covenants. The results do not change. Thus, after the layoffs, banks impose more covenant restrictions in their loan contracts on high CSR firms than on low CSR firms.

Finally, in columns (7) and (8), we replace the dependent variables used in columns (4) through (6) with an indicator for the presence and the number of general covenants, respectively. The coefficients on the interaction term are positive and significant at the 1% level.

As an alternative test, we perform a propensity score matching approach using nearest neighborhood matching. Specifically, we use a logit model to estimate a firm's probability (i.e.,

²⁴ In untabulated tests, we perform univariate tests for loan spreads and the number of covenants and find that prior to layoffs, compared with low CSR firms, high CSR firms enjoy lower loan rates by 21 basis points, fewer financial covenants by 0.56, and fewer general covenants by 0.82. All these differences are statistically significant. However, following layoffs, high CSR firms experience the worsening of their loan contract terms: high CSR firms pay higher loan rates by 42 basis points and receive more general covenants by 0.08. The difference in the number of financial covenants between the two groups is also reduced to 0.29 from 0.56. Thus, high CSR firms engaging in layoffs experience an increase in loan rates by 63 basis points, an increase in the number of financial covenants by 0.27, and an increase in the number of general covenants by 0.91 compared with low CSR firms engaging in layoffs.

propensity score) of engaging in layoffs by regressing an indicator for layoffs on *Adjusted CSR*, firm size, leverage, Tobin's q , return on assets, standard deviation of daily returns, issuer credit rating, and year and industry fixed effects (two-digit SIC level). We restrict our sample to firms that have at least one loan contract in the previous two years and subsequent two years, respectively. We then match, without replacement, a layoff firm with a non-layoff control firm that has the closest propensity score. Our sample consists of 102 loan observations by 30 layoff firms and 92 loan observations by 30 non-layoff matched firms from 2003 to 2013. Panel B of Table X compares the matching variables between layoff firms and their matching non-layoff firms. We use bootstrapped standard errors based on 50 replications to conduct statistical inferences. We find that none of the firm-level characteristics are significantly different between the two groups, indicating that our propensity-score matching approach has identified highly similar firms.

Panel C of Table X reports results of OLS regressions of loan contract terms for our propensity-score matched sample firms. The explanatory variable of interest is the triple interaction term including indicators for *Adjusted CSR*, *Post Layoff*, and *Treated Firm*. *Treated Firm* is an indicator that takes the value of one if the firm has engaged in layoffs during the year, and zero otherwise. In columns (1) and (2), the dependent variable is the all-in drawn spread. In column (1), we include industry fixed effects and in column (2), we replace industry fixed effects with industry-year fixed effects and firm fixed effects. We find that the coefficient on the triple interaction term is positive and significant, suggesting that compared to matched non-layoff firms, banks charge higher loan rates on high CSR firms that engage in layoffs in the post-layoff period. In columns (3) and (4), we use an indicator for the presence of financial covenants as the dependent variable and find that the coefficient on the triple interaction term is positive and significant at the 1% level. Finally, in column (5), we use the indicator for general covenants as the dependent variable and find the coefficient on the triple interaction term is positive but not significant.²⁵ Overall, the results in Table X suggest that banks change the contract terms of high CSR borrowers post layoffs more aggressively than those of low

²⁵ Given the small sample size used in Panel C of Table IX, Poisson models in which we use the number of financial and general covenants as the dependent variables, respectively, cannot be estimated. However, when we estimate these regressions using OLS, we find that the triple interaction term is significant at the 10% level.

CSR borrowers by charging higher loan rate and by imposing more financial and general covenants, supporting the relationship deterioration hypothesis.

VI. Post-layoff Changes in CEO Compensation and Workforce

In this section we examine post-layoff changes in CEO compensation and the number of employee of layoff firms to assess how high and low CSR layoff firms take different actions to change investors' perceptions on their stakeholder relationships. We employ a propensity score matching approach in comparing layoff and non-layoff control firms in the S&P 1500 index. We experiment with the nearest neighborhood approach. We use a logit model to estimate a firm's probability (i.e., propensity score) of engaging in layoffs. More specifically, we first regress an indicator for a layoff firm on *Adjusted CSR*, firm size, leverage, Tobin's q , return on assets, R&D / sales, firm age, past one year return, standard deviation of daily returns, log (number of employees), and year and industry fixed effects (two-digit SIC level). We then match, without replacement, a layoff firm with a non-layoff control firm that has the closest propensity score. We obtain a propensity score-matched sample of 478 (239 layoff and 239 non-layoff) firm-year observations from 2003 to 2013.

In untabulated test, we compare firm characteristics between layoff firms and their matching non-layoff firms. We find that none of the firm-level characteristics are significantly different between the two groups, indicating that our propensity-score matching approach identifies matching firms that are highly similar with respect to a variety of firm characteristics. We use bootstrapped standard errors based on 50 replications to conduct statistical inferences.

Table XI presents results of OLS (columns (1) through (3)) and logit regressions (columns (4) through (9)) using the propensity-score matched sample. The dependent variables in columns (1) through (3) are the changes in log (CEO total compensation) from year -1 to year 0, from year -1 to year +1, and year -1 to year +2, respectively, where year 0 is the year of a layoff announcement.²⁶ The

²⁶ We measure CEO total compensation as the sum of salary, bonus, long term incentive pays, option grants, and other payments obtained from the Execucomp database.

control variables are the same as those used in Table IV. We also control for industry fixed effects. Our key independent variable of interest is the interaction term between *Treated Firm* and *Adjusted CSR (indicator)*. We find that the coefficient on the interaction term is negative and significant in first two columns. These findings suggest that high CSR layoff firms take an action that significantly reduces CEO compensation in the year of and year after layoff announcements even after controlling for pre-layoff firm performance and other important determinants of top executive compensation, suggesting that firms take an action in which top management shares the pains that the employees suffer.

In columns (4) through (9), the dependent variable is an indicator that takes the value of one if the number of employees reported in Compustat for year 0, year +1, and year +2 are, respectively, lower than that for year -1, and zero otherwise. The coefficients reported are estimates of marginal effects on the probability. We divide the sample into high and low adjusted CSR firms and estimate the regressions separately for these two subsamples.²⁷ We find that the coefficient on the layoff indicator is insignificant in columns (4) through (6) in which we use a subsample of high adjusted CSR firms in the regressions, while it is positive and significant in columns (7) through (9) in which we use a subsample of low adjusted CSR firms in the regression. Thus, low CSR layoff firms are more likely to decrease their employees in the year of and two subsequent years after the layoff announcement than low CSR non-layoff firms, whereas high CSR layoff firms are not than high CSR non-layoff firms. Thus, relative to low CSR layoff firms, high CSR layoff firms refrain from engaging in further workforce reductions, possibly to ameliorate their relationship with employees and other stakeholders.

Overall, the findings in Table XI suggest that relative to non-layoff firms, high CSR layoff firms undertake more positive reputation rebuilding actions to improve stakeholder relationships such as reducing CEO compensation and engaging in fewer layoffs post layoffs.

²⁷ We use subsamples in the analysis since Ai and Norton (2003) and Powers (2005) highlight the problems of interpreting the marginal effects on the interaction term when the model is nonlinear.

VII. Robustness Tests

To check the robustness of our main results, we perform several additional tests. Below, we briefly summarize the results of these untabulated tests. First, to mitigate the concern that more negative layoff announcement returns for high CSR firms than for low CSR firms are due to high CSR firms' poorer future financial prospects, we compare the changes in the frequency of credit ratings downgrades, the analyst's earnings (EPS) forecasts, and operating performance in the post layoff period between high and low CSR layoff firms. We compare the change from year -1 to year 4, where year 0 is the layoff announcement year. We find that from year -1 to year 1, about 25.8% of high CSR layoff firms are downgraded compared to 32.1% of low CSR layoff firms. The difference in these proportions is not significant. We find similar results for the proportions of credit downgrades from year -1 to year 0, year 2, and year 3. Thus, high CSR firms witness similar changes in credit rating downgrades compared to low CSR firms in the years following the layoff announcement. Similarly, we find no significant difference in the changes in analysts' EPS forecasts within four years of the layoffs between high and low CSR firms. In the second year following the layoffs, the difference in the median change in an analyst's median consensus EPS estimate between high and low CSR firms is a positive 0.15, significant at the 5% level. The mean and median changes in all other years are not significantly different between high and low CSR firms. These results suggest high CSR layoff firms' future earnings prospects are not materially worse than those of low CSR layoff firms – in fact, the median change in an analyst's median consensus EPS estimate in the second year is more profitable for high CSR layoff firms than for low CSR layoff firms. We further find that the differences in mean (median) ROA changes between high and low CSR firms from year -1 to year 0, year 1, year 2, and year 3 are insignificant. Thus, the changes in operating performance post-layoffs are almost indistinguishable between high and low CSR firms. Overall, these results suggest that more negative CARs for high CSR firms than for low CSR firms documented in Section IV are unlikely to be due to their poorer future financial performance.

Second, to examine whether our results are robust to using alternative measures of the announcement returns, we recompute abnormal returns using the Fama-French (1993) three factor

model and the Carhart (1997) four factor model. Regressing the CAR (-1, 1) computed using the three and four factor models on the variables used in regression (1) of Table IV, we find that the results do not change: the coefficients on *Adjusted CSR* are -0.552 and -0.581, respectively, both of which are significant at the 5% level. In addition, to mitigate the concern that the difference in CARs between high and low CSR layoff firms is due to the difference in their repeated layoff announcements, we focus only on a firm's first layoff announcement in each calendar year. For a sample of 261 first layoff announcements, regressing the CAR (-1, 1) on the variables used in regression (1) of Table IV, we find that the coefficient on *Adjusted CSR* is still negative and significant.

Finally, to make sure that our results are robust to using different measures of firms' social performance, we use raw CSR scores (difference between the score for total strengths and the score for total concerns) and raw CSR strength scores (score for total strengths) as the alternative measures. We find that the results in Table IV do not change. Further, we use the raw CSR scores of each of the seven dimensions of CSR as categorized by KLD and find that layoff firms that score high in the categories of diversity, corporate governance, community, and environment experience significantly lower CARs. This suggests that our results are not driven by any particular facet of CSR performance.

VIII. Summary and Conclusion

In this paper we investigate the effect of the change in a firm's stakeholder treatment policy on its shareholder and stakeholder wealth and post-layoff contract terms with stakeholders. We use employee layoffs as an empirical setting for the change in stakeholder perception about a firm's treatment of its stakeholders and its pre-layoff investment in corporate social responsibility (CSR) as a measure of how fairly it treats its stakeholders. We propose two competing hypotheses on the valuation effect and the change in post-layoff contracting terms. The relationship deterioration hypothesis posits that the change in a firm's policy that induces stakeholders to perceive the firm as being less committed to its stakeholders (i.e., employee layoffs) imposes significant costs to both firms and non-employee stakeholders and thus adversely affects post-layoff contract terms. On the other hand, the relationship improvement hypothesis suggests that layoffs make the firm's relationship

with non-employee stakeholders more valuable and sustainable, thus resulting in wealth transfer from employees laid off to shareholders and non-employee stakeholders and favorable changes in post-layoff contract terms.

We find strong support for the relationship deterioration hypothesis. More specifically, we find that layoff announcements by firms with high pre-layoff CSR performance are greeted by the market more negatively than those by firms with low pre-layoff CSR performance after controlling for firm performance and correcting for endogeneity bias. Bondholders and suppliers of high CSR firms also experience more negative layoff announcement returns than those of low CSR firms. These negative valuation effects are more pronounced when bondholders hold longer duration bonds, or when suppliers are less important to layoff firms such as when suppliers operate in nondurable goods industries, or when their sales fraction to the layoff firms is lower. Following the layoffs, high CSR firms' relationship duration with suppliers becomes shorter than that of low CSR firms, particularly for suppliers that are less important to layoff firms. Our difference-in-differences test also shows that following layoffs, banks charge higher loan rates and impose more covenants for high CSR firms than for low CSR firms. We further find that compared to matched non-layoff firms, banks charge higher loan rates and impose more covenants on high CSR layoff firms in the post-layoff period. Finally, we find that following the layoffs, high CSR layoff firms undertake more positive reputation rebuilding actions than matching non-layoff firms, such as cutting CEO salaries and refraining from engaging in further workforce reductions, possibly to restore stakeholder confidence and improve their stakeholder relationships.

Overall, these findings are consistent with the relationship deterioration hypothesis and suggest that a firm's commitment to treat its stakeholders fairly is an important determinant of shareholder and stakeholder wealth and its future stakeholder relations.

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Table I
Sample Distribution and Summary Statistics

This table provides sample distribution by year and industry (Panel A), summary statistics for firms with high and low corporate social responsivity (CSR) (Panel B), and changes in performance, credit ratings, and employee productivity for firms with high and low CSR in pre-layoff periods (Panel C). The sample consists of 486 layoff announcements by S&P 1500 firms during the 2003 to 2013 period. We obtain information on layoff announcements by searching *Factiva*. We remove announcements concurrent with major confounding corporate events (e.g. announcements of mergers and acquisitions, dividend payments, earnings, security issuance, legal events, and product-specific material information) within one trading day before and after the announcement. We also exclude announcements that are implementation of previously announced layoff plans, those by firms with missing stock return data in CRSP, those by firms with missing financial data in Compustat, those by firms with missing CSR data in KLD database, and those by firms in regulated industries (Standard industrial classification (SIC) codes between 4900 and 4999 and between 6000 and 6999). In Panels B and C, firms are divided into high and low adjusted CSR firms according to the sample median adjusted CSR. In Panel C, year 0 is the year of layoff announcement. The Appendix provides a detailed description on the construction of the variables. All continuous variables are winsorized at the 1% level at both tails of the distribution. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Sample Distribution by Year and Industry							
Year	Agriculture, forestry & fisheries (01-09)	Mineral industries & construction (10-17)	Manufacturing (20-39)	Transportation & communications (40-48)	Wholesale trade & retail trade (50-59)	Service industries (70-89)	Total
2003	0	0	59	3	0	5	67
2004	0	0	22	2	0	1	25
2005	0	0	35	1	1	3	40
2006	0	0	46	6	6	2	60
2007	0	0	36	2	2	1	41
2008	0	0	43	3	2	4	52
2009	0	0	49	5	1	5	60
2010	0	2	27	3	1	3	36
2011	0	0	26	2	1	2	31
2012	0	0	19	0	6	8	33
2013	0	1	31	2	4	3	41
Total	0	3	393	29	24	37	486

Panel B: Summary Statistics

Variable	Full sample (N=486)		Subsample of high adjusted CSR firms (N=243): A		Subsample of low adjusted CSR firms (N=243): B		Test of difference: (A-B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Raw CSR	1.498	0.000	4.942	5.000	-1.947	-2.000	6.889***	7.000***
Adjusted CSR	0.018	-0.149	0.628	0.379	-0.592	-0.517	1.220***	0.895***
Industry-adjusted return on assets	-0.012	-0.012	-0.004	-0.004	-0.020	-0.016	0.017***	0.012***
Industry-adjusted past 1 year return	-0.051	-0.071	-0.073	-0.080	-0.029	-0.054	-0.044	-0.026
Tobin's q	1.539	1.357	1.746	1.479	1.333	1.267	0.414***	0.212***
Firm size (total assets in \$ billion)	105.312	38.855	91.336	38.657	119.288	52.342	-27.952*	-13.685
Firm age (in years)	57.064	60.500	53.984	57.000	60.144	67.000	-6.160***	-10.000***
Leverage	0.323	0.320	0.290	0.290	0.355	0.349	-0.066***	-0.059***
R&D / sales	0.049	0.030	0.068	0.042	0.030	0.020	0.038***	0.023***
Standard deviation of daily returns	0.024	0.021	0.024	0.019	0.025	0.023	-0.001	-0.004
Sales / employee	0.409	0.366	0.432	0.393	0.385	0.347	0.047***	0.046**
Institutional block ownership	0.159	0.117	0.139	0.092	0.179	0.140	-0.040***	-0.047***
Board size	11.606	11.000	11.563	11.000	11.650	11.000	-0.088	0.000
Proportion of independent directors	0.804	0.818	0.807	0.818	0.801	0.818	0.006	0.000
Herfindahl index	722.871	590.947	635.733	471.285	810.009	670.247	-174.276***	-198.961***
Change in industry employment	0.006	0.005	0.015	0.012	-0.004	-0.004	0.019***	0.016***
Layoff size	0.021	0.004	0.025	0.006	0.017	0.003	0.009**	0.003***

Panel C: Changes in Performance, Credit Ratings, and Employee Productivity from Years -2 to -1 and from Years -3 to -1

Variable	Full sample (N=486)		Subsample of high adjusted CSR firms (N=243): A		Subsample of low adjusted CSR firms (N=243): B		Test of difference: (A - B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
<i>Year -2 to year -1</i>								
Cumulative industry-adjusted stock return	-0.106	-0.106	-0.032	0.021	-0.179	-0.160	0.147***	0.181***
Change in industry-adjusted return on assets	-0.012	-0.005	-0.014	-0.001	-0.010	-0.008	-0.004	0.006
Change in issuer credit rating	-0.396	0.000	-0.282	0.000	-0.509	0.000	0.227**	0.000***
Change in total factor productivity	0.012	0.017	0.018	0.018	0.005	0.017	0.014*	0.001
Change in log (sales per employee)	0.015	0.017	0.014	0.017	0.016	0.019	-0.001	-0.002
Change in log (operating profit per employee)	-0.001	0.011	-0.004	0.024	0.001	0.002	-0.005	0.021**
<i>Year -3 to year -1</i>								
Cumulative industry-adjusted stock return	-0.104	-0.123	-0.038	-0.018	-0.169	-0.166	0.131**	0.148**
Change in industry-adjusted return on assets	-0.014	-0.007	-0.017	-0.008	-0.011	-0.006	-0.006	-0.002
Change in issuer credit rating	-0.734	0.000	-0.549	0.000	-0.917	0.000	0.368**	0.000**
Change in total factor productivity	0.011	0.020	0.013	0.024	0.009	0.017	0.004	0.006
Change in Log (sales per employee)	0.023	0.028	0.022	0.027	0.025	0.031	-0.003	-0.004
Change in Log (operating profit per employee)	-0.003	0.026	-0.002	0.031	-0.004	0.018	0.002	0.012

Table II
Corporate Social Responsibility (CSR) and Employee Layoff-Performance Sensitivity

This table presents estimates of logit regressions of employee layoffs. The dependent variables are an indicator that takes the value of one if *Factiva* reports a firm's layoff and zero otherwise in columns (1)-(3), an indicator that takes the value of one if a firm experiences a decrease in the number of employees by more than 3% and zero otherwise in columns (4)-(6), and an indicator that takes the value of one if a firm experiences a decrease in the number of employees by more than 10% and zero otherwise in columns (7)-(9). The sample consists of all S&P 1500 firms during the 2003 to 2013 period. We exclude firms with missing stock return data in CRSP, those with missing financial data in Compustat, those with missing corporate social responsibility data in KLD database, and those in regulated industries (Standard industrial classification (SIC) codes between 4900 and 4999 and between 6000 and 6999). In columns (4)-(9), we obtain information on the number of employees from Compustat. Two-digit SIC code indicators are used to control for industry fixed effects. All independent variables are measured as of the fiscal year-end that immediately precedes the layoff. The numbers in parentheses are *z*-statistics based on standard errors adjusted for heteroskedasticity. The Appendix provides a detailed description on the construction of the variables. All continuous variables are winsorized at the 1% level at both tails of the distribution. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Independent variables	Layoff data (obtained from <i>Factiva</i>)			Employee data (obtained from Compustat)					
	Layoff (indicator)			Number of employees decreases more than 3% (indicator)			Number of employees decreases more than 10% (indicator)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Adjusted CSR (indicator): a	0.191 (0.94)	0.172 (0.83)	-0.125 (-0.36)	0.081 (1.44)	0.073 (1.29)	0.028 (0.31)	0.034 (0.43)	0.036 (0.45)	0.038 (0.32)
Past 1 year return: b	-1.710*** (-4.04)	-1.423*** (-2.99)	-1.726*** (-4.04)	-1.001*** (-10.43)	-1.112*** (-8.48)	-0.999*** (-10.41)	-0.996*** (-6.94)	-1.017*** (-5.75)	-0.996*** (-6.94)
Return on assets: c	-2.864 (-1.22)	-2.758 (-1.17)	-5.230* (-1.65)	0.223 (0.40)	0.219 (0.39)	-0.053 (-0.08)	-0.697 (-0.93)	-0.697 (-0.93)	-0.675 (-0.77)
a x b		-0.608 (-1.08)			0.204 (1.33)			0.040 (0.19)	
a x c			3.643 (1.11)			0.579 (0.71)			-0.049 (-0.04)
<i>Other firm characteristics</i>									
Firm size	3.676*** (13.41)	3.668*** (13.45)	3.669*** (13.41)	-0.016 (-0.22)	-0.016 (-0.23)	-0.016 (-0.22)	-0.028 (-0.28)	-0.028 (-0.29)	-0.028 (-0.28)
Firm age	0.006 (1.13)	0.006 (1.14)	0.006 (1.15)	0.006*** (3.48)	0.006*** (3.49)	0.006*** (3.47)	0.004 (1.58)	0.004 (1.58)	0.004 (1.58)
Tobin's <i>q</i>	0.145 (0.80)	0.150 (0.82)	0.116 (0.61)	-0.445*** (-7.59)	-0.444*** (-7.59)	-0.450*** (-7.60)	-0.456*** (-4.93)	-0.456*** (-4.93)	-0.456*** (-4.90)
Leverage	0.831 (0.85)	0.791 (0.81)	0.799 (0.83)	1.841*** (6.85)	1.840*** (6.84)	1.839*** (6.84)	0.548 (1.53)	0.549 (1.53)	0.548 (1.53)

R&D / sales	3.804** (2.26)	3.741** (2.23)	3.676** (2.17)	2.281*** (4.37)	2.278*** (4.36)	2.280*** (4.37)	1.558** (2.22)	1.558** (2.22)	1.558** (2.22)
Log (sales / employee)	0.098 (0.17)	0.083 (0.15)	0.075 (0.13)	-0.490*** (-4.17)	-0.487*** (-4.13)	-0.492*** (-4.19)	-0.490*** (-3.07)	-0.490*** (-3.07)	-0.490*** (-3.07)
Standard deviation of daily returns	19.202 (1.23)	18.479 (1.16)	18.360 (1.15)	23.699*** (5.79)	23.420*** (5.74)	23.773*** (5.81)	36.601*** (6.80)	36.552*** (6.80)	36.593*** (6.79)
<i>Corporate governance characteristics</i>									
Institutional block ownership	1.463 (1.57)	1.473 (1.57)	1.452 (1.56)	0.377 (1.64)	0.381* (1.65)	0.378 (1.64)	0.502 (1.64)	0.503 (1.64)	0.502 (1.64)
Log (board size)	0.736 (0.61)	0.731 (0.61)	0.786 (0.66)	0.138 (0.40)	0.146 (0.43)	0.133 (0.39)	0.497 (1.06)	0.498 (1.07)	0.497 (1.06)
Proportion of independent directors	0.296 (0.36)	0.287 (0.35)	0.343 (0.42)	0.541** (2.32)	0.543** (2.32)	0.546** (2.34)	0.346 (1.08)	0.346 (1.08)	0.345 (1.08)
<i>Industry characteristics</i>									
Herfindahl index	-0.002*** (-2.67)	-0.002*** (-2.72)	-0.002*** (-2.73)	0.000 (1.27)	0.000 (1.29)	0.000 (1.28)	-0.000 (-0.08)	-0.000 (-0.08)	-0.000 (-0.08)
Change in industry employment	-1.946 (-1.09)	-1.981 (-1.11)	-1.912 (-1.07)	-0.091 (-0.17)	-0.097 (-0.18)	-0.074 (-0.14)	-0.330 (-0.47)	-0.331 (-0.47)	-0.332 (-0.47)
Constant	-40.271*** (-9.70)	-40.014*** (-9.69)	-39.904*** (-9.61)	0.523 (0.55)	0.526 (0.55)	0.567 (0.59)	-0.931 (-0.82)	-0.934 (-0.82)	-0.933 (-0.82)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,169	7,169	7,169	9,383	9,383	9,383	9,332	9,332	9,332
Pseudo R^2	0.452	0.453	0.453	0.160	0.160	0.160	0.156	0.156	0.156

Table III
Cumulative Abnormal Returns (CARs) for Layoff Firms, Bondholders, and Suppliers around Layoff Announcement Dates

This table reports cumulative abnormal returns (CARs) for layoff firms (Panel A), their bondholders (Panel B), and their suppliers (Panel C) around layoff announcements dates. In Panel A, the sample consists of 486 layoff announcements by S&P 1500 firms during the 2003 to 2013 period. We obtain information on layoff announcements by searching *Factiva*. For each layoff event, we use the date that is first disclosed on *Factiva* as the announcement date. We remove announcements concurrent with major confounding corporate events (e.g. announcements of mergers and acquisitions, dividend payments, earnings, security issuance, legal events, and product-specific material information) within one trading day before and after the announcement. We also exclude announcements that are implementation of previously announced layoff plans, those by firms with missing stock return data in CRSP, those by firms with missing financial data in Compustat, those by firms with missing corporate social responsivity (CSR) data in KLD database, and those by firms in regulated industries (Standard industrial classification (SIC) codes between 4900 and 4999 and between 6000 and 6999). The daily abnormal stock return (AR) is calculated using the market model. The market model parameters are estimated using 200 trading days of return data ending 11 days before announcement. The CRSP value-weighted return is used as a proxy for the market return. ARs are cumulated to obtain the CAR from day t_1 before the layoff announcement to day t_2 after the layoff announcement date. In Panel B, the samples consist of 3,905 individual bonds issued by layoff firms in the S&P 1500 index, and 303 and 295 equally and value-weighted bond portfolios of these individual bonds, respectively, during the 2003 to 2013 period. We use TRACE database to obtain daily bond prices of layoff firms. Using the volume weighted daily price for each bond, we compute individual bond abnormal returns by subtracting the return of the equally weighted control portfolio of all bonds that have the same issuer S&P rating as the layoff firm from the raw return of the layoff firm's bonds. In Panel C, the samples consist of 3,471 individual public suppliers of S&P 1500 firms that announce layoffs and 324 and 324 equally and value-weighted portfolios of these suppliers, respectively, during the 2003 to 2013 period. Public suppliers are those whose information on sales to the layoff firms is covered by the Compustat Segment Customer database. Firms are divided into high and low adjusted CSR firms according to the sample median adjusted CSR. In Panels B and C, the first, second, and third numbers in parentheses denote those of observations used in individual, equally weighted portfolio, and value-weighted portfolio return analyses, respectively. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Announcement Returns for Layoffs (%)								
Variable	Full sample (N = 486)		Subsample of high adjusted CSR firms (N = 243): A		Subsample of low adjusted CSR firms (N = 243): B		Test of difference: (A - B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
CAR (-1, 1)	-0.507***	-0.201**	-0.830***	-0.416***	-0.184	0.034	-0.645*	-0.449*
CAR (-1, 0)	-0.165	-0.048	-0.386	-0.305**	0.054	0.159	-0.440	-0.464*
CAR (-5, -2)	0.191	0.128	0.022	0.115	0.360	0.165	-0.338	-0.050

Panel B: Announcement Returns for Bondholders of Layoff firms (%)

	Full sample (N = 3,905; 303; 295)		Bondholders of high adjusted CSR firms (N = 2,125; 149; 142): A		Bondholders of low adjusted CSR firms (N = 1,780; 154; 153): B		Test of difference: (A - B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Individual CAR (-1, 1)	0.176***	0.231***	-0.153**	0.113***	0.570***	0.361***	-0.723***	-0.248***
Individual CAR (-1, 0)	0.088***	0.040***	0.031	0.011	0.152***	0.084***	-0.121**	-0.074***
Equally weighted portfolio CAR (-1, 1)	0.006	0.147**	-0.203	0.028	0.207*	0.258**	-0.410*	-0.230
Equally weighted portfolio CAR (-1, 0)	0.018	0.016	0.007	0.022	0.027	0.011	-0.020	0.011
Value-weighted portfolio CAR (-1, 1)	-0.022	0.176*	-0.288	0.030	0.224*	0.306**	-0.512*	-0.276
Value-weighted portfolio CAR (-1, 0)	-0.012	0.001	-0.046	0.025	0.021	-0.005	-0.067	0.030

Panel C: Announcement Returns for Suppliers of Layoff firms (%)

	Full sample (N = 3,471; 324; 324)		Suppliers of high adjusted CSR firms (N = 1,677; 165; 165): A		Suppliers of low adjusted CSR firms (N = 1,794; 159; 159): B		Test of difference: (A - B)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Individual CAR (-1, 1)	-0.207**	-0.184***	-0.330**	-0.343***	-0.092	-0.031	-0.238	-0.312*
Individual CAR (-1, 0)	-0.130	-0.142**	-0.193	-0.248**	-0.070	-0.072	-0.124	-0.176
Equally weighted portfolio CAR (-1, 1)	-0.246	-0.173	-0.372	-0.222	-0.116	-0.148	-0.256	-0.074
Equally weighted portfolio CAR (-1, 0)	-0.289*	-0.207**	-0.443**	-0.318**	-0.129	-0.094	-0.314	-0.224
Value-weighted portfolio CAR (-1, 1)	-0.062	-0.025	-0.053	-0.062	-0.071	0.019	0.018	-0.081
Value-weighted portfolio CAR (-1, 0)	-0.255*	-0.025	-0.251	-0.157	-0.259	0.130	0.008	-0.287

Table IV
Regression of Cumulative Abnormal Return (-1, 1) for Layoff Announcing Firms on Explanatory Variables

This table presents estimates of OLS regressions (column (1)), two-stage least square (2SLS) regressions (columns (2)-(3)), and difference-in-difference regressions (columns (4)-(5)). In columns (1), (3), (4), and (5), the dependent variable is the cumulative abnormal return (CAR) for layoff firms from one day before to one day after the layoff announcement date. In column (2), the dependent variable is adjusted corporate social responsivity (CSR). The sample consists of 486 layoff announcements by S&P 1500 firms during the 2003 to 2013 period. We obtain information on layoff announcements by searching *Factiva*. For each layoff event, we use the date that is first disclosed on *Factiva* as the announcement date. We remove announcements concurrent with major confounding corporate events (e.g. announcements of mergers and acquisitions, dividend payments, earnings, security issuance, legal events, and product-specific material information) within one trading day before and after the announcement. We also exclude announcements that are implementation of previously announced layoff plans, those by firms with missing stock return data in CRSP, those by firms with missing financial data in Compustat, those by firms with missing CSR data in KLD database, and those by firms in regulated industries (Standard industrial classification (SIC) codes between 4900 and 4999 and between 6000 and 6999). The market model parameters are estimated using 200 trading days of return data ending 11 days before announcement. The CRSP value-weighted return is used as a proxy for the market return. We use *Constituency statute* and *Blue state rank* as the instrument variables for adjusted CSR in 2SLS regressions. The first instrument, *Constituency statute* is an indicator that takes the value of one if the layoff firm is incorporated in a state that passes a constituency statute and zero otherwise. The second instrument, *Blue state rank*, measures the ranking of U.S. states according to how democratically aligned the state is, based on historical presidential voting, congressional composition, and control of state legislature in the state in which the layoff announcing firm is headquartered. *Government contractor* is an indicator that takes the value of one if the layoff firm has been a supplier to a federal, state, or local government in the prior year, and zero otherwise. *Post* is an indicator that takes the value of one if the layoff announcement date is after the promulgation of October 2009 memorandum ("Increasing Competition and Structuring Contracts for Best Results") that requires reduction in the amount of newly awarded non-competitive government contracts to suppliers, and zero otherwise. Two-digit SIC code indicators are used to control for industry fixed effects. The numbers in parentheses in OLS and difference-in-differences (2SLS) regressions are *t*-statistics based on standard errors adjusted for heteroskedasticity and firm clustering (*t*-statistics). The Appendix provides a detailed description on the construction of the variables. All continuous variables are winsorized at the 1% level at both tails of the distribution. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	OLS	2SLS		Difference-in-differences	
		1st Stage	2nd Stage		
Independent variables	(1)	(2)	(3)	(4)	(5)
Adjusted CSR	-0.714*** (-2.85)		-2.949** (-2.40)		
Constituency statute (indicator)		0.173** (1.97)			
Blue state rank		-0.017*** (-4.75)			
Government contractor (indicator): a				1.395** (2.57)	1.869*** (3.57)
Post (indicator) : b				0.672 (1.42)	1.324** (2.35)
a x b					-1.273** (-2.13)
Firm characteristics					
Firm size	1.719*** (2.64)	0.475*** (5.41)	2.748*** (3.29)	1.512** (2.42)	1.516** (2.43)
Firm age	-0.041*** (-3.44)	-0.003 (-1.65)	-0.047*** (-3.36)	-0.038*** (-3.64)	-0.035*** (-3.42)
Tobin's <i>q</i>	0.373 (0.96)	0.124* (1.82)	0.659 (1.35)	0.148 (0.34)	0.170 (0.39)
Leverage	-0.076 (-0.04)	-0.981*** (-3.52)	-2.178 (-1.00)	-0.874 (-0.42)	-1.241 (-0.58)
R&D / sales	-5.955 (-1.53)	-1.344* (-1.91)	-8.640* (-1.79)	-4.697 (-1.09)	-4.941 (-1.13)
Log (sales / employee)	-2.738*	-0.249	0.422	-1.757	-1.555

	(-1.73)	(-1.05)	(0.10)	(-1.25)	(-1.11)
Return on assets	1.453	-0.115	-1.152**	1.752	1.300
	(0.30)	(-0.18)	(-2.20)	(0.34)	(0.25)
Past 1 year return	-0.781*	-0.180**	-3.147**	-0.645	-0.725*
	(-1.76)	(-2.55)	(-1.96)	(-1.52)	(-1.70)
Standard deviation of daily returns	-16.458	10.967***	-0.620	-15.357	-17.460
	(-0.40)	(3.19)	(-0.02)	(-0.67)	(-0.77)
Corporate governance					
Institutional block ownership	-0.790	-1.024***	-3.256	0.859	1.374
	(-0.54)	(-4.40)	(-1.62)	(0.57)	(0.88)
Log (board size)	-7.454**	-0.333	-7.576**	-6.641**	-7.008**
	(-2.36)	(-0.73)	(-2.43)	(-1.99)	(-2.11)
Proportion of independent directors	0.206	0.334	0.578	-0.296	-0.716
	(0.14)	(1.17)	(0.30)	(-0.19)	(-0.50)
Layoff characteristics					
Layoff size	-0.275	1.716**	4.041	-0.498	-0.738
	(-0.05)	(2.24)	(0.72)	(-0.08)	(-0.13)
Industry characteristics					
Herfindahl index	-0.001	0.000	-0.000	-0.001	-0.002
	(-0.42)	(0.27)	(-0.11)	(-0.53)	(-0.98)
Change in industry employment	4.742	-0.583	3.146	5.112	5.779
	(0.98)	(-0.75)	(0.59)	(1.25)	(1.41)
Constant	6.824	-4.130***	-3.887	3.106	2.718
	(1.00)	(-3.53)	(-0.40)	(0.50)	(0.43)
First-stage Cragg-Donald statistic (Weak identification test)		<i>F</i> -statistic: 15.40 (0.00)			
Second-stage Sargan statistic (Overidentification test)			<i>Chi-square:</i> 2.07 (0.15)		
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	No	No
Observations	471	467	467	471	471
Adjusted R^2	0.025	0.614	-0.085	0.033	0.035

Table V
Regression of Cumulative Abnormal Returns (%) for Layoff Announcing Firms' Bondholders on Explanatory Variables

This table presents estimates of OLS regressions of layoff announcing firms' bondholder cumulative abnormal returns (CARs) from one day before to one day after the layoff announcement date. The dependent variables are the CAR (-1, 1) of an equally weighted portfolio of all traded bonds issued by a layoff firm in columns (1) and (2) and the CAR (-1, 1) of an individual bond issued by a layoff firm in columns (3)-(5). The samples consist of 303 bond portfolios (columns (1) and (2)) and 1,658 individual bonds (columns (3)-(5)) issued by layoff firms in the S&P 1500 Index during the 2003 to 2013 period. We obtain information on layoff announcements by searching *Factiva*. For each layoff event, we use the date that is first disclosed on *Factiva* as the announcement date. We remove announcements concurrent with major confounding corporate events (e.g. announcements of mergers and acquisitions, dividend payments, earnings, security issuance, legal events, and product-specific material information) within one trading day before and after the announcement. We also exclude announcements that are implementation of previously announced layoff plans, those by firms with missing stock return data in CRSP, those by firms with missing financial data in Compustat, those by firms with missing corporate social responsibility data in KLD database, those by firms in regulated industries (Standard industrial classification (SIC) codes between 4900 and 4999 and between 6000 and 6999), and those by firms that do not have any bonds traded around layoff announcement dates, reported in TRACE database. Using the volume weighted daily price for each bond, we compute individual bond abnormal returns by subtracting the return of the equally weighted control portfolio of all bonds that have the same issuer S&P rating as the layoff firm from the raw return of the layoff firm's bonds. Two-digit SIC code indicators are used to control for industry fixed effects. The numbers in parentheses in columns (1) and (2) (columns (3)-(5)) are *t*-statistics based on standard errors adjusted for heteroskedasticity and clustered by firm (layoff announcement). The Appendix provides a detailed description on the construction of the variables. All continuous variables are winsorized at the 1% level at both tails of the distribution. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Independent variables	Portfolio bond CARs (-1, 1) %		Individual bond CARs (-1, 1) %		
	(1)	(2)	(3)	(4)	(5)
Adjusted CSR (indicator): a	-0.550**	-0.524*	-1.135**	-1.661*	-1.069
	(-2.09)	(-1.97)	(-2.30)	(-1.73)	(-1.16)
a x b					-0.045*
					(-1.89)
Bond characteristics					
Years to maturity: b			0.004	0.011	0.031**
			(0.34)	(0.93)	(2.36)
Log (issue proceeds)			-0.031	-0.102	-0.088
			(-0.63)	(-1.24)	(-1.07)
Covenant (indicator)			-0.261	0.038	0.039
			(-1.04)	(0.10)	(0.10)
Coupon rate			-0.072	-0.105	-0.104
			(-1.11)	(-1.07)	(-1.07)
Multiple issues (indicator)			0.749	0.983	0.794
			(1.06)	(0.82)	(0.67)
Bond credit rating				-0.001	-0.008
				(-0.01)	(-0.07)
Borrower characteristics					
S&P issuer rating	0.136***	0.137***			
	(3.05)	(3.18)			
Firm size	0.327	0.394	0.290	-1.078	-1.014
	(1.18)	(1.40)	(0.47)	(-1.13)	(-1.06)
Tobin's <i>q</i>	0.677**	0.700**	0.407	0.794	0.913
	(2.42)	(2.38)	(0.73)	(0.81)	(0.91)
Leverage	0.536	0.642	-1.795	-3.391	-2.777
	(0.43)	(0.50)	(-0.84)	(-0.89)	(-0.74)
Return on assets	-9.465***	-9.042***	-4.713	-17.452*	-17.097*
	(-2.97)	(-3.02)	(-0.67)	(-1.81)	(-1.78)
Layoff characteristics					
Layoff size		2.224	3.044	3.711	3.622
		(0.50)	(0.42)	(0.49)	(0.47)
Macroeconomic conditions					
Credit spread		-0.167	0.303	0.737	0.712
		(-0.54)	(0.70)	(1.19)	(1.15)
Term spread		0.259	-0.380	0.009	-0.008
		(1.03)	(-0.64)	(0.01)	(-0.01)
Constant	-5.805*	-7.611**	-0.697	12.114	10.836
	(-1.77)	(-2.09)	(-0.10)	(1.07)	(0.96)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	303	303	1,658	1,057	1,057
Adjusted <i>R</i> ²	0.054	0.047	0.113	0.126	0.129

Table VI
Regression of Cumulative Abnormal Returns (%) for Layoff Announcing Firms' Suppliers on Explanatory Variables

This table reports estimates of OLS regressions of layoff announcing firms' supplier cumulative abnormal return (CAR) from one day before to one day after the layoff announcement date. The dependent variable is the CAR (-1, 1) of an equally weighted portfolio of all public suppliers of a layoff firm. The samples consist of 325 portfolios of public suppliers of S&P 1500 firms that announce layoffs during the 2003 to 2013 period. Public suppliers are those whose information on sales to the layoff firms is covered by the Compustat Segment Customer database. We obtain information on layoff announcements by searching *Factiva*. For each layoff event, we use the date that is first disclosed on *Factiva* as the announcement date. We exclude firms with missing financial data in Compustat, those with missing corporate social responsiveness (CSR) data in KLD, and those in regulated industries (Standard industrial classification (SIC) codes between 4900 and 4999 and between 6000 and 6999). We remove suppliers of firms that make layoff announcements concurrent with major confounding corporate events (e.g. announcements of mergers and acquisitions, dividend payments, earnings, security issuance, legal events, and product-specific material information) within one trading day before and after the announcement. In columns (3)-(9), suppliers are divided into subsamples according to whether they operate in durable (SIC codes between 3400-3990) and nondurable goods industries, whether they have high and low sales fraction to the layoff firm (based on the same median ratio of supplier sales made to the layoff firm to supplier total sales), and the combination of these two different classifications. The abnormal return is calculated using the market model. The market model parameters are estimated using 200 trading days of return data ending 11 days before announcement. The CRSP value-weighted return is used as a proxy for the market return. Two-digit SIC code indicators are used to control for industry fixed effects. The numbers in parentheses in are *t*-statistics based on standard errors adjusted for heteroskedasticity and clustered by firm. The Appendix provides a detailed description on the construction of the variables. All continuous variables are winsorized at the 1% level at both tails of the distribution. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	Full sample	Industry uniqueness		Sales dependence to layoff firm		Industry uniqueness / sales dependence to layoff firm		
		Durable goods industry	Nondurable goods industry	High sales fraction to layoff firm	Low sales fraction to layoff firm	Durable goods industry and high sales fraction to layoff firm	Nondurable goods industry or low sales fraction to layoff firm	Nondurable goods industry and low sales fraction to layoff firm
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Adjusted CSR (indicator)	-0.376 (-0.73)	0.472 (0.94)	-1.997*** (-3.18)	0.349 (0.42)	-1.517** (-2.09)	1.548* (1.85)	-1.647*** (-2.74)	-2.298* (-1.99)
Relationship characteristics								
Supplier diversity	-0.023 (-0.83)	0.009 (0.30)	-0.030 (-0.75)	-0.024 (-0.78)	0.017 (0.54)	-0.007 (-0.15)	-0.003 (-0.09)	-0.066 (-0.85)
Layoff firm characteristics								
Firm size	-0.612 (-0.69)	-0.429 (-0.48)	-1.700 (-1.53)	0.453 (0.29)	-3.363*** (-3.15)	1.586 (0.97)	-2.708** (-2.66)	-1.894 (-0.91)
Firm age	-0.024 (-1.13)	-0.030 (-1.10)	0.009 (0.46)	-0.046 (-1.16)	0.013 (0.67)	-0.055 (-1.11)	0.016 (1.00)	0.032 (0.95)
Tobin's <i>q</i>	-0.975 (-1.61)	-1.238 (-1.59)	-1.146 (-1.63)	-2.786*** (-2.93)	0.009 (0.01)	-2.261* (-1.89)	-0.506 (-0.80)	0.380 (0.42)
Leverage	1.689 (0.91)	3.059 (1.19)	2.975 (1.54)	2.834 (0.96)	4.614 (1.67)	3.742 (1.10)	4.540* (1.86)	7.935** (2.05)
R&D / sales	-5.199 (-1.01)	-4.320 (-0.61)	8.750 (0.94)	-10.480 (-0.92)	4.509 (0.43)	-8.453 (-0.66)	6.295 (0.66)	14.255 (1.16)

Log (sales / employee)	0.559 (0.31)	-0.017 (-0.01)	4.148 (1.63)	-2.108 (-0.68)	3.186 (1.40)	-4.407 (-1.02)	3.112 (1.46)	8.076* (1.98)
Return on assets	-3.690 (-0.60)	7.188 (1.41)	-8.700 (-1.12)	2.547 (0.37)	-6.301 (-0.94)	3.026 (0.37)	-5.286 (-0.89)	-14.485 (-1.61)
Past 1 year return	-0.622 (-1.10)	-0.215 (-0.35)	-1.612* (-2.00)	-0.717 (-0.77)	-0.708 (-1.01)	-0.141 (-0.13)	-0.968 (-1.45)	-1.121 (-0.96)
Standard deviation of daily returns	-14.893 (-0.47)	14.760 (0.42)	-31.187 (-1.18)	-27.831 (-0.68)	29.605 (1.02)	-2.867 (-0.07)	14.349 (0.53)	2.710 (0.08)
<i>Layoff firm corporate governance characteristics</i>								
Institutional block ownership	-2.166 (-0.74)	-1.831 (-0.58)	-1.887 (-0.83)	-1.684 (-0.66)	0.075 (0.03)	1.041 (0.35)	-0.766 (-0.34)	-0.752 (-0.23)
Log (board size)	3.971 (1.29)	-1.571 (-0.31)	5.087 (1.23)	8.181 (1.51)	2.140 (0.62)	-0.612 (-0.07)	2.152 (0.63)	4.658 (0.64)
Proportion of independent directors	0.365 (0.23)	1.722 (0.91)	-1.708 (-0.64)	2.746 (1.07)	-2.251 (-1.00)	4.742 (1.48)	-2.954 (-1.42)	-1.050 (-0.20)
<i>Layoff characteristics</i>								
Layoff size	2.896 (0.40)	4.456 (0.54)	2.753 (0.30)	6.072 (0.61)	2.900 (0.29)	-0.182 (-0.02)	2.797 (0.29)	-3.717 (-0.38)
<i>Layoff firm industry characteristics</i>								
Herfindahl index	0.001 (0.50)	0.001 (0.34)	0.005 (1.25)	-0.005 (-1.28)	0.003 (1.25)	0.001 (0.17)	0.003 (1.12)	0.006 (1.22)
Change in industry employment	-1.214 (-0.17)	3.658 (0.47)	-7.603 (-0.74)	2.175 (0.22)	-5.896 (-0.60)	7.747 (1.01)	-8.153 (-0.95)	4.170 (0.30)
Constant	0.536 (0.04)	-1.708 (-0.10)	-7.633 (-0.47)	4.178 (0.26)	12.437 (0.82)	-13.217 (-0.51)	8.185 (0.56)	-34.213 (-0.99)
Tests (<i>p</i> -value) for equality of the coefficients on Adjusted CSR (indicator)		0.00 (column (2) versus column (3))		0.05 (column (4) versus column (5))			0.00 (column (6) versus column (7))	0.00 (column (6) versus column (8))
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	318	271	251	276	293	235	303	202
Adjusted <i>R</i> ²	0.016	0.023	0.020	0.097	-0.006	0.103	-0.004	-0.017

Table VII
Cox Regression Analysis of Post-Layoff Relationship Duration between Layoff Firms and Their Suppliers

This table reports estimates (hazard ratios) of nonparametric Cox regression of post-layoff relationship duration between layoff firms and their suppliers. The dependent variable is the number of years the relationship lasts after the layoff announcement date. The sample consists of 2,752 public suppliers of S&P 1500 firms that announce layoffs during the 2003 to 2013 period. Public suppliers are those whose information on sales to the layoff firms is covered by the Compustat Segment Customer database. We obtain information on layoff announcements by searching *Factiva*. For each layoff event, we use the date that is first disclosed on *Factiva* as the announcement date. We exclude firms with missing financial data in Compustat, those with missing corporate social responsivity (CSR) data in KLD, and those in regulated industries (Standard industrial classification (SIC) codes between 4900 and 4999 and between 6000 and 6999). In columns (2)-(8), suppliers are divided into subsamples according to whether they operate in durable (SIC codes between 3400-3990) and nondurable goods industries, whether they have high and low sales fraction to the layoff firm (based on the same median ratio of supplier sales made to the layoff firm to supplier total sales), and the combination of these two different classifications. Two-digit SIC code indicators are used to control for industry fixed effects. The numbers in parentheses are *z*-statistics based on standard errors adjusted for heteroskedasticity and clustered by layoff event. The Appendix provides a detailed description on the construction of the variables. All continuous variables are winsorized at the 1% level at both tails of the distribution. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	Full sample	Industry uniqueness		Sales dependence to layoff firm		Industry uniqueness / sales dependence to layoff firm		
		Durable goods industry	Nondurable goods industry	High sales fraction to layoff firm	Low sales fraction to layoff firm	Durable goods industry and high sales fraction to layoff firm	Nondurable goods industry or low sales fraction to layoff firm	Nondurable goods industry and low sales fraction to layoff firm
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Adjusted CSR of layoff firm	1.052 (0.64)	0.943 (-0.57)	1.175* (1.65)	0.884 (-1.25)	1.301** (2.19)	0.876 (-1.02)	1.184* (1.81)	1.929*** (3.55)
Relationship characteristics								
Relationship duration	0.898*** (-16.34)	0.883*** (-13.41)	0.910*** (-12.95)	0.907*** (-9.60)	0.912*** (-7.99)	0.889*** (-8.66)	0.901*** (-15.29)	1.041** (2.53)
Supplier diversity	1.014*** (3.42)	1.026*** (5.05)	1.001 (0.12)	1.007 (1.29)	1.040*** (6.51)	1.032*** (3.82)	1.016*** (3.43)	1.000 (-0.02)
Supplier characteristics								
Supplier firm size	0.898*** (-3.35)	0.950 (-1.04)	0.878** (-2.39)	0.718*** (-6.34)	1.033 (0.69)	0.703*** (-4.30)	0.938 (-1.44)	0.868** (-1.96)
Supplier Tobin's <i>q</i>	1.084 (0.66)	2.001*** (3.59)	0.786 (-1.23)	1.140 (0.67)	0.822 (-0.88)	4.728*** (4.61)	0.585*** (-3.09)	5.052*** (4.41)
Supplier leverage	1.016 (0.65)	0.996 (-0.13)	1.135*** (3.66)	0.958 (-1.48)	1.053 (1.24)	0.985 (-0.37)	1.068** (1.99)	1.288*** (11.08)
Supplier R&D / sales	0.326*** (-4.71)	0.147*** (-4.39)	1.419 (1.32)	0.487** (-2.29)	0.121*** (-5.04)	0.439 (-1.35)	0.576** (-2.10)	1.273 (0.62)
Supplier return on assets	0.620*** (-3.41)	1.235 (0.69)	0.835 (-1.32)	0.723** (-2.12)	0.269*** (-2.72)	3.681*** (3.48)	0.612*** (-3.10)	1.680** (2.01)
Other controls in Table VI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,752	1,813	939	1,491	1,261	952	1,800	400
Pseudo <i>R</i> ²	0.028	0.042	0.027	0.042	0.040	0.068	0.031	0.042

Table VIII
Regression of Post-Layoff Changes in Suppliers' Sales Fraction to Layoff Firms

This table presents estimates of OLS regressions of the post-layoff change in a supplier's sales fraction to the layoff firm. The dependent variable is the change in the ratio of supplier sales made to a layoff firm to supplier total sales from the fiscal year-end that immediately precedes the layoff announcement to one year (two and three years) after the layoff announcement. The sample consists of 2,752 public suppliers of S&P 1500 firms that announce layoffs during the 2003 to 2013 period. Public suppliers are those whose information on sales to the layoff firms is covered by the Compustat Segment Customer database. We obtain information on layoff announcements by searching *Factiva*. For each layoff event, we use the date that is first disclosed on *Factiva* as the announcement date. We exclude firms with missing financial data in Compustat, those with missing corporate social responsivity (CSR) data in KLD, and those in regulated industries (Standard industrial classification (SIC) codes between 4900 and 4999 and between 6000 and 6999). In columns (4)-(9), suppliers are divided into those in durable (SIC codes between 3400 and 3990) and nondurable goods industries. Two-digit SIC code indicators are used to control for industry fixed effects. The numbers in parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity and clustered by layoff event. The Appendix provides a detailed description on the construction of the variables. All continuous variables are winsorized at the 1% level at both tails of the distribution. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	Full sample			Subsample of suppliers in durable goods industry			Subsample of suppliers in nondurable goods industry		
	Year -1 to year 0	Year -1 to year +1	Year -1 to year +2	Year -1 to year 0	Year -1 to year +1	Year -1 to year +2	Year -1 to year 0	Year -1 to year +1	Year -1 to year +2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Adjusted CSR (indicator)	-0.014 (-1.51)	-0.036*** (-3.30)	-0.072*** (-5.39)	-0.005 (-0.50)	-0.009 (-1.02)	-0.029** (-2.43)	-0.033** (-2.29)	-0.095*** (-3.73)	-0.135*** (-5.04)
Relationship characteristics									
Relationship duration	-0.001*** (-3.46)	-0.001* (-1.72)	-0.002*** (-2.60)	-0.001*** (-3.06)	-0.001*** (-2.97)	-0.003*** (-3.72)	-0.002*** (-2.80)	-0.000 (-0.06)	0.000 (0.24)
Supplier diversity	-0.001* (-1.85)	-0.003*** (-6.10)	-0.006*** (-9.21)	-0.000 (-0.38)	-0.002*** (-3.33)	-0.004*** (-5.87)	-0.003*** (-3.68)	-0.004*** (-4.22)	-0.008*** (-6.51)
Supplier characteristics									
Supplier firm size	-0.003 (-0.67)	-0.004 (-1.31)	0.016* (1.87)	-0.006 (-1.06)	-0.002 (-0.61)	0.028** (2.09)	0.011** (2.54)	-0.004 (-0.56)	-0.023** (-2.50)
Supplier Tobin's <i>q</i>	0.027*** (3.32)	0.026*** (2.86)	0.033** (2.17)	0.013* (1.76)	0.015 (1.37)	0.000 (0.03)	-0.004 (-0.18)	0.013 (0.56)	0.125*** (4.44)
Supplier leverage	-0.006** (-2.46)	-0.001 (-0.35)	-0.002 (-0.42)	-0.005 (-1.60)	-0.001 (-0.29)	-0.006 (-0.98)	-0.010** (-2.21)	-0.004 (-0.56)	0.007 (0.80)
Supplier R&D / sales	0.042 (1.47)	0.117*** (2.97)	0.161** (2.55)	0.029 (0.69)	0.110* (1.89)	0.190* (1.73)	-0.002 (-0.04)	0.054 (0.84)	0.108 (1.54)
Supplier return on assets	0.083*** (4.24)	0.123*** (4.11)	0.119** (2.50)	-0.001 (-0.02)	0.087 (1.53)	0.124 (1.48)	0.092*** (3.76)	0.119*** (3.04)	0.113** (1.98)
Other controls in Table VI									
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2718	2085	1688	1782	1459	1220	936	626	468
Adjusted <i>R</i> ²	0.042	0.116	0.134	0.027	0.123	0.134	0.128	0.224	0.293

Table IX
Post-Layoff Relationship Duration for Layoff Firm-Supplier Pairs and Matched Non-Layoff Firm-Supplier Pairs

This table reports mean post-layoff relationship duration for layoff firm-supplier pairs and propensity-score matched non-layoff firm-supplier pairs. The sample consists of 834 firm-supplier pairs (417 layoff firm-supplier pairs and 417 matching non-layoff firm-supplier pairs) in the S&P 1500 index from 2003 to 2013 period. We obtain information on layoff announcements by searching *Factiva*. We exclude firms with missing stock return data in CRSP, those with missing financial data in Compustat, those with missing CSR data in KLD database, and those in regulated industries (Standard industrial classification (SIC) codes between 4900 and 4999 and between 6000 and 6999). We match the layoff firm-supplier pairs with non-layoff firm-supplier pairs using the nearest neighbourhood algorithm without replacement and with common support. The variables used in the matching are customer characteristics including *Adjusted CSR*, size, leverage, Tobin's *q*, return on assets, standard deviation of daily returns, log (sales per employee), log (number of suppliers), and industry fixed effects (two-digit SIC level), relationship characteristics including supplier's fraction of sales to its customer and past relationship duration of the customer-supplier pair, supplier characteristics including size and industry fixed effects (two-digit SIC level), and fear fixed effects. Suppliers are divided into subsamples according to whether they operate in durable (SIC codes between 3400-3990) and nondurable goods industries, whether they have high and low sales fraction to the layoff firm (based on the same median ratio of supplier sales made to the layoff firm to supplier total sales), and the combination of these two different classifications. The Appendix provides a detailed description on the construction of the variables. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Subsample of suppliers	Layoff firm-supplier pairs (N = 417)			Matched non-layoff firm-supplier pairs (N = 417)			Test of difference	
	High CSR: A (N = 212)	Low CSR: B (N = 205)	Test of difference: (A - B)	High CSR: C (N = 205)	Low CSR: D (N = 212)	Test of difference: (C - D)	(A - C)	(B - D)
All suppliers	2.476	2.810	-0.333	2.868	2.910	-0.042	-0.392	-0.100
Nondurable goods industry suppliers (1)	1.863	2.301	-0.438	2.524	2.176	0.348	-0.661*	0.125
Durable goods industry suppliers (2)	3.232	3.435	-0.203	3.230	3.966	-0.736	0.002	-0.531
Low sales fraction suppliers (3)	1.899	2.598	-0.699*	2.057	2.560	-0.503	-0.158	0.038
High sales fraction suppliers (4)	2.894	3.065	-0.170	3.737	3.282	0.456	-0.843**	-0.217
(2) and (4)	3.685	3.830	-0.145	3.815	4.556	-0.741	-0.130	-0.726
(1) or (3)	2.063	2.506	-0.443	2.530	2.467	0.063	-0.467	0.039
(1) and (3)	1.271	2.313	-1.043**	1.683	2.075	-0.391	-0.412	0.238

Table X
Changes in Bank Loan Spreads and Covenants around Layoff announcement Dates: Difference-in-Difference Tests

This table reports estimates of regressions of layoff firms' loan spreads and covenants during the pre- and post-layoff periods (two years prior to the layoff announcement to two years after the layoff announcement) (Panel A), descriptive statistics for firms in the propensity-score matching analysis (Panel B), and estimates of regressions of loan spreads and covenants for a sample of layoff firms and matching non-layoff firms during the pre- and post-layoff periods (Panel C). In Panel A, the sample consists of 1,218 bank loans to S&P 1500 firms covered in Loan Pricing Corporation's DealScan that announce layoffs during the 2003 to 2013 period. We restrict the sample to firms that have at least one loan contract available during both two years before and two years after the layoff announcement date. We obtain information on layoff announcements by searching *Factiva*. We exclude firms with missing stock return data in CRSP, those with missing financial data in Compustat, those with missing corporate social responsivity (CSR) data in KLD database, and those in regulated industries (Standard industrial classification (SIC) codes between 4900 and 4999 and between 6000 and 6999). Firms are divided into high and low adjusted CSR firms according to the sample median adjusted CSR. Post layoff is an indicator that takes the value of one for firm-year observations in the post-layoff period and zero for firm-year observations in the pre-layoff period. In Panel B, the sample consists of 30 layoff firms and 30 matching non-layoff firms and in Panel C, the sample consists of 161 bank loans to 60 firms (30 layoff firms and 30 matching non-layoff firms). We match the layoff firms with non-layoff firms using the nearest neighbourhood algorithm without replacement and with common support and restrict the sample to firms that have at least one loan contract available during both two years prior and two years after the layoff year. The variables used in the matching are adjusted CSR score, firm size, Tobin's q, leverage, return on assets, standard deviation of daily returns, issuer credit rating, and indicators for year and two-digit SIC codes. In Panels A and C, *Post Layoff* is an indicator that takes the value of one if the loan contract is observed in the post-layoff years, and zero otherwise. In Panel C, *Treated Firm* is an indicator that takes the value of one if the firm engages in layoff in a given year, and zero otherwise. In Panels A and C, the numbers in parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity in OLS models and *z*-statistics based on standard errors adjusted for heteroskedasticity in Poisson models, respectively. In Panel B, the numbers in parentheses are *t*-statistics based on bootstrapped standard errors using 50 replications. Two-digit SIC code indicators are used to control for industry fixed effects. The Appendix provides a detailed description on the construction of the variables. All continuous variables are winsorized at the 1% level at both tails of the distribution. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Difference-in-Difference Tests (Using a Full Sample of Layoff Firms)

Variable	All-in drawn spread		Financial covenants				General covenants	
	OLS		Indicator		Number		Indicator	Number
			OLS		Poisson		OLS	Poisson
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Adjusted CSR (indicator): a	11.369		-0.267***		-1.289***			
	(1.36)		(-5.59)		(-5.28)			
Post Layoff (indicator): b	23.025***		-0.082**		-0.389***			
	(4.71)		(-2.50)		(-5.03)			
a x b	15.230*	15.359***	0.111**	0.081***	0.469***	0.341*	0.136***	0.163***
	(1.78)	(2.70)	(2.38)	(2.59)	(2.72)	(1.73)	(4.84)	(2.65)
Loan characteristics								
Duration	4.667**	10.353***	0.090***	0.099***	0.221***	0.224***	0.071***	0.134***
	(2.02)	(4.41)	(6.74)	(7.90)	(6.14)	(5.50)	(5.50)	(5.13)
Loan size / total assets	-246.516***	-52.777	2.176***	2.158***	6.023***	8.869***	2.464***	4.016***
	(-3.87)	(-0.77)	(5.09)	(4.73)	(4.35)	(3.40)	(5.40)	(3.95)
All-in drawn spreads			-0.000	-0.000	0.002***	0.004***	0.001***	0.004***
			(-0.51)	(-1.19)	(2.65)	(3.44)	(2.87)	(7.76)

Financial covenants (number)	-8.271*	-16.509***						
	(-1.81)	(-2.87)						
General covenants (number)	12.209***	15.559***						
	(6.09)	(5.60)						
<i>Firm characteristics</i>								
Firm size	-13.506	-51.346*	-0.265***	0.519***	-0.512***	6.022***	-0.663***	-0.917***
	(-1.20)	(-1.65)	(-4.11)	(2.74)	(-3.41)	(4.63)	(-4.25)	(-2.82)
Tobin's <i>q</i>	-44.866***	-5.491	0.082**	0.160	0.435***	2.945***	-0.170*	-0.321*
	(-6.93)	(-0.35)	(2.48)	(1.31)	(2.61)	(4.11)	(-1.86)	(-1.79)
Leverage	23.878	-144.556**	0.630***	0.039	3.257***	3.011**	-0.050	1.869***
	(0.58)	(-2.55)	(3.50)	(0.13)	(4.95)	(2.00)	(-0.20)	(3.53)
Return on assets	241.216***	64.913	-2.649***	-0.387	-11.896***	6.865	-0.765	-2.018
	(3.21)	(0.48)	(-8.25)	(-0.34)	(-6.93)	(1.37)	(-0.85)	(-1.16)
Current ratio	52.624***	62.710***	0.028	-0.056	-0.085	0.055	-0.182***	-0.875***
	(5.54)	(3.75)	(0.53)	(-0.77)	(-0.70)	(0.10)	(-2.96)	(-6.54)
Tangibility	52.250	106.899**	-1.173***	0.174	-5.235***	1.313	-1.326***	-2.014***
	(1.53)	(2.31)	(-4.98)	(0.39)	(-6.78)	(0.76)	(-4.24)	(-3.74)
Issuer credit rating	-20.415***	-3.891**	0.035***	0.038***	0.248***	0.042	0.004	0.039
	(-18.30)	(-2.14)	(5.04)	(2.63)	(7.64)	(0.94)	(0.32)	(1.56)
<i>Layoff characteristics</i>								
Layoff size	3.549	6.535	0.422	0.237	3.242	1.147	0.338	0.198
	(0.05)	(0.16)	(1.24)	(1.00)	(1.61)	(0.48)	(1.49)	(0.50)
<i>Macroeconomic conditions</i>								
Credit spread		7.445	0.049*	0.025	-0.576***	-0.729***	0.075**	-0.035
		(1.08)	(1.72)	(0.88)	(-3.36)	(-3.18)	(2.37)	(-0.45)
Term spread		30.786***	-0.008	0.036	0.322***	0.181**	-0.101***	-0.242***
		(9.19)	(-0.48)	(1.63)	(5.43)	(1.97)	(-6.05)	(-7.34)
Constant	793.134***	928.116***	1.882**	-7.442***	-13.356***	-91.453*	7.152***	-10.286
	(6.52)	(2.86)	(2.40)	(-3.61)	(-4.97)	(-1.76)	(4.37)	(-0.40)
Loan type and purpose fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	No	Yes	No	Yes	No	Yes	Yes	Yes
Industry fixed effects	Yes	No	Yes	No	Yes	No	No	No
Firm fixed effects	No	Yes	No	Yes	No	Yes	Yes	Yes
Observations	1,084	1,084	1,084	1,084	1,084	1,084	1,084	1,084
Adjusted/Pseudo <i>R</i> ²	0.782	0.879	0.447	0.592	0.379	0.464	0.682	0.377

Panel B: Descriptive Statistics (Mean) for Layoff Firms and Propensity-score Matched Non-Layoff Firms

Variable	Layoff firms (N = 30): A	Matching firms (N = 30): B	Test of difference: (A-B)	
			Difference	t-statistic
Adjusted CSR	-0.180	-0.359	0.179	(1.09)
Firm size	10.387	10.236	0.151	(1.31)
Leverage	1.862	1.905	-0.043	(-0.21)
Return on assets	0.117	0.142	-0.024	(-1.46)
Tobin's q	0.175	0.163	0.012	(0.47)
Standard deviation of daily returns	0.020	0.021	-0.001	(-0.53)
Issuer credit rating	16.667	16.700	-0.033	(-0.04)

Panel C: Difference-in-Difference Tests (Using a Sample of Layoff Firms and Propensity-score Matched Non-Layoff Firms)

Variable	All-in drawn spread		Financial covenant indicator		General covenant indicator
	OLS		OLS		OLS
	(1)	(2)	(3)	(4)	(5)
Adjusted CSR (indicator): a	-22.565		-0.048		
	(-1.05)		(-0.40)		
Post Layoff (indicator): b	-11.391		-0.101		
	(-0.72)		(-0.71)		
Treated Firm (indicator): c	43.402**		0.412***		
	(2.02)		(2.70)		
a x b	5.429		-0.008		
	(0.20)		(-0.04)		
a x c	-39.746		-0.278		
	(-1.44)		(-1.36)		
b x c	-45.903		-0.492**		
	(-1.48)		(-2.44)		
a x b x c	73.391*	56.421**	0.760***	0.834***	0.166
	(1.69)	(2.59)	(2.92)	(2.98)	(0.64)
Loan characteristics, firm characteristics and macroeconomic conditions in Panel A	Yes	Yes	Yes	Yes	Yes
Loan type and purpose fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	No	Yes	No	No
Industry-year fixed effects	No	Yes	No	Yes	Yes
Firm fixed effects	No	Yes	No	Yes	Yes
Observations	161	161	161	161	161
Adjusted R^2	0.788	0.971	0.446	0.756	0.802

Table XI

Changes in CEO Compensation and Number of Employees around Layoff announcement Dates: Difference-in-Differences Regression (Using Propensity-score Matched Sample)

This table presents estimates of OLS regressions of post-layoff changes in the logarithm of CEO total compensation (columns (1), (2), and (3)), logit regressions of post-layoff employee decreases in a subsample of high CSR firms (columns (4), (5), and (6)), and logit regressions of post-layoff employee decreases in a subsample of low CSR firms (columns (7), (8), and (9)). The sample consists of 478 firms (239 layoff firms and 239 matching non-layoff firms) in the S&P 1500 index from 2003 to 2013 period. We obtain information on layoff announcements by searching *Factiva*. We exclude firms with missing stock return data in CRSP, those with missing financial data in Compustat, those with missing CSR data in KLD database, and those in regulated industries (Standard industrial classification (SIC) codes between 4900 and 4999 and between 6000 and 6999). We match the layoff firms with non-layoff firms using the nearest neighbourhood algorithm without replacement and with common support. The variables used in the matching are adjusted CSR score, firm size, firm age, Tobin's q , leverage, R&D / sales, return on assets, past 1 year return, standard deviation of daily returns, logarithm of number of employees, and indicators for year and two-digit SIC codes. *Treated firm* is an indicator that takes the value of one if the firm engages in layoff in a given year, and zero otherwise. CEO total compensation is measured as the sum of salary, bonus, long term incentive pays, option grants, and other payments obtained from Execucomp. In columns (4) through (9), the coefficients reported are estimates of marginal effects on the probability. In columns (1) through (3) (columns (4) through (9)), the numbers in parentheses are t -statistics (z -statistics) based on standard errors adjusted for heteroskedasticity. Two-digit SIC code indicators are used to control for industry fixed effects. The Appendix provides a detailed description on the construction of the variables. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Variable	OLS			Logit					
	Change in log (CEO total compensation)			Decrease in number of employee (indicator)					
				Subsample of high adjusted CSR firms			Subsample of low adjusted CSR firms		
	Year -1 to year 0	Year -1 to year +1	Year -1 to year +2	Year -1 to year 0	Year -1 to year +1	Year -1 to year +2	Year -1 to year 0	Year -1 to year +1	Year -1 to year +2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treated Firm (indicator): a	0.083*	0.076	0.095*	0.573	0.732	0.791	1.019***	1.307***	0.765*
	(1.87)	(1.64)	(1.94)	(1.48)	(1.59)	(1.41)	(2.73)	(2.97)	(1.82)
Adjusted CSR (indicator): b	0.047	0.021	0.046						
	(1.12)	(0.36)	(0.56)						
a x b	-0.140**	-0.129*	-0.175						
	(-2.35)	(-1.85)	(-1.58)						
Firm, corporate governance, and industry characteristics in Table IV	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	436	383	337	205	166	137	213	191	184
Adjusted/Pseudo R^2	0.037	0.026	-0.015	0.301	0.294	0.332	0.283	0.284	0.263

Appendix Variable Definitions

This appendix provides a detailed description of the variables used in the tables.

Variable	Definition	Source
Adjusted CSR	Sum of the difference of strength and concerns scores of seven categories of corporate social responsivity including community, corporate governance, diversity, employee relations, environment, human rights, and product. Adjusted CSR is estimated by scaling the raw strength and concern scores of each category by the number of items of the strength and concern of that category in the year and then taking the net difference between adjusted strength and concern scores for that category (Deng, Kang, and Low, (2013)).	KLD
Adjusted CSR (indicator)	Indicator that takes the value of one if adjusted CSR is above the sample median, and zero otherwise.	KLD
All-in drawn spreads	Basis point loan spread over LIBOR plus the annual fee plus the upfront fee over the duration of the loan.	Dealscan
Bond credit rating	Bond credit rating converted into the cardinal scale and the rating class number. Following Klock, Mansi, and Maxwell (2005), we assign the value of 22 to the best rating categories (S&P: AAA, Moody's: Aaa) and the value of one to the worst rating categories (S&P: D, Moody's: D). All intermediate rating categories are allocated numeric values in increments of one.	FISD
Change in industry employment	Lagged percentage change in total number of employees of all the firms in the same two-digit standard industrial classification (SIC) code.	Compustat
Covenants (indicator)	Indicator that takes the value of one if the bond has any covenants, and zero otherwise.	TRACE
Credit spread	Difference between AAA corporate bond yield and BAA corporate bond yield, in the month preceding the layoff announcement date.	Federal reserve board of governors Compustat
Current ratio	Ratio of current assets to current liabilities.	Compustat
Duration	Duration of the bank loan contract (in years) computed as (maturity date - deal active date) / 365.	Dealscan
Financial covenants (indicator)	Indicator that takes the value of one if the number of financial covenants (restrictions related to specific balance sheet, income statement, or cash flow items) in the loan contract is equal to or more than one, and zero otherwise.	Dealscan
Financial covenants (number)	Number of financial covenants in the loan contract.	Dealscan
Firm age	Max (years in CRSP, years in Compustat).	CRSP Compustat
Firm size	Logarithm of book value of total assets.	Compustat
General covenants (indicator)	Indicator that takes the value of one if the number of general covenants (restrictions related to prepayment, dividends, or voting rights) in the loan contract is equal to or more than one, and zero otherwise.	Dealscan
General covenants (number)	Number of general covenants in the loan contract.	Dealscan
Herfindahl Index	Sum of the squares of the market share (measured by sales) of all the firms in the same two-digit SIC.	Compustat
High yield (indicator)	Indicator that takes the value of one if S&P issuer rating is below BBB-, and zero otherwise.	Compustat
Industry-adjusted past 1 year return	Compounded monthly return over the year minus the median compounded monthly stock return over the year of all the other firms in the same two-digit SIC.	CRSP
Industry-adjusted return on assets	Return on assets minus the median return on assets of all the other firms in the same two-digit SIC.	Compustat
Institutional block ownership	Number of shares held by institutional shareholders that own more than 5% of a firm's equity divided by total shares outstanding.	Thomson Reuters Institutional Holdings

Issuer credit rating	S&P long term issuer credit rating for the most recent completed month converted into the cardinal scale and the rating class number. Following Klock, Mansi, and Maxwell (2005), we assign the value of 22 to the best rating (AAA) and the value of one to the worst rating (D). All intermediate rankings are allocated numeric values in increments of one.	Compustat
Layoff size	Number of employees affected by the layoff divided by the total number of employees. If the <i>Factiva</i> reports the range of the number of employees laid off instead of the exact number, the upper end of the range is used as the number of employees laid off.	Factiva
Leverage	Book value of debt (current liabilities plus long-term debt) divided by the market value of assets (book value of assets minus book value of equity plus market value of equity).	Compustat
Loan size / total assets	Ratio of the loans borrowed to total assets.	Dealscan
Log (board size)	Logarithm of the number of directors on the board.	Riskmetrics
Log (issue proceeds)	Logarithm of bond offering size (in \$ million).	FISD
Log (operating profit per employee)	Logarithm of the ratio of operating income to the number of employees	Compustat
Log (sales / employee)	Logarithm of the ratio of sales to the number of employees.	Compustat
Multiple issues (indicator)	Indicator that takes the value of one if a layoff firm has more than one bond traded around the layoff announcement date, and zero otherwise.	TRACE
Past 1 year return	A firm's compounded monthly returns over the year.	CRSP
Proportion of independent directors	Ratio of the number of independent directors to the total number of directors on the board.	Riskmetrics
R&D / sales	Ratio of research & development expenses to sales.	Compustat
Raw CSR	Sum of the difference of strength and concerns scores of seven categories of corporate social responsivity including community, corporate governance, diversity, employee relations, environment, human rights, and product.	KLD
Relationship duration	Number of years the supplier-customer relationship last until the fiscal year-end immediately preceding the layoff announcement.	Compustat Segment Customer
Return on assets	Ratio of operating income after depreciation to total assets.	Compustat
Standard deviation of daily returns	Standard deviation of a firm's daily stock returns during the past 200 days.	CRSP
Supplier diversity	Number of a layoff firm's suppliers in the fiscal year-end that immediately precedes the layoff announcement date.	Compustat Segment Customer
Tangibility	Ratio of tangible assets to total assets.	Compustat
Term spread	Difference between 10 year treasury yield and 2 year treasury yield, in the month preceding layoff announcement date.	Federal reserve board of governors
Tobin's q	Market value of assets (total book value of assets minus book value of equity plus market value of equity) over book value of assets.	Compustat
Total factor productivity	Residual of Cobb-Douglas production functions estimated by regressing the logarithm of sales on logarithm of the number of employees and the logarithm of net property, plant, and equipment, using all firms in the same year and in the same three-digit SIC code (Faleye, Mehrotra, and Morck (2006)).	Compustat
Years to maturity	Bond's time left until maturity (in years).	TRACE

Essay two: Corporate Ownership and Restructuring: Evidence from Restructuring Activities by Family and Non-family Firms during the Economic Crisis

Abstract

We examine restructuring activities of family and non-family firms during the 2007 to 2009 economic crisis. Using hand-collected data on restructuring activities, we find that family firms are less likely to engage in ineffective downsizing and ineffective CEO turnover activities than non-family firms. These results are more pronounced for family firms managed by founding family CEOs. Family firms are also less likely to enter into unrelated businesses. Despite family firms' reluctance to downsize, those that choose to do so during the crisis experience more positive stock market reactions to downsizing announcements and outperform in the post-crisis period. Our findings show that in response to the crisis, family firms undertake restructuring actions that improve firm value, suggesting that corporate ownership is an important factor that influences firms' restructuring decisions.

Keywords: Family firm; Founder; Restructuring; Downsizing; Acquisition; CEO turnover; Socioemotional wealth; Agency problem; Long-term horizon.

JEL Classification: G34, J63, L2, M12, M51

1. Introduction

Restructuring is one of the most important corporate strategic decisions that have a significant effect on firms' future performance and efficiency (Bowman and Singh, 1993). It becomes particularly important during an economic crisis when a firm's survival and financial viability are at risk due to high business uncertainty and weak consumer demand. During a crisis, firms face an altered set of opportunities and those that effectively pursue these opportunities can not only improve their odds of survival but also emerge post-crisis with a clear strategic advantage (Wan and Yiu, 2009). Prior studies have extensively examined factors that affect firm performance during an economic crisis (Chakrabarti, Singh, and Mahmood, 2007; Dowell, Shackell, and Stuart, 2011; Wan and Yiu, 2009).²⁸ Little is known, however, about factors that influence a firm's restructuring activities and their effectiveness when the economy is hit by a large negative shock. In particular, the literature has relatively little to say about what incentivizes managers in firms with different ownership structures to engage in restructuring activities, and whether these activities ultimately help firms overcome negative market-wide shocks.²⁹ When a firm's survival is at risk, its ownership type may influence its restructuring decisions as the benefits and costs associated with restructuring that accrue to shareholders differ across ownership structures and, in particular, across owners' involvement in management.

To shed light on how corporate ownership affects firm incentives to engage in restructuring activities, in this paper we compare the restructuring activities of family and non-family firms in the U.S. during the 2007 to 2009 economic crisis.³⁰ Focusing on family versus non-family firms has

²⁸ Most studies that examine firm performance during the crisis focus on how firm-level corporate governance structures (Dowell *et al.*, 2011; Fahlenbrach and Stulz, 2011; Mangena, Taurangana, and Chamisa 2012; Virany, Tushman, and Romanelli 1992), country-level governance mechanisms (Beltratti and Stulz, 2009; Erkens, Hung, and Matos, 2012), and CEO character traits (Ho *et al.*, 2016) affect firm value.

²⁹ Some earlier studies such as Bethel and Liebeskind (1993) and Gibbs (1993) take firms' ownership structure into account in examining the determinants of restructuring activities. Focusing on the 1980s wave of corporate restructurings in the U.S., Bethel and Liebeskind (1993) find that firms are more likely to restructure when they are pressured by blockholders. They find no evidence that insider owners or institutional investors influence restructuring decisions. Similarly, Gibbs (1993) finds no relation between management equity ownership and restructuring activities.

³⁰ Our study differs from prior studies that examine firms' restructuring decisions followed by a decline in firm performance (e.g., Denis and Kruse, 2000; Hoskisson, Johnson, and Moesel, 1994; Hoskisson and Turk, 1990; Kang and Shivdasani, 1997) as we focus on restructuring activities during the financial crisis. While Kang, Lee, and Na (2010) examine restructuring actions by Korean firms that experienced a severe financial crisis during

several advantages. First, family ownership is prevalent around the world (Claessens, Djankov, and Lang, 2000; La Porta, Lopez-de-Silanes, and Shleifer, 1999), and in the U.S. family owners are the most common type of large, undiversified shareholders, together controlling about one-third of the number of firms in *Fortune* 500 and S&P 500 industrial firms (Anderson and Reeb, 2003). Second, unlike managers in non-family firms, owner-managers in family firms have strong incentives to preserve socioemotional wealth (Gómez-Mejía *et al.*, 2007; Gómez-Mejía, Makri, and Kintana, 2010; Wiseman and Gómez-Mejía, 1998). For example, to protect the family legacy or due to a strong personal attachment to the firm, family owner-managers may favor strategies that enhance socioemotional wealth irrespective of whether such strategies increase firm value. Third, family firms face different agency problems than non-family firms (Villalonga and Amit, 2006; Jensen and Meckling, 1976; Schulze *et al.*, 2001; Wiseman and Gómez-Mejía, 1998) – in particular, family firms are subject to fewer (greater) agency problems between managers and shareholders (large and small shareholders) than non-family firms – which can lead to different incentives to engage in restructuring activities during a crisis. Finally, compared to non-family owners, family owners tend to have a relatively longer-term horizon (due, for example, to bequest motives) and play a more active leadership role in firms' decision-making processes (Miller, Minichilli, and Corbetta, 2013), which can help reduce managerial myopia and significantly affect firms' incentives to engage in restructuring actions.

We focus on the period of the recent economic crisis as prior studies show that to protect their return on investment amid a decline, controlling shareholders have strong incentives to expropriate minority shareholders (Johnson *et al.*, 2000).³¹ The intensified agency problems during the crisis may therefore prompt family owner-managers to pursue restructuring actions that increase their private benefits at the expense of minority shareholders. However, it is also possible that the decrease in access to financial markets and increase in survival risk during the crisis may increase the importance of family owners' ability to make effective interventions on a timely basis.

the 1997-1998 Asian crisis, they focus on the role of business groups and firm-level corporate governance in explaining firms' restructuring activities.

³¹ We choose the 2007-09 financial crisis as our setting in the interest of availability of data.

The above arguments lead to two competing hypotheses on the role of corporate ownership in restructuring decisions and the effect of restructurings on firm value. The “restructuring efficiency” hypothesis posits that family firms engage in value-increasing restructuring activities during the crisis, as founding family owners who have a large equity claim on firm value and a long-term horizon play an effective monitoring role. Moreover, such restructurings are more likely when family firms are managed by founder or descendent CEOs (*Family member CEO firms*) than when they are managed by outsider CEOs (*Outsider CEO firms*) since *Family member CEO firms* face lower agency conflicts between managers and shareholders and lower short-term performance pressure than *Outsider CEO firms*. In contrast, the “restructuring inefficiency” hypothesis holds that, due to a strong bequest motive and a desire to preserve socioemotional wealth, family owner-managers engage in value-decreasing restructuring activities during the crisis, with this tendency expected to be greater for *Family member CEO firms* than *Outsider CEO firms* since family member CEOs can exert greater influence on decision-making processes through their power and access to inside information.³²

To test these competing hypotheses, we manually collect data on the restructuring activities announced by 1,463 non-regulated firms in ExecuComp during the economic crisis of 2007 to 2009. We find that compared to non-family firms, family firms are less likely to downsize, replace their CEO, or pursue unrelated acquisitions. Family firms’ reluctance to engage in downsizing or replace their CEO is particularly pronounced among family firms managed by founder CEOs, followed by those managed by descendent CEOs. To mitigate the concern that differences in observable firm characteristics between family and non-family firms drive these results, we conduct propensity-score matching analysis, where we match each family firm with a non-family control firm based on several firm characteristics, and find that the results continue to hold. When we split restructuring activities according to whether the market reacts positively or negatively to the restructuring announcement, we find that family firms, especially *Family member CEO firms*, are less likely to engage in ineffective

³² Chang and Shim (2015) show that family firms that replace family member CEOs with outsider CEOs outperform those that retain family member CEOs.

downsizing activities (i.e., downsizing actions with negative announcement returns) than non-family firms.³³

Next, we compare abnormal returns around restructuring announcements between family and non-family firms. We find that the market reacts more positively to downsizing announcements made by family firms, particularly to announcements related to asset contractions, than those made by non-family firms. In contrast, the market reacts more negatively to family firms' unrelated business acquisitions. We further find that the market reacts more positively to news on forced CEO departures in family firms, especially in *Family member CEO firms* and *Outsider CEO firms with family involvement* (i.e., family firms in which outsiders serve as CEO and family members have directorships and/or executive positions).

Finally, we examine whether downsizing actions undertaken during the crisis affect a firm's long-term post-crisis performance, as measured by its industry-adjusted holding period returns and industry-adjusted operating performance. We find that downsizing family firms outperform propensity-score matched non-downsizing family firms in the post-crisis period. We find no evidence that non-family firms that engage in downsizing outperform matched non-downsizing non-family firms.

Overall, our results support the restructuring efficiency hypothesis, which suggests that the characteristics particular to family ownership structure induce family owner-managers to avoid ineffective restructuring actions and instead pursue value-increasing restructuring actions during the crisis, resulting in improved post-crisis performance.

Our study contributes to the literature at least in two important ways. First, our study adds to the literature on family firms and restructuring by showing that corporate ownership plays an important role in affecting firms' restructuring decisions in crisis periods. In particular, we find that in response

³³ Mitchell and Lehn (1990) show that the probability of firms becoming takeover targets in the future is inversely related to their prior acquisition announcement returns. This result suggests that the stock market discriminates between potential bad bidders, which are more likely to become takeover targets, and potential good bidders, which are less likely to become targets. Although the market consensus based on investor reactions is not a manager's choice variable when making restructuring decisions, it is reasonable to expect that managers have a fair expectation ex-ante about how outside investors view their restructuring actions. Positive (negative) stock market reactions to restructuring announcements are therefore likely to be strong indicators of managers' incentives to pursue effective (ineffective) restructurings.

to economy-wide negative shocks, family firms not only pursue effective restructurings on a timely basis, but also maximize the economic benefits from doing so.

Second, our paper adds to the literature on family firms' strategic behaviors and corporate policies. Previous studies show that on average loss-averse family firms invest less in R&D activities than non-family firms (Patel and Chrisman, 2012; 2014). Family owner-managers' aversion to a loss of control also discourages them from diversifying (Gómez-Mejía *et al.*, 2010) or divesting assets (Chung and Luo, 2008; Feldman, Amit, and Villalonga, 2016) despite the potential value gains arising from these strategic actions (e.g., decrease in risk and increase in synergies by combining business segments). We extend this literature by showing that family owner-managers' incentives allow family firms to engage in restructurings that improve firm value during a negative economic shock.

This paper proceeds as follows. In Section 2 we review the literature and develop our hypotheses. In Section 3 we detail our data and methods. We report results in Section 4. In Section 5 we summarize and offer concluding remarks.

2. Literature Review and Hypotheses

2.1. Restructuring activity during a crisis

Economy-wide shocks, such as the Great Depression in the U.S., the financial crisis of East Asia in 1997, and the economic crisis of 2007 to 2009, can have a disproportionately large negative effect on many fronts, including investor sentiment, consumer demand, and firms' strategic and operational policies. For example, during the recent economic crisis, overall employment in the economy was adversely affected and pessimistic investor sentiment reduced demand for products and services, negatively impacting corporate activities and business operations.³⁴

However, an unanticipated economic shock can provide firms with opportunities to pursue restructuring activities such as expansions into new businesses or markets, asset sales, or employee layoffs that, if conducted in a timely and effective manner, can prevent escalation of the crisis at the

³⁴ During the 2007 to 2009 financial crisis, unemployment rose from 4.7% in July 2007 to 8.7% in March 2009 (U.S. Bureau of Labor Statistics), real GDP growth shrunk from 2.7% in 2006 to a negative 2.8% in 2009 (World Bank), new loans made to large corporate borrowers fell by 74% compared to second quarter of 2007 (Ivashina and Scharfstein, 2010), and almost \$8 trillion was wiped out of the U.S. stock market between October 2007 and October 2008 (Brunnermeier, 2009).

firm level, improve a firm's long-term competitiveness and organizational efficiency, and ultimately enhance its performance (Blatz, Kraus, and Haghani, 2006; Dess and Beard, 1984; Wan and Yiu, 2009). The sense of urgency prevailing during a crisis can also help managers overcome resistance from stakeholders to restructuring, for example, by making it easier for firms to seek concessions from labor unions, suppliers, or debtholders (Jog, Kotlyar, and Tate, 1993).

Restructuring of human assets, physical assets, and firm operation can bring significant changes to a firm's business portfolio (Bethel and Liebeskind, 1993; Bowman and Singh, 1993; Brauer, 2006), and help firms redefine their boundaries through expansion actions (e.g., acquisitions), contraction actions (e.g., asset sales and employee layoffs), or internal reorganization (e.g., lowering inventory). Taken together, restructuring actions can be thought of as a bundle of options: call options to invest/expand the firm's portfolio and put options to divest portions of the portfolio (Hurry, 1993). Managers determine whether they should exercise these options, and if they do so, which options they should exercise to enhance firm value and operational efficiency. Such critical decisions can be largely influenced by a firm's organizational and ownership structure (Bethel and Liebeskind, 1993; Gibbs, 1993) as discussed below.

2.2. Family ownership

Compared to non-family firms, family firms have several different characteristics. First, family firms face lower agency problems between managers and shareholders, since controlling owners have incentives to play an active monitoring role. However, they face greater agency problems between large and small shareholders, since controlling owners have strong incentives to expropriate minority shareholders to increase their private benefits (Johnson *et al.*, 2000). Controlling owners also have strong incentives to pursue non-financial goals such as socioemotional wealth (Gómez-Mejía *et al.*, 2007; Wiseman and Gómez-Mejía, 1998) or other legacy benefits for their family (Casson, 1999; Arregle *et al.*, 2007; Zellweger *et al.*, 2012; Bertrand and Schoar, 2006; Barnett, 1960). These differences in agency problems are likely to be particularly pronounced for family firms in which members of the founder's family are involved in management or sit on the board because they more

likely to exert a strong influence on the firm's strategic decisions using their status and access to private information (Baysinger and Hoskisson, 1990; Kim, Kim, and Lee, 2008).

Second, compared to non-family firm owners, family owners have a strong interest in the firm as a going concern and thus tend to have a relatively longer-term horizon (Mueller and Philippon, 2011). A longer-term horizon reduces managerial myopia, which allows family firms to focus on investments and restructuring activities that increase long-term firm value.

Finally, according to Tagiuri and Davis (1996), the presence of family owner-managers who play multiple roles in the firm (e.g., role of a family member, role of a shareholder, and role a manager) can help enhance operational efficiency and improve the speed of decision-making. It is possible, however, that such centralized decision-making may disincentivize non-family top management and employees from taking initiatives or working hard (Aghion and Tirole, 1997; Carney, 2005; Chang and Harrington, 2000; Morris *et al.*, 1997; Tagiuri and Davis, 1996).

Given family firms' unique agency problems, longer-term horizon, and multiple roles, family owner-managers are likely to make different restructuring decisions in response to an unanticipated external shock. Below, we propose two competing hypotheses based on the discussion above.

2.3. Restructuring efficiency hypothesis

As discussed above, family owner-managers who have different incentives and larger equity claims on firm value than diversified shareholders have a strong interest in the firm as a going concern and thus have a longer-term business horizon than non-family firms (Anderson, Mansi, and Reeb, 2003; Mueller and Philippon, 2011; Schulze *et al.*, 2001). This longer-term horizon reduces managerial myopia, allowing family firms to focus on long-term value-increasing actions. Moreover, controlling owners have an information advantage in evaluating restructuring actions, play a leadership role in undertaking restructuring actions, and perform active monitoring, which helps lower shareholder-manager conflicts. Thus, during the crisis, compared to non-family firms, family firms are more likely to undertake value-increasing restructuring projects (i.e., restructurings with a positive

announcement return).³⁵ Moreover, restructuring actions by family firms are likely to lead to a larger long-term performance improvement post-crisis than those by non-family firms. Finally, the effectiveness of restructuring activities is expected to be more pronounced when founding family members exert greater influence on the restructuring decision through effective monitoring and active leadership roles, such as when they serve as CEO (Jayaraman *et al.*, 2000; Miller *et al.*, 2013), and thus among family firms, *Family member CEO firms* are likely to be most effective in undertaking value-increasing restructuring projects.

Taken together, the restructuring efficiency hypothesis leads to the following two testable predictions:

Hypothesis 1 (H1): Compared to non-family firms, family firms are more likely to undertake value-increasing restructuring projects during the crisis and their restructuring actions are likely to lead to a larger long-term performance improvement post-crisis.

Hypothesis 2 (H2): The effectiveness of family firms' restructuring during the crisis is likely to be more pronounced when founding family members serve as CEO.

2.4. Restructuring inefficiency hypothesis

Prior studies show that family owner-managers have incentives to pursue socioemotional wealth (Gómez-Mejía *et al.*, 2007; Gómez-Mejía, Makri, and Kintana, 2010; Wiseman and Gómez-Mejía, 1998) as well as to maintain firm assets to transfer their control to the next generation at the expense of other shareholders (Bertrand and Schoar, 2006). Prior studies also suggest that family owners may base restructuring decisions not on their firm value implications but rather on whether they can help increase private benefits (Schulze *et al.*, 2001; Villalonga and Amit, 2006, 2009). For example, family owners may be reluctant to undertake value-increasing downsizing actions if such actions were to reduce family-controlled assets that can be passed onto future generations. Similarly, family owners may avoid performance-increasing layoffs for fear that their firms' stakeholder-oriented reputation

³⁵ Alternatively, to the extent that family owners play an active role in monitoring managers, family firms' managers may be constrained from empire building in the pre-crisis period and thus there may be less need for family firms to downsize during the crisis. To mitigate this concern, we conduct an analysis using a propensity-score matched sample of family and non-family firms constructed using observable pre-crisis firm characteristics.

would be tarnished. Alternatively, the boards may be reluctant to replace family CEOs with outsider CEOs since new outsider CEOs may have weak incentives to preserve socioemotional wealth of the family during a crisis. These arguments imply that instead of undertaking value-increasing restructuring projects, family firms may pursue less effective restructurings in an effort to pursue other goals. Furthermore, given that family firms are less likely to face financial constraints than non-family firms,³⁶ they may be less intent on identifying positive NPV restructuring projects and executing them promptly. Therefore, during the crisis, compared to non-family firms, family firms are more likely to pursue value-decreasing restructurings (i.e., restructurings with a negative announcement return). Moreover, restructuring actions by family firms are likely to lead to a larger long-term performance decline post-crisis than those by non-family firms. Finally, among family firms, *Family member CEO firms* are more likely to engage in ineffective restructurings, as their restructuring decisions are likely to be driven by family members' non-financial preferences. On the other hand, *Outsider CEO family firms* are less likely to engage in ineffective restructurings, as outsider CEOs in family firms face pressure to deliver good firm performance from investors and derive less utility from non-financial preferences.

Taken together, the restructuring inefficiency hypothesis predicts that:

Hypothesis 3 (H3): Compared to non-family firms, family firms are more likely to undertake value-decreasing restructuring projects during the crisis and their restructuring actions are likely to lead to a larger long-term performance decline post-crisis.

Hypothesis 4 (H4): The ineffectiveness of family firms' restructuring during the crisis is likely to be more pronounced when founding family members serve as CEO.

3. Sample, Variables, and Empirical Design

3.1. Sample

To construct our sample, we start with firms covered in ExecuComp immediately prior to the 2007 to 2009 economic crisis (i.e., fiscal year 2006), where we define the crisis period as July 1, 2007

³⁶ Prior studies show that on average family firms in the U.S. outperform non-family firms (e.g., Anderson and Reeb, 2003).

to March 31, 2009.³⁷ We exclude financial firms (SIC codes 4900 to 4999) and utilities (SIC codes 6000 to 6999). We next delete firms with missing stock return data in the Center for Research in Security Prices (CRSP) and firms with missing accounting data in Compustat. Our final sample comprises 1,463 firms in fiscal year 2006.

3.2. Sample firms' restructuring activities

For our sample of 1,463 firms, we obtain information on their restructuring activities during the crisis. To do so we follow Kang and Shivdasani (1997) and classify restructuring activities into six broad categories as follows:

1. **Downsizing:** Downsizing involves permanent reductions in a firm's physical assets, human resources, or both (Dewitt, 1998). We divide downsizing activities into two types, asset contraction and employee changes. Asset contraction includes reductions in physical assets such as asset sales, plant closures, spinoffs, exits from joint ventures, a reduction in capital expenditures or production capacity, a suspension of operations, and a shutdown of offices or branches. Employee changes include reductions in human resources such as layoffs, furloughs, wage or salary cuts, and early retirement incentives. Previous studies show that asset downsizing during a performance decline can help improve operating performance (John and Ofek, 1995) while employee downsizing can reduce organizational slack and operating costs (Guthrie and Datta, 2008).

2. **Expansion:** Expansion involves actions that enhance the scale or scope of operations such as acquiring other firms, establishing joint ventures, increasing output, expanding capital expenditures, and setting up new facilities. Expansionary activities can help a firm enter a market with greater entry barriers, increase market power, and accelerate the acquisition of knowledge and resources in a short period of time (Barkema and Vermeulen, 1998). During the economic crisis, acquisitions can increase NPV to the extent that firms acquire targets facing financial constraints at an attractive price (Zhan

³⁷ Fahlenbrach and Stulz (2011), who examine how CEO incentives affect the performance of U.S. banks during the crisis, define the crisis period as running from July 1, 2007 to December 31, 2008. They explain that although the crisis extends into 2009, they end their focal period in 2008 since the threat of nationalization of banks via bailouts was very high in 2009, which could confound any effect of CEO incentives on performance. Lins *et al.* (2013), who investigate the effect of family ownership on investment decisions for a sample of firms from 35 countries, define the crisis period as running from August 1, 2008 to December 31, 2009. They point out that global markets generally reached their lowest point in March 2009.

and Ozawa, 2001). However, indiscriminate acquisitions of unrelated businesses may divert managerial attention, resulting in reduced firm value (Jensen, 1986).

3. CEO turnover: Replacing poorly performing CEOs with new, more effective CEOs constitutes one of the most important responsibilities of a firm's board of directors (Bushman, Dai, and Wang, 2010; Parrino, 1997). Chang and Shim (2015) show that family firms that transition from family CEOs to outsider CEOs tend to outperform those managed by family CEOs. Such turnover during the crisis can signify a momentous shift in firm strategy, with implications for future performance. We consider forced and routine CEO turnovers separately in our analysis.³⁸

4. Change in operating policy: We focus on changes in technology and operating policies, which include changes in pricing, cost-cutting, outsourcing, inventory, and input acquisition policies.

5. Corporate control transaction as a target: This category includes cases in which firms face takeover threats through block purchases, proxy contests, mergers, or LBO proposals. Since firms facing a takeover threat are under pressure to restructure (Gibbs, 1993), examining corporate events related to takeover threats provides us a more complete picture of a firm's restructuring decisions during the crisis.

6. Miscellaneous actions: This residual category includes corporate events that do not fall into any of the categories above, such as bankruptcy and capital structure changes.

We collect information on restructuring activities and restructuring announcement dates during the crisis for our sample firms using several sources. We first extensively search *Factiva*. As the focus of our study is to examine the effect of family firm status on a firm's restructuring choice and its valuation effect, if the firm is acquired during the crisis, we track its restructuring activities up to the acquisition announcement. We use the date that a restructuring event first appears on *Factiva* as the announcement date. For restructuring activities related to acquisitions, divestitures, and spin-offs, we supplement the data obtained from *Factiva* with SDC Platinum database. For restructuring activities related to routine CEO turnovers and forced CEO turnovers, we supplement the data obtained from

³⁸ The classification of CEO turnover into routine and forced turnover follows Parrino (1997). Forced CEO turnover includes all CEO departures for which media mentions them as CEOs being fired, forced out, or resigned due to policy differences or pressure, while the remaining turnover is classified as routine CEO turnover.

Factiva with the Audit analytics database and with Peters and Wagner (2014) and Jenter and Kanaan (2015), respectively.³⁹ For partial and full acquisitions, we further classify them as related (either horizontally or vertically) or unrelated acquisitions following the methodology of Ahern (2012).⁴⁰ Acquisitions involving target firms whose SIC codes are unknown are classified as unidentifiable acquisitions.

In some cases, a firm announces multiple restructuring activities on the same day. For the analysis of the likelihood of undertaking restructuring activities, we consider each restructuring activity that occurs on a given date independently and classify it into the corresponding category. However, for the analysis of announcement effects, we exclude restructuring activities reported on the same day to avoid the possibility of confounding effects. For example, on August 2, 2007, Unifi Inc. announced that it would be terminating its CEO, closing one of its yarn facilities, and laying off 260 employees. In this case, we count each of Unifi's three restructuring activities independently as, respectively, a CEO turnover, asset contraction, and employee change, but we exclude these events from our analysis of the effects of restructuring announcements on firm value since it is not clear which restructuring type affects announcement returns more on a given date.

3.3. Family firms

Following prior literature (Anderson and Reeb, 2003; Feldman *et al.*, 2016; Villalonga and Amit, 2006), we identify family firms using two criteria: the fractional equity ownership of founding family members and the presence of family members among top management or on the board of directors. We define family firms as those in which founding family members, either individually or as a group, have an equity ownership position that exceeds 5% or in which at least one founding family member sits on the board or is in top management. We identify family firms by searching sections in firms'

³⁹ We search *Factiva* to verify the announcement date of CEO turnovers identified from these supplementary sources.

⁴⁰ To identify horizontally and vertically related acquisitions, we use the Bureau of Economic Analysis (BEA) IO tables for 2007 and map acquirer-target industry relationships based on target industry inputs used by the acquirer industry or vice versa. The BEA industry classification is mapped to SIC codes using the BEA's concordance tables. For each acquirer industry by two-digit SIC code, we identify vertically related industries as those that either provide inputs to the acquirer industry or use the output of the acquirer industry as part of the target's activity. Using this mapping approach, we classify an acquisition as horizontally related if the target's two-digit SIC code is the same as that of the acquirer, vertically related if the target's two-digit SIC code is that of an industry that is vertically related to the acquirer industry, and unrelated otherwise.

proxy statements that contain director biographies, the list of family firms in the November 10, 2003 issue of Business Week magazine, the Board Analyst database, and various internet sources including companies' websites. Among family firms, we define *Family member CEO firms* as those firms whose CEO is a member of the founding family, and *Outsider CEO firms* as those firms whose CEO is not related to the founding family (Villalonga and Amit, 2006). We further divide *Family member CEO firms* into *Founder CEO firms* (i.e., the CEO is the firm founder) and *Descendent CEO firms* (i.e., the CEO is a descendent of the firm founder), and *Outsider CEO firms* into *Outsider CEO firms with family involvement* (i.e., outsider CEO firms in which family members assume directorships or non-CEO executive positions) and *Outsider CEO firms with no family involvement* (i.e., outsider CEO firms in which family members do not hold any directorships or non-CEO executive positions). The classification of family firms into these four subgroups allows us to differentiate between firms that exhibit different degrees of family firm attributes, where *Founder CEO firms* exhibit the strongest and *Outsider firms with no family involvement* exhibit the weakest family firm attributes.

Table 1 presents the distribution of restructuring activities for the full sample of firms by restructuring type and family firm status. During the economic crisis there are a total of 4,783 restructuring activities, with about 87% of sample firms involved in at least one restructuring activity. On average, sample firms engage in about 1.13 downsizing activities and 1.54 expansionary activities during the crisis. The frequencies associated with engaging in other types of restructuring activities are relatively small, at 0.17 for CEO turnovers, 0.16 for changes in operating policy, and 0.23 for corporate control transactions as a target. These frequencies are also smaller for family firms than for non-family firms, suggesting that family firms are generally less likely to engage in restructuring activities than non-family firms during the crisis. In particular, family firms are less involved than non-family firms in restructuring events such as downsizings, unrelated acquisitions, forced CEO turnovers, and being a target of a corporate control transaction. A Kolmogorov-Smirnov test that compares the frequency of restructuring events between family and non-family firms shows that the difference is significant at the 1% level ($p\text{-value} = 0.002$).

3.4. Variables

For the analysis that examines the effect of corporate ownership on a firm's propensity to restructure, we use as the dependent variable an indicator that takes the value of one if a firm engages in a particular type of restructuring activity during the crisis, and zero otherwise. For the analysis that examines the valuation effect of a firm's restructuring choice, we use as the dependent variable the cumulative abnormal return (CAR) from one day before the restructuring announcement to one day after the restructuring announcement. We use industry-adjusted holding period returns and industry-adjusted return on assets (ROA) in the years around the crisis to measure the impact of a firm's restructuring choice on its long-term performance. Throughout the analysis, our key explanatory variable of interest is a family firm indicator that takes the value of one for family firms and zero for non-family firms.

We include as controls a variety of variables capturing firm, corporate governance, and CEO characteristics that can have direct impact on a firm's restructuring decisions. At the firm level, we first include leverage, computed as the ratio of the book value of debt to the market value of assets, to measure a firm's indebtedness. We next include firm size, measured as the logarithm of the book value of a firm's total assets, and Tobin's q , measured as the ratio of the market value of assets (book value of assets + market value of equity – book value of equity) to the book value of assets, as a proxy for firm value. Prior studies show that large firms and highly levered firms are more likely to be involved in restructuring actions, whereas firms with low Tobin's q are less likely to be involved in restructuring actions (Gibbs, 1993; Hoskisson and Johnson, 1992; Jensen, 1989; John and Ofek, 1995; Phan and Hill, 1995). We also control for the ratio of operating income to total assets (ROA) and past stock returns to capture a firm's profitability and stock performance (Khurana and Lippincott (2000)), the ratio of research and development expenses to sales to capture R&D intensity (Hoskisson and Johnson (1992)), the Whited-Wu index (2006) to capture financial constraints, the standard deviation of quarterly operating cash flows over the previous ten years scaled by total assets (cash flow volatility) to capture risk, and firm age. To the extent that access to the capital market is significantly reduced during the crisis, these variables are expected to influence firms' restructuring decisions. We further include the logarithm of the number of business segments a firm operates in, as Markides (1992) shows that diversified firms are more likely to engage in restructuring activities that

concentrate business focus. Turning to firm-level corporate governance mechanisms, we include institutional block ownership, board size, and the proportion of independent directors on the board, as corporate governance can also play an important role in firms' restructuring decisions (Gibbs, 1993; Hoskisson and Turk, 1990; Jensen, 1986). For example, a poorly governed firm's managers may have stronger incentives than managers of a well-governed firm to increase the resources under their control (Jensen, 1986), which could lead to a loss of efficiency and firm value and an increase in takeover risk. Finally, we control for CEO characteristics such as scaled-wealth performance sensitivity,⁴¹ CEO-chair duality, and CEO age.

Table 2 presents summary statistics (mean) for the control variables by family and non-family firm status. We find that family firms are smaller, younger, and more profitable (i.e., higher ROA) than non-family firms. Although family firms have lower leverage and higher firm value (Tobin's q), their stock returns tend to be lower than those of non-family firms. We also find that family firms' boards are less independent than those of non-family firms, CEOs in family firms are older than those in non-family firms, and CEOs' scaled wealth-performance sensitivity is greater for CEOs in family firms than in non-family firms. All of these differences are significant at the 5% level or better.

Within family (non-family) firms, we split the sample further into firms that downsize during the crisis and firms that do not. For both family and non-family firms, firms that downsize are different from those that do not downsize in several respects. For example, compared to non-downsizing firms, downsizing firms are larger, more diversified, older, and less financially constrained (Whited-Wu index, 2006). They also have higher leverage, lower firm value (Tobin's q), poorer stock returns, and larger boards. These differences are statistically significant at the 5% level or better.

When we compare downsizing (non-downsizing) family firms with downsizing (non-downsizing) non-family firms, we find that downsizing (non-downsizing) family firms have lower leverage, a less independent board, and smaller size than downsizing (non-downsizing) non-family

⁴¹ Following Edmans, Gabaix, and Landier (2009), scaled wealth-performance sensitivity is measured as the dollar change in CEO wealth for a 100 percentage point change in firm value, divided by annual CEO compensation, taking both stock and option holdings into account. We include this variable to control for managerial incentives.

firms. Moreover, their CEOs are older, have larger scaled wealth-performance sensitivity, and are more likely to also be Chairman of the Board than CEOs of the corresponding non-family firms.

Other observations that emerge from Table 2 are that *Family member CEO firms* account for 57.1% of all family firms in the sample, of which 37.6% are *Founder CEO firms* and 19.5% are *Descendent CEO firms*. Further, among *Outsider CEO firms*, 40.8% are *Outsider CEO firms with family involvement* and 2.1% are *Outsider CEO firms with no family involvement*. Comparing family firms that downsize during the crisis to those that do not, we find that *Family member CEO firms*, especially *Founder CEO firms*, are less likely to downsize.

3.5. Empirical design

To examine whether the likelihood of undertaking a restructuring in response to the crisis is different between family and non-family firms, we use a logistic regression model with industry fixed effects (Fama-French 48 industry classification). We then estimate a multinomial logistic regression of the likelihood of undertaking a value-increasing restructuring (i.e., a restructuring greeted by positive announcement returns) or a value-reducing restructuring (i.e., a restructuring greeted by negative announcement returns) using firms that do not engage in a restructuring during the crisis as the reference group.

To examine the valuation effects of restructuring announcements for each restructuring type that we consider, we use an event study approach. Daily abnormal returns are calculated using a market model with a 200-trading day estimation period beginning 210 days before and ending 11 days before the restructuring announcement date, where the CRSP value-weighted index return is used as a proxy for the market return. For firms that announce multiple restructuring plans of a given type during the crisis, we focus on the first announcement as subsequent events may have a different valuation impact. We also omit events accompanied by announcements of M&As, dividend payments, earnings, security issuances, legal disputes, or product-related news that are reported within one trading day before and after the announcement to avoid confounding effects.

Finally, to examine whether a firm's decision to restructure during the crisis affects its post-crisis performance, we evaluate the long-term industry-adjusted holding period returns and operating

performance of those sample firms that downsize during the crisis. To mitigate endogeneity concerns,⁴² we use a propensity-score matching approach (Heckman, Ichimura, and Todd, 1997) whereby we match firms that downsize (treated firms) during the crisis with firms that do not (control firms). We require that treated firms undertake downsizing activities but not engage in other types of restructuring to avoid confounding effects. We compute the propensity score by regressing an indicator that takes the value of one if a firm undertakes downsizing activities, and zero otherwise, on several firm characteristics such as firm size, leverage, Tobin's q , ROA, stock returns, diversification, and industry dummies. We then use nearest-neighborhood matching without replacement.⁴³ To compare long-term performance among family (non-family) firms, we match family (non-family) downsizing firms with family (non-family) non-downsizing firms. We obtain a matched sample of 102 (51 pure downsizing and 51 non-downsizing) family firms and 130 (65 pure downsizing and 65 non-downsizing) non-family firms.⁴⁴

4. Results

4.1. Likelihood of restructuring

Panel A of Table 3 presents estimates of logit regressions in which the dependent variable is an indicator that takes the value of one if a firm undertakes a particular type of restructuring during the crisis, and zero otherwise. P -values based on standard errors adjusted for heteroskedasticity are reported in parentheses (White, 1980). In column (1), we compare the likelihood of downsizing activities between family and non-family firms. We find that the coefficient on *Family firm* is negative and significant at the 10% level, suggesting that family firms are less likely to downsize than non-family firms. In columns (2) and (3), we estimate the regressions for asset contractions and employee changes, respectively, and find that family firms are less likely to engage in both types of

⁴² For example, it is possible that outperformance of downsizing firms relative to non-downsizing firms is due to firm characteristics that allow them to engage in downsizing during the crisis, not to their restructuring actions.

⁴³ In untabulated tests, we repeat our analyses using other types of restructuring activities. We find no significant difference in performance in the subsamples of family and non-family firms. However, since the number of firms that engage in a certain type of restructuring actions but do not engage in the other types of restructuring like downsizing actions is very small, these results should be interpreted with caution.

⁴⁴ Although it would be ideal to match downsizing family firms with downsizing non-family firms to examine the effect of restructuring on long-term performance, the numbers of family and non-family firms that engage in pure downsizing actions are only 59 and 76, respectively, which does not allow us to perform efficient propensity-score matching.

downsizing actions relative to non-family firms. Looking at the control variables, the results are largely consistent with previous studies that examine the determinants of corporate restructuring choices during a performance decline (Gibbs, 1993; Kang and Shivdasani, 1997). In particular, we find that firms that are larger, more diversified, and less profitable (i.e., lower ROA) and those that have poorer stock return performance are more likely to downsize during the crisis.

In column (4), we examine the likelihood of expansion activities and find that the coefficient on *Family firm* is insignificantly negative, indicating that family and non-family firms are equally likely not to expand in crisis periods. When we split expansion activities into unrelated acquisitions, related acquisitions, and internal expansion in columns (5) to (7), we find that family firms are less likely to engage in unrelated acquisitions than non-family firms.

Next, we examine the likelihood of CEO turnover in columns (8) to (10). Column (8) uses an indicator for CEO turnover (forced or routine) as the dependent variable, while column (9) (column (10)) uses an indicator for forced CEO turnover (routine CEO turnover) as the dependent variable. We find that the coefficient on *Family firm* is negative and significant in all three regressions, indicating that CEO replacement is less likely to occur in family firms than in non-family firms.

Finally, in columns (11) and (12) we examine the likelihood of firms changing their operating policy or being a target of a corporate control transaction, respectively. We find no difference in the likelihood of these types of restructuring activities between family and non-family firms.⁴⁵

In Panel B of Table 3, we reestimate the regressions in Panel A after replacing *Family firm* with the indicators *Family member CEO firms* and *Outsider CEO firms*. We find that our findings in Panel A concentrate largely among family firms in which a family member serves as CEO. The only exception is the result in column (5), where we find that *Outsider CEO firms* are less likely to engage

⁴⁵ In untabulated tests, we also reestimate the logit regression in column (9) of Table 3, Panel A using an indicator for forced turnover in the 12 months following the crisis (i.e., April 2009 to March 2010) as the dependent variable to examine whether family and non-family firms differ in the likelihood of forced CEO turnover post-crisis. We do not find a significant coefficient on *Family firm*, suggesting that family and non-family firms are equally likely to be involved in forced CEO turnovers in the post-crisis period.

in unrelated acquisitions than non-family firms, while we find no such evidence for *Family member CEO firms*.⁴⁶

In Panel C of Table 3, we replace *Family member CEO firms* with *Founder CEO firms* and *Descendent CEO firms*, and we replace *Outsider CEO firms* with *Outsider CEO firms with family involvement* and *Outsider CEO firms with no family involvement*. We find that both *Founder CEO firms* and *Descendent CEO firms* are less likely to engage in asset contractions, employee changes, and forced CEO turnovers than non-family firms. Among *Outsider CEO firms*, we find that *Outsider CEO firms with family involvement* are less likely to engage in unrelated acquisitions and routine CEO turnovers, whereas *Outsider CEO firms with no family involvement* are more likely to engage in expansionary actions. These results suggest that the restructuring choices of family firms observed in Panel A are particularly pronounced when family members play an active monitoring role.⁴⁷

The likelihood of restructuring during the crisis can be endogenously influenced by pre-crisis firm-level characteristics and corporate policies. To address this concern, we use a propensity-score matching approach. Specifically, for non-regulated firms covered in ExecuComp in 2006, we first estimate a logit model in which the dependent variable is a family firm indicator and the explanatory variables include firm size, leverage, Tobin's q , ROA, stock returns, diversification, and industry dummies (using the Fama-French 48-industry classification). Next, for every family firm, we choose a non-family control firm that has the closest propensity score (one-to-one matching without replacement). This procedure yields a sample of 532 family firms (treated firms) and 532 non-family firms (control firms). We then repeat our analyses in Table 3 using this propensity-score matched sample.

⁴⁶ In untabulated tests, we estimate the regressions in Table 3 with Poisson regressions in which the dependent variable is the number of restructuring events. We find that the results are qualitatively similar.

⁴⁷ In untabulated tests, we examine whether the likelihood of restructuring is different when family owners use part of their name in the company name. Specifically, we use an indicator that takes the value of one for family firms whose company name includes part of the founding family's name, and zero otherwise. We find that this indicator is not significantly associated with any type of restructuring during the crisis.

The results are reported in Appendix Table A.1.⁴⁸ Panel A presents the results of logit regressions using the propensity-score matched sample. We find qualitatively similar results to those in Table 3, Panel A: family firms are less likely to engage in downsizing (both asset contractions and employee changes), unrelated acquisitions, and CEO turnovers (both routine and nonroutine turnovers) than non-family firms during the crisis. In Panels B and C, the results also mirror those of Table 3, Panels B and C when we further divide family firms into subgroups based on CEO type. Thus, our previous findings on the effect of family firm status on the likelihood of restructuring during the crisis do not appear to be driven by pre-crisis differences in firm characteristics between family and non-family firms.

Overall, the results in this section suggest that compared to non-family firms, family firms are less likely to pursue downsizing actions or replace top management in response to the crisis. Family firms also largely refrain from expanding their operations beyond their core business during the crisis.

4.2. Likelihood of value-increasing restructuring: Multinomial logit regressions

In this section, we examine whether the likelihood of undertaking value-increasing restructurings differs between family and non-family firms. To do so, recall that we classify restructuring events into value-increasing and value-decreasing events according to CAR (-1, 1). We then estimate a multinomial logistic model in which the dependent variable is equal to zero if a firm does not engage in a restructuring activity, one if it undertakes a value-increasing restructuring activity, and two if it undertakes a value-decreasing restructuring activity, where we use the same control variables as in Table 3.

Panel A of Table 4 reports results using *Family firm* as the independent variable of interest. In columns (1) to (3), we find that family firms are more likely to avoid value-reducing downsizing actions than non-family firms. In columns (4) to (7), we find that family firms are less likely to engage in value-increasing expansion projects, especially unrelated acquisitions. In column (8), we find that family firms are less likely to make both value-increasing and value-decreasing CEO

⁴⁸ In untabulated tests, we compare the mean (median) values of the variables used in matching between family and non-family firms and find no significant difference, which mitigates the concern that family firms are systematically different than non-family firms along observable characteristics.

replacement decisions. When we divide CEO turnover into forced and routine turnovers, we find that family firms are less likely to engage in value-decreasing forced CEO turnovers. For the other types of events, we do not find a significant difference in the likelihood of engaging in value-increasing or -decreasing restructurings.

In Panel B of Table 4, we replace *Family firm* with *Family member CEO firms* and *Outsider CEO firms* and reestimate the regressions. We find that all of our findings in Panel A of Table 4 are driven by *Family member CEO firms*, in line with *H2*. In Panel C of Table 4, we replace the two family firm indicators in Panel B with the four indicators discussed previously. We find that irrespective of whether family firms are managed by founder CEOs or descendant CEOs, these two types of family firms are more likely to avoid ineffective downsizing and ineffective CEO replacement decisions than non-family firms.⁴⁹

In sum, the results in this section suggest that family firms, particularly *Family member CEO firms*, effectively screen out restructurings that are not value-increasing, consistent with the restructuring efficiency hypothesis (*H1* and *H2*). However, we find no evidence that they are more effective in identifying positive NPV restructuring projects.

4.3. Valuation effects of restructuring announcements

We next perform event studies to compare stock market reactions to restructuring plans announced by family and non-family firms. Table 5 presents results from univariate tests of CAR (-1, 1) for the first announcement of each type of restructuring activity. For the full sample of family and non-family firms, we find that the market reacts negatively when a firm announces employee changes or forced CEO departures. However, consistent with prior studies (King *et al.*, 2004), we find a positive market reaction to news that a firm becomes a target of a corporate control transaction. When we split the sample into family and non-family firms, we find that the market reacts positively (albeit insignificantly) to family firms' downsizing announcements, but negatively to non-family firms' downsizing announcements: the mean (median) CAR (-1, 1) for a family firm's downsizing

⁴⁹ In untabulated tests, we reestimate the multinomial logistic regressions of Table 4 using the propensity-score matched sample of family firms and non-family control firms used in Table A.1. We find that our results are qualitatively similar to those in Table 4.

announcement is 0.53% (0.13%) compared to -0.64% (-0.17%) for non-family firms. The difference in mean CARs between family and non-family firms is significant at the 10% level. When we further divide downsizing actions into asset contractions and employee changes, we find that the mean (median) CAR (-1, 1) for an asset contraction announcement is a significant 1.48% (1.00%) for family firms compared to an insignificant -0.07% (0.01%) for non-family firms. The difference in mean (median) CARs between family and non-family firms is significant at the 5% level. We also find that the market reacts negatively when family firms unveil internal expansion plans and when non-family firms announce forced CEO departures. Any news on corporate control transactions in which the firm is a target receives a positive market response regardless of the firm's ownership structure.

Panel A of Table 6 reports estimates of ordinary least squares (OLS) regressions in which the dependent variable is CAR (-1, 1) for the first announcement of each restructuring activity made by a firm during the crisis. We use the same controls as in Table 3, as well as quarter fixed effects to control for potential effects of macroeconomic conditions on firm value. In column (1), we examine CAR (-1, 1) for downsizing actions. We find that the coefficient on *Family firm* is positive and significant at the 1% level. The coefficient estimate of 0.019 suggests that all else being equal, family firms' downsizing announcement returns are 1.9% higher than those of non-family firms. Given the sample firms' average market value is \$7.8 billion, the 1.9% difference is economically large and significant. These results support the restructuring efficiency hypothesis (*HI*), which holds that family firms are better able to identify value-increasing restructuring projects compared to non-family firms.

In columns (2) and (3), we split downsizing actions into asset contractions and employee changes and find that the positive market reaction to family firms' downsizing announcements is driven primarily by asset contraction activities. In columns (4) to (7), we examine whether expansion announcements elicit different stock market responses for family and non-family firms. We find that the market reaction is negative when family firms unveil plans to engage in unrelated acquisitions. In columns (8) to (10), we compare market responses to family and non-family firms' CEO turnover decisions. We find the coefficient on *Family firm* is positive and significant at the 1% level in column (9), suggesting that a decision to replace a poorly performing CEO elicits a more positive market reaction for family firms than non-family firms. In columns (11) and (12), we do not find any

difference between family and non-family firms in the market reactions to announcements related to other changes in operating policy or to corporate control transactions in which the firm is a target.

In Panel B of Table 6, we replace *Family firm* with *Family member CEO firms* and *Outsider CEO firms* and reestimate the regressions in Panel A of Table 6. We find that our key findings in Panel A are driven mainly by *Family member CEO firms*. However, the same results also hold for announcements of downsizing actions, unrelated acquisitions, and forced CEO turnovers made by *Outsider CEO firms*. Thus, although market reactions to family and non-family firms' restructuring plans differ sharply, we find little variation in market responses to restructuring events within family firms.

In Panel C of Table 6, we replace *Family member CEO firms* with *Founder CEO firms* and *Descendent CEO firms*, and we replace *Outsider CEO firms* with *Outsider CEO firms with family involvement* and *Outsider CEO firms with no family involvement*. We find that family firms' positive announcement returns for downsizing and CEO turnover actions, and their negative announcement returns for expansionary actions, observed in Panel A are particularly pronounced when family members play an active role as a director and/or as an executive officer.

In Table 7, we examine whether the results for downsizing actions in Table 6 vary with downsizing firms' pre-crisis performance. To do so, we split our sample of downsizing firms according to their median pre-crisis ROA and reestimate regressions (1) to (3) of Table 6 separately for these two subsamples. Panel A reports the results using *Family firm* as our independent variable of interest. In columns (1) and (2), we find that the positive market reaction to a family firm's downsizing announcement concentrates among family firms that underperform in the pre-crisis period, with the difference in coefficients on *Family firm* between high and low pre-crisis ROA firms significant at the 1% level ($p\text{-value} = 0.01$). We find similar results when we use asset contraction subsamples. Although the coefficient on *Family firm* is insignificant for both high and low pre-crisis ROA firms when we use employee change subsamples, it is a positive 0.025 for low pre-crisis ROA firms and a negative 0.014 for high pre-crisis ROA firms, with the difference in coefficients on *Family firm* significant at the 5% level. These results therefore show that the market reacts more positively when underperforming family firms engage in downsizing actions.

Panel B of Table 7 sheds light on whether the results in Table 7, Panel A vary with the extent to which family members are involved in management. We find that the results in Panel A are more pronounced among *Descendant CEO firms* and *Outsider CEO firms with family involvement*. Thus, outside investors view downsizing actions by poorly performing family firms as particularly value increasing when these firms are managed by descendant CEOs or when they are managed by outsider CEOs but have founding family members as directors and/or top executives.

In sum, in this section we find strong support for the restructuring efficiency hypothesis, which holds that family firms engage in effective restructuring activities that increase firm value. We further find that these results are more pronounced among family firms that perform poorly in the pre-crisis period, suggesting that family firms that actively restructure to improve their performance are those that gain most from their restructuring actions.

4.4. Impact of restructuring on long-term performance

In this section, we examine whether a firm's restructuring activities during the crisis affect its long-term post-crisis performance. To do so, we use a propensity-score matched sample of family (non-family) firms that engage in downsizing and control family (non-family) firms that do not engage in downsizing. The restructuring efficiency hypothesis (*HI*) predicts that family firms are more effective in identifying value-increasing restructuring projects and thus their restructuring actions during the crisis lead to higher post-crisis long-term performance.

Panel A of Table 8 presents the results of OLS regressions using the propensity-score matched samples.⁵⁰ In columns (1) and (3) (columns (2) and (4)), the dependent variable is the change in industry-adjusted holding period stock returns from one year (two years) prior to the economic shock to one year (two years) after the shock. The regressions use the same control variables as in Table 3. Columns (1) and (2) report results using family firms that downsize and their matched non-downsizing family firms. We find that the coefficient on *Downsizing*, which takes a value of one if a firm engages in a downsizing action during the crisis and zero otherwise, is positive and significant at

⁵⁰ In untabulated tests, we compare the mean (median) values of the variables used in matching family (non-family) firms that engage in downsizing and non-downsizing family (non-family) firms. We find no significant differences, suggesting that the matching properly identifies non-downsizing firms as close as possible to downsizing firms.

the 10% and 5% levels, respectively, suggesting that family firms that choose to downsize during the crisis observe better stock return performance in the post-crisis period compared to family firms that choose not to downsize. In columns (3) and (4), we focus on non-family firms that downsize and their matched non-downsizing non-family firms. In this case the coefficients on *Downsizing* are insignificant.

In Panel B of Table 8, we replace industry-adjusted holding period stock returns with industry-adjusted ROA as the dependent variable. The results remain unchanged.⁵¹

Overall, the results suggest that family firms that undertake downsizing during the crisis experience improved performance in the post-crisis period. This finding supports the restructuring efficiency hypothesis (*H1*).

5. Discussion and Conclusion

In this paper we examine the restructuring activities of family and non-family firms in response to the recent crisis. We propose two competing hypotheses based on the unique incentives of family-owner managers. Under the restructuring efficiency hypothesis, family firms' longer-term horizon and lower agency conflicts between shareholders and managers allow them to identify and pursue effective restructuring projects during the crisis, which results in improved performance and firm value. In contrast, the restructuring inefficiency hypothesis predicts that family owners tend to engage in ineffective restructuring activities due to strong bequest motives, incentives to preserve socioemotional wealth, and conflicts with non-family shareholders.

We find that corporate ownership type influences the effectiveness of restructuring activities and in turn firm value. Specifically, we find that family firms are more likely to avoid value-reducing restructuring activities during the crisis. We further find that asset downsizing and forced CEO turnover actions by family firms lead to more positive announcement returns than those by non-family firms, and in the post-crisis period, family firms that choose to downsize during the crisis outperform family firms that do not engage in downsizing actions. Additional analysis shows that *Family member*

⁵¹ Due to the small number of observations, we are unable to perform the same tests as in Table 8 for the subsamples of firms that engage in asset contractions only and firms that engage in employee changes only.

CEO firms are more likely to engage in effective restructurings than non-family firms. Finally, we find that the market reacts more positively when restructuring plans are announced by family firms, particularly by *Descendent CEO firms* and *Outsider CEO firms with family involvement*. Taken together, the results support the restructuring efficiency hypothesis.

This study advances our understanding about the impact of corporate ownership type on firms' restructuring choices and also provides insights into the benefits of family ownership. Prior studies provide ample evidence on the costs arising from agency problems in family firms (Gómez-Mejía, Núñez-Nickel, and Gutierrez, 2001; Morck and Yeung, 2003; Schulze *et al.*, 2001). Our study shows that during the crisis, the potential costs arising from family owner-managers' expropriation incentives (Johnson *et al.*, 2000) may be more than offset by the benefits of family ownership. For example, our results suggest that family owner-managers have better ability to identify value-increasing strategic options and implement them effectively in response to negative economy-wide shocks. These findings complement Feldman *et al.* (2016), who document the effectiveness of family firms in the context of corporate divestitures.

Although Lins *et al.* (2013) perform cross-country analyses to examine how family ownership affects firm investment and performance during the crisis, international evidence on family firms' restructuring decisions during crises and the effect of these restructuring decisions on firm value is limited. Extending the current study on the effect of corporate ownership type on firms' restructuring decisions during the crisis and on restructuring outcomes following the crisis to an international context is likely to be a promising area for future research. In particular, emerging markets where minority shareholder protection is weaker and family ownership plays a more important role may provide an interesting empirical setting.

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Table 1 Distribution of Restructuring Activities by Type and Family Firm Status

The table shows the distribution of restructuring activities by type and family firm status for a sample of 4,783 restructuring activities announced by 1,463 non-regulated firms in ExecuComp during the 2007 to 2009 economic crisis. Following Fahlenbrach and Stulz (2011) and Lins *et al.* (2013), we define the economic crisis as the period from July 1, 2007 to March 31, 2009. We obtain information on restructuring activities by searching *Factiva* and supplementing it with the SDC Platinum and Audit Analytics databases. We obtain information on forced CEO turnover from Peters and Wagner (2014) and Jenter and Kanaan (2015). *Asset contraction* includes asset sales, leasebacks, plant closures, capital expenditure cuts or delays, production capacity cuts, exits from joint ventures, office/branch shutdowns, unit spinoffs, suspensions of production, and line-of-business withdrawals. *Employee changes* include furloughs, layoffs, reductions in mandatory retirement age, early retirement incentives, manager or employee pay cuts, and reductions in director salary or bonus. *Internal expansion* includes buyouts of joint venture partners, diversifications, the establishment of new subsidiaries, expansions of distribution channels, increases in capital expenditures, increases in output or expansions of existing production facilities, joint ventures, construction of new facilities, new production, the opening of new office/branch/factories, the establishment of research labs, and increases in R&D. *Changing operating policy* includes pricing policy changes, product design or line changes, reductions in operating costs, distributional efficiency improvements, product or production quality improvements, changes in input acquisition policies, inventory reductions, production technique/equipment changes, asset management updates, outsourcing changes, the reorganization of existing production processes, and the reorganization of subsidiaries/units. *Becoming a target firm* includes block sales of equity, proxy contests, successful firm sales, takeover rumors or negotiations, and targets of unsolicited offers or unsuccessful LBO offers. *Miscellaneous actions* include cancellations of bond or equity issues, chapter 11 filings, company name changes, dissolutions and liquidations, emergence from chapter 11, and the retirement of bank debt or interest payments. In the last two columns, the test of distribution equality in the number of events and the test of difference in the ratios are performed using the Kolmogorov-Smirnov test and z- test, respectively.

Types of restructuring	Full sample: a (N = 1,463)			Family firms: b (N = 569)			Non-family firms: c (N = 894)			Test of distribution equality (<i>p</i> -value): (b – c)	Test of difference (<i>p</i> - value): (b – c)
	No. of events: d	No. of unique restructuring firms / no. of sample firms	No. of events per firm: (d / a)	No. of events: e	No. of unique restructuring firms / no. of sample firms	No. of events per firm: (e / b)	No. of events: f	No. of unique restructuring firms / no. of sample firms	No. of events per firm: (f / c)	No. of events	No. of unique restructuring firms / no. of sample firms
<i>Downsizing:</i>	1,657	0.48	1.13	549	0.43	0.96	1,108	0.51	1.24	(0.032)	(0.004)
Asset contraction	898	0.33	0.61	304	0.29	0.53	594	0.36	0.66	(0.076)	(0.007)
Employee changes	759	0.31	0.52	245	0.27	0.43	514	0.34	0.57	(0.042)	(0.003)
<i>Expansion:</i>	2,254	0.60	1.54	804	0.58	1.41	1,450	0.61	1.62	(0.688)	(0.145)
Unrelated acquisitions	177	0.08	0.12	54	0.06	0.09	123	0.09	0.14	(0.981)	(0.082)
Related acquisitions	761	0.31	0.52	286	0.30	0.50	475	0.32	0.53	(1.000)	(0.615)
Other acquisitions	666	0.27	0.46	233	0.26	0.41	433	0.28	0.48	(0.991)	(0.325)
Internal expansion	650	0.25	0.44	231	0.25	0.41	419	0.25	0.47	(1.000)	(0.927)
<i>CEO turnover:</i>	253	0.17	0.17	82	0.14	0.14	171	0.19	0.19	(0.430)	(0.019)
Forced turnover	106	0.07	0.07	29	0.05	0.05	77	0.08	0.09	(0.899)	(0.025)
Routine turnover	147	0.10	0.10	53	0.09	0.09	94	0.11	0.11	(1.000)	(0.457)
<i>Changing operating policy</i>	233	0.13	0.16	80	0.12	0.14	153	0.13	0.17	(1.000)	(0.485)
<i>Becoming a target firm</i>	336	0.18	0.23	110	0.16	0.19	226	0.20	0.25	(0.605)	(0.049)
<i>Miscellaneous actions</i>	50	0.03	0.03	15	0.03	0.03	35	0.04	0.04	(1.000)	(0.193)
<i>Total</i>	4,783	0.87	3.27	1,640	0.84	2.88	3,143	0.89	3.52	(0.002)	(0.006)

Table 2 Summary Statistics

The table shows summary statistics (mean) for a sample of 1,463 non-regulated firms in ExecuComp during the 2007 to 2009 economic crisis. Following Fahlenbrach and Stulz (2011) and Lins *et al.* (2013), we define the economic crisis as the period from July 1, 2007 to March 31, 2009. We obtain information on restructuring activities by searching *Factiva* and supplementing it with the SDC Platinum and Audit Analytics databases. All mean values are measured as of the fiscal year-end immediately prior to the economic crisis. Table A.2 provides a detailed description of the variables. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Family firms			Non-family firms			Test of difference				
	Full sample: a (N = 569)	Non-downsizing firms: b (N = 324)	Downsizing firms: c (N = 245)	Full sample: d (N = 894)	Non-downsizing firms: e (N = 440)	Downsizing firms: f (N = 454)	a - d	b - c	e - f	b - e	c - f
<i>Firm characteristics:</i>											
Leverage	0.215	0.195	0.243	0.248	0.227	0.268	-0.033***	-0.048***	-0.041***	-0.032**	-0.025***
Total assets (\$ billions)	4.509	2.340	7.379	6.209	2.798	9.514	-1.699**	-5.039***	-6.716***	0.458	-2.135
Tobin's <i>q</i>	2.242	2.387	2.050	2.081	2.246	1.921	0.161**	0.337***	0.325***	0.141	0.129
ROA	0.107	0.111	0.102	0.095	0.099	0.091	0.012**	0.009	0.008	0.012	0.011
R&D / sales	0.048	0.049	0.046	0.047	0.053	0.042	0.001	0.003	0.011**	-0.004	0.004
Firm age (in years)	23.603	20.639	27.522	28.700	25.111	32.178	-5.097***	-6.883***	-7.067***	-4.472***	-4.656***
Diversification	0.809	0.677	0.984	0.867	0.727	1.004	-0.058	-0.307	-0.277	-0.049	-0.02
Stock return	0.201	0.231	0.163	0.247	0.291	0.206	-0.046**	0.068**	0.085***	-0.060*	-0.043**
Cash flow volatility	0.035	0.036	0.033	0.036	0.038	0.034	-0.001	0.003	0.004**	-0.002	-0.001
Whited-Wu index	-0.961	-0.939	-0.989	-0.962	-0.938	-0.985	0.001	0.050***	0.047***	-0.001	-0.004
<i>Corporate governance characteristics:</i>											
Institutional blockholder ownership	0.223	0.226	0.219	0.236	0.233	0.239	-0.013*	0.007	-0.006	-0.007*	-0.020
Board size	8.851	8.418	9.425	8.995	8.616	9.367	-0.144	-1.007***	-0.751***	-0.198	0.058
Proportion of independent directors	0.659	0.657	0.661	0.746	0.736	0.756	-0.087***	-0.004	-0.020**	-0.079***	-0.095***
<i>CEO characteristics</i>											
Scaled wealth-performance sensitivity	63.931	59.539	69.475	11.004	13.459	8.675	52.927***	-9.936	4.784	46.080***	60.800***
CEO-chair duality (indicator)	0.486	0.510	0.456	0.512	0.475	0.547	-0.026	0.054	-0.072**	0.035**	-0.091
CEO age (in years)	56.163	56.123	56.216	54.844	54.711	54.971	1.319***	-0.093	-0.260	1.412**	1.245**
<i>Family firm characteristics</i>											
Firm with a family member CEO (indicator)	0.571	0.642	0.478	-	-	-	-	0.164***	-	-	-
Firm with a founder CEO (indicator)	0.376	0.463	0.261	-	-	-	-	0.202***	-	-	-
Firm with a descendent CEO (indicator)	0.195	0.179	0.216	-	-	-	-	-0.037	-	-	-
Firm with an outsider CEO, but having a family member as its director and/or top executive (indicator)	0.408	0.340	0.498	-	-	-	-	-0.158***	-	-	-
Firm with an outsider CEO and having no family member as its director and/or top executive (indicator)	0.021	0.019	0.024	-	-	-	-	-0.005	-	-	-

Table 3 Likelihood of Undertaking Restructuring Activities during the Crisis

The table presents estimates of logit regressions in which the dependent variable is an indicator that takes the value of one if a firm undertakes a particular type of restructuring during the crisis, and zero otherwise. The sample consists of all non-regulated firms in ExecuComp during the 2007 to 2009 economic crisis. Following Fahlenbrach and Stulz (2011) and Lins *et al.* (2013), we define the economic crisis as the period from July 1, 2007 to March 31, 2009. We obtain information on restructuring activities by searching *Factiva* and supplementing it with the SDC Platinum and Audit Analytics databases. We obtain information on forced CEO turnover from Peters and Wagner (2014) and Jenter and Kanaan (2015). All control variables are measured as of the fiscal year-end immediately prior to the economic crisis. Table A.2 provides a detailed description of the variables. *P*-values reported in parentheses are based on standard errors adjusted for heteroscedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Family Firm Status and Likelihood of Undertaking Restructuring Activities

Independent variables	Downsizing			Expansion				CEO turnover			Changing operating policy	Becoming a target firm
	All	Asset contraction	Employee changes	All	Unrelated acquisitions	Related acquisitions	Internal expansion	All	Forced turnover	Routine turnover		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Family firm (indicator)	-0.064* (0.07)	-0.066** (0.04)	-0.065** (0.04)	-0.012 (0.70)	-0.083* (0.08)	-0.016 (0.58)	0.014 (0.61)	-0.070*** (0.00)	-0.039** (0.02)	-0.031* (0.09)	-0.004 (0.84)	-0.024 (0.29)
Firm characteristics												
Leverage	0.195 (0.22)	0.269* (0.06)	0.039 (0.77)	-0.212 (0.13)	-0.477** (0.02)	0.057 (0.71)	-0.133 (0.30)	0.027 (0.79)	0.063 (0.36)	-0.026 (0.76)	0.138 (0.11)	0.155 (0.13)
Firm size	0.152** (0.03)	0.004 (0.95)	0.258*** (0.00)	0.196*** (0.00)	0.123 (0.20)	0.005 (0.94)	0.129** (0.02)	0.035 (0.44)	0.034 (0.29)	0.005 (0.89)	0.034 (0.34)	-0.007 (0.87)
Tobin's <i>q</i>	-0.007 (0.74)	-0.046** (0.03)	0.022 (0.22)	0.036** (0.04)	-0.016 (0.55)	-0.006 (0.73)	0.042** (0.01)	0.009 (0.47)	0.006 (0.55)	0.005 (0.65)	0.032*** (0.00)	-0.022* (0.10)
ROA	-0.561** (0.05)	-0.636** (0.02)	-0.272 (0.28)	-0.300 (0.19)	-0.136 (0.71)	0.273 (0.27)	-0.454* (0.06)	-0.121 (0.44)	-0.096 (0.35)	-0.015 (0.90)	-0.169 (0.24)	-0.230 (0.14)
R&D / sales	0.264 (0.37)	-0.347 (0.26)	0.413* (0.09)	-0.460* (0.06)	-0.162 (0.67)	0.381 (0.30)	-0.611** (0.02)	0.151 (0.37)	0.062 (0.58)	0.085 (0.50)	0.037 (0.85)	0.091 (0.54)
Ln (Firm age)	-0.038 (0.16)	-0.044* (0.09)	0.023 (0.34)	-0.032 (0.22)	-0.017 (0.57)	-0.004 (0.85)	0.009 (0.68)	-0.025 (0.15)	-0.001 (0.97)	-0.022* (0.07)	0.012 (0.41)	0.035* (0.06)
Diversification	0.103*** (0.00)	0.072*** (0.00)	0.047** (0.04)	0.020 (0.38)	0.064** (0.02)	-0.033 (0.12)	0.031 (0.13)	0.023 (0.15)	0.010 (0.36)	0.011 (0.37)	0.029** (0.02)	0.001 (0.92)
Stock return	-0.249*** (0.00)	-0.236*** (0.00)	-0.171*** (0.00)	0.055 (0.20)	-0.091 (0.15)	0.044 (0.32)	-0.009 (0.83)	-0.120*** (0.00)	-0.086*** (0.00)	-0.044* (0.07)	-0.060** (0.03)	-0.053 (0.12)
Cash flow volatility	0.898 (0.24)	-0.626 (0.37)	1.300** (0.04)	-0.880 (0.17)	-0.745 (0.54)	-0.721 (0.25)	-0.320 (0.64)	0.799* (0.08)	0.563* (0.05)	0.286 (0.39)	-0.495 (0.17)	0.064 (0.88)
Whited-Wu index	-1.081* (0.05)	-1.568*** (0.00)	0.321 (0.52)	-0.179 (0.72)	1.239* (0.10)	-0.320 (0.59)	-0.237 (0.59)	0.428 (0.22)	0.273 (0.27)	0.161 (0.55)	-0.193 (0.51)	0.286 (0.44)
Corporate governance characteristics												
Institutional blockholder ownership	0.148 (0.24)	0.080 (0.50)	0.089 (0.42)	-0.234** (0.04)	-0.164 (0.27)	0.169 (0.16)	-0.113 (0.27)	0.015 (0.85)	-0.010 (0.86)	0.008 (0.91)	0.015 (0.80)	0.035 (0.66)
Ln (Board size)	0.054 (0.54)	0.050 (0.55)	0.062 (0.42)	-0.013 (0.86)	0.227** (0.02)	-0.049 (0.45)	0.094 (0.16)	0.073 (0.16)	0.019 (0.60)	0.048 (0.24)	0.115** (0.01)	-0.031 (0.57)
Proportion of independent directors	0.222* (0.07)	0.183 (0.12)	0.095 (0.40)	0.131 (0.27)	-0.131 (0.35)	0.019 (0.86)	0.097 (0.33)	-0.092 (0.23)	-0.062 (0.24)	-0.031 (0.63)	0.007 (0.91)	0.140* (0.08)
CEO characteristics												

Scaled wealth-performance sensitivity	0.000 (0.20)	0.000*** (0.01)	0.000 (0.52)	-0.000 (0.89)	-0.001 (0.28)	0.001 (0.27)	0.000 (0.15)	-0.000 (0.47)	-0.000 (0.52)	-0.000 (0.47)	-0.000 (0.26)	0.000* (0.09)
CEO-chair duality (indicator)	-0.033 (0.35)	-0.014 (0.66)	-0.054* (0.08)	-0.021 (0.51)	0.058 (0.19)	-0.051 (0.12)	-0.024 (0.39)	0.007 (0.76)	0.020 (0.22)	-0.006 (0.73)	0.006 (0.76)	-0.012 (0.58)
Ln (CEO age)	-0.144 (0.27)	0.034 (0.77)	-0.174 (0.13)	-0.110 (0.34)	0.115 (0.52)	-0.034 (0.78)	0.167 (0.12)	0.246*** (0.00)	-0.128** (0.02)	0.363*** (0.00)	-0.165** (0.01)	-0.052 (0.54)
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of observations	1,274	1,265	1,262	1,271	425	373	1,258	1,224	1,013	1,176	1,247	1,236
Pseudo R^2	0.169	0.198	0.182	0.121	0.218	0.269	0.141	0.072	0.100	0.072	0.149	0.091

Panel B: Family Firm Status and Likelihood of Undertaking Restructuring Activities: Family Member CEOs versus Outsider CEOs

	Downsizing			Expansion				CEO turnover			Changing operating policy	Becoming a target firm
	All	Asset contraction	Employee changes	All	Unrelated acquisitions	Related acquisitions	Internal expansion	All	Forced turnover	Routine turnover		
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Family firm with a family member CEO (indicator)	-0.129*** (0.00)	-0.139*** (0.00)	-0.111*** (0.01)	-0.034 (0.40)	-0.021 (0.72)	-0.041 (0.25)	-0.002 (0.96)	-0.132*** (0.00)	-0.108*** (0.00)	-0.051** (0.03)	-0.023 (0.34)	-0.020 (0.51)
Family firm with an outsider CEO (indicator)	0.003 (0.95)	0.003 (0.93)	-0.024 (0.54)	0.012 (0.78)	-0.131** (0.02)	0.006 (0.87)	0.030 (0.40)	-0.010 (0.71)	0.007 (0.63)	-0.009 (0.69)	0.011 (0.61)	-0.029 (0.31)
Control variables in Panel A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of observations	1,274	1,265	1,262	1,271	425	373	1,258	1,224	1,013	1,176	1,247	1,236
Pseudo R^2	0.173	0.203	0.184	0.121	0.223	0.272	0.141	0.081	0.130	0.075	0.150	0.091

Panel C: Family Firm Status and Likelihood of Undertaking Restructuring Activities: Different Types of Family Member CEOs and Outsider CEOs

	Downsizing			Expansion				CEO turnover			Changing operating policy	Becoming a target firm
	All	Asset contraction	Employee changes	All	Unrelated acquisitions	Related acquisitions	Internal expansion	All	Forced turnover	Routine turnover		
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Family firm with a founder CEO (indicator)	-0.161*** (0.00)	-0.170*** (0.00)	-0.097** (0.05)	0.002 (0.97)	-0.041 (0.50)	-0.054 (0.18)	-0.011 (0.80)	-0.107** (0.03)	-0.141*** (0.00)	-0.056 (0.25)	-0.019 (0.54)	-0.013 (0.71)
Family firm with a descendent CEO (indicator)	-0.073 (0.28)	-0.099* (0.10)	-0.134** (0.03)	-0.093 (0.12)	0.021 (0.80)	-0.013 (0.80)	0.013 (0.80)	-0.166*** (0.01)	-0.114** (0.02)	-0.143** (0.03)	-0.027 (0.42)	-0.034 (0.46)
Family firm with an outsider CEO, but having a family member as its director and/or top executive (indicator)	0.007 (0.88)	0.018 (0.67)	-0.019 (0.63)	-0.012 (0.78)	-0.112* (0.05)	-0.009 (0.81)	0.027 (0.47)	-0.074* (0.08)	-0.010 (0.73)	-0.081* (0.06)	0.016 (0.49)	-0.031 (0.30)
Family firm with an outsider CEO and having no family member as its director and/or top executive (indicator)	-0.031 (0.86)	-0.181 (0.33)	-0.113 (0.36)	0.466* (0.09)	- (0.99)	- (0.99)	0.089 (0.50)	0.096 (0.53)	-0.013 (0.90)	0.179 (0.23)	-0.072 (0.43)	-0.009 (0.93)
Control variables in Panel A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of observations	1,274	1,265	1,262	1,271	418	366	1,258	1,224	1,013	1,176	1,247	1,236
Pseudo R^2	0.173	0.205	0.184	0.126	0.223	0.275	0.142	0.081	0.134	0.075	0.151	0.091

Table 4 Likelihood of Undertaking Restructuring Activities According to Their Valuation Effects during the Crisis: Multinomial Logit Regressions

The table presents estimates of multinomial logit regressions in which the dependent variable is equal to zero if a firm does not engage in a restructuring activity during the 2007 to 2009 economic crisis, one if the firm undertakes a restructuring activity that results in a positive cumulative abnormal return from one day before to one day after the restructuring announcement (CAR (-1, 1)) estimated using a market model, and two if a firm undertakes a restructuring activity that results in a negative CAR (-1, 1). The sample consists of all non-regulated firms in ExecuComp during the crisis. Following Fahlenbrach and Stulz (2011) and Lins *et al.* (2013), we define the economic crisis as the period from July 1, 2007 to March 31, 2009. We obtain information on restructuring activities by searching *Factiva* and supplementing it with the SDC Platinum and Audit Analytics databases. We obtain information on forced CEO turnover from Peters and Wagner (2014) and Jenter and Kanaan (2015). *Positive (Negative) CAR family firm* is an indicator that takes the value of one if the family firm undertakes a restructuring activity during the crisis that results in a positive (negative) CAR (-1, 1). All control variables are measured as of the fiscal year-end immediately prior to the economic crisis. Table A.2 provides a detailed description of the variables. *P*-values are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Likelihood of Undertaking Restructuring Activities According to Positive and Negative CARs (-1, 1)

	Downsizing			Expansion				CEO turnover			Changing operating policy	Becoming a target firm
		Asset contraction	Employee changes		Unrelated acquisitions	Related acquisitions	Internal expansion		Forced turnover	Routine turnover		
	All			All				All				
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Firms engaging in restructuring with positive CARs versus those with no restructuring</i>												
Positive CAR family firm (indicator)	-0.083	-0.170	-0.271	-0.369*	-0.839*	-0.016	-0.396	-0.501*	-0.371	-0.418	-0.036	-0.225
	(0.66)	(0.41)	(0.24)	(0.05)	(0.08)	(0.94)	(0.13)	(0.07)	(0.34)	(0.26)	(0.91)	(0.29)
<i>Firms engaging in restructuring with negative CARs versus those with no restructuring</i>												
Negative CAR family firm (indicator)	-0.335**	-0.381*	-0.365*	-0.026	-0.284	-0.086	0.269	-0.518**	-0.814**	-0.084	-0.127	0.015
	(0.04)	(0.06)	(0.06)	(0.86)	(0.43)	(0.63)	(0.15)	(0.03)	(0.02)	(0.79)	(0.63)	(0.96)
Control variables in Table 3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of observations	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274
Pseudo R^2	0.145	0.184	0.168	0.102	0.265	0.128	0.164	0.143	0.091	0.170	0.105	0.126

Panel B: Likelihood of Undertaking Restructuring Activities According to Positive and Negative CARs (-1, 1): Family Member CEOs versus Outsider CEOs

Independent variables	Downsizing			Expansion				CEO turnover			Changing operating policy	Becoming a target firm
	All	Asset contraction	Employee changes	All	Unrelated acquisitions	Related acquisitions	Internal expansion	All	Forced turnover	Routine turnover		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		
<i>Firms engaging in restructuring with positive CARs versus those with no restructuring</i>												
Positive CAR family firm with a family member CEO (indicator)	-0.249 (0.30)	-0.330 (0.21)	-0.342 (0.26)	-0.443* (0.07)	-0.662 (0.34)	-0.209 (0.43)	-0.198 (0.52)	-0.622* (0.08)	-0.862 (0.14)	-0.485 (0.28)	-0.705 (0.17)	-0.191 (0.47)
Positive CAR family firm with an outsider CEO (indicator)	0.097 (0.69)	-0.008 (0.98)	-0.203 (0.48)	-0.284 (0.26)	-0.952 (0.11)	0.168 (0.51)	-0.687* (0.07)	-0.358 (0.35)	0.048 (0.92)	-0.334 (0.51)	0.311 (0.37)	-0.265 (0.35)
<i>Firms engaging in restructuring with negative CARs versus those with no restructuring</i>												
Negative CAR family firm with a family member CEO (indicator)	-0.646*** (0.00)	-0.873*** (0.00)	-0.486* (0.05)	-0.083 (0.66)	-0.208 (0.67)	0.020 (0.93)	0.111 (0.65)	-1.219*** (0.00)	-2.832*** (0.01)	-0.543 (0.20)	-0.160 (0.65)	-0.095 (0.80)
Negative CAR family firm with an outsider CEO (indicator)	-0.038 (0.86)	0.029 (0.91)	-0.258 (0.27)	0.039 (0.84)	-0.341 (0.44)	-0.189 (0.42)	0.410* (0.07)	0.016 (0.96)	-0.113 (0.77)	0.364 (0.34)	-0.095 (0.78)	0.115 (0.75)

Controls variables in Table 3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of observations	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274
Pseudo R^2	0.147	0.188	0.168	0.102	0.266	0.129	0.166	0.150	0.108	0.174	0.108	0.126

Panel C: Likelihood of Undertaking Restructuring Activities According to Positive and Negative CARs (-1, 1): Different Types of Family Member CEOs and Outsider CEOs

Independent variables	Downsizing			Expansion				CEO turnover			Changing operating policy	Becoming a target firm
	Asset contraction	Employee changes	All	Unrelated acquisitions	Related acquisitions	Internal expansion	All	Forced turnover	Routine turnover			
	All											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
<i>Firms engaging in restructuring with positive CARs versus those with no restructuring</i>												
Positive CAR family firm with a founder CEO (indicator)	-0.558*	-0.633*	-0.384	-0.207	-0.110	-0.330	-0.166	-0.793*	-1.218	-0.565	-0.981	-0.130
	(0.07)	(0.07)	(0.32)	(0.45)	(0.88)	(0.31)	(0.65)	(0.06)	(0.12)	(0.26)	(0.21)	(0.67)
Positive CAR family firm with a descendent CEO (indicator)	0.146	0.016	-0.351	-0.927**	-16.090	-0.010	-0.255	-0.285	-0.350	-0.304	-0.471	-0.335
	(0.66)	(0.96)	(0.41)	(0.02)	(0.99)	(0.98)	(0.59)	(0.58)	(0.66)	(0.65)	(0.47)	(0.44)
Positive CAR family firm with an outsider CEO, but having a family member as its director and/or top executive (indicator)	0.144	0.052	-0.130	-0.315	-0.847	0.204	-0.657*	-0.303	0.106	-0.284	0.394	-0.208
	(0.56)	(0.85)	(0.65)	(0.22)	(0.16)	(0.43)	(0.09)	(0.43)	(0.82)	(0.57)	(0.26)	(0.47)
Positive CAR family firm with an outsider CEO and having no family member as its director and/or top executive (indicator)	-0.467	-0.629	-17.455	-0.196	-17.041	-0.338	-15.303	-15.947	-13.638	-16.029	-11.778	-15.682
	(0.67)	(0.57)	(1.00)	(0.87)	(1.00)	(0.76)	(1.00)	(1.00)	(0.99)	(1.00)	(0.98)	(0.99)
<i>Firms engaging in restructuring with negative CARs versus those with no restructuring</i>												
Negative CAR family firm with a founder CEO (indicator)	-0.575**	-0.948***	-0.166	0.092	0.064	0.004	0.068	-0.962**	-14.313	-0.315	0.084	0.016
	(0.03)	(0.01)	(0.58)	(0.68)	(0.91)	(0.99)	(0.82)	(0.02)	(0.97)	(0.48)	(0.84)	(0.97)
Negative CAR family firm with a descendent CEO (indicator)	-0.706**	-0.760**	-0.952**	-0.366	-1.062	0.048	0.170	-1.952**	-1.884*	-1.592	-0.555	-0.263
	(0.03)	(0.05)	(0.01)	(0.18)	(0.32)	(0.89)	(0.62)	(0.01)	(0.07)	(0.14)	(0.32)	(0.66)
Negative CAR family firm with an outsider CEO, but having a family member as its director and/or top executive (indicator)	-0.065	0.082	-0.296	-0.039	-0.292	-0.221	0.347	0.072	-0.070	0.403	-0.110	-0.029
	(0.76)	(0.74)	(0.22)	(0.84)	(0.51)	(0.36)	(0.14)	(0.80)	(0.85)	(0.30)	(0.75)	(0.94)
Negative CAR family firm with an outsider CEO and having no family member as its director and/or top executive (indicator)	0.317	-0.619	0.094	0.963	-16.435	0.222	1.174*	-16.346	-13.942	-16.230	-0.016	1.391
	(0.65)	(0.48)	(0.91)	(0.19)	(1.00)	(0.77)	(0.09)	(1.00)	(0.99)	(1.00)	(0.99)	(0.13)
Controls variables in Table 3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of observations	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274	1,274
Pseudo R ²	0.149	0.190	0.171	0.104	0.272	0.130	0.167	0.154	0.113	0.178	0.112	0.129

Table 5 Cumulative Abnormal Returns (-1, 1) around Announcement Dates of Restructuring Activities during the Crisis

The table presents cumulative abnormal returns from one day before to one day after restructuring announcements (CARs (-1, 1)) made during the 2007 to 2009 economic crisis. The sample consists of 2,537 uncontaminated announcements of restructuring activities made by 1,463 non-regulated firms in ExecuComp. We focus on a firm's first announcement of each type of restructuring activity during the crisis. Following Fahlenbrach and Stulz (2011) and Lins *et al.* (2013), we define the economic crisis as the period from July 1, 2007 to March 31, 2009. We obtain information on restructuring activities by searching *Factiva* and supplementing it with the SDC Platinum and Audit Analytics databases. We obtain information on forced CEO turnover from Peters and Wagner (2014) and Jenter and Kanaan (2015). Daily abnormal returns are calculated using a market model with a 200-trading-day estimation period beginning 210 days before and ending 11 days before the restructuring announcement date, using the CRSP value-weighted return as a proxy for the market return. The mean is reported on top and the median is reported in parentheses. The number of restructuring events is reported in brackets. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	Full sample		Family firms: a		Non-family firms: b		Test of difference: (a - b)
Downsizing	-0.244	[641]	0.527	[216]	-0.639*	[425]	1.166*
	(-0.042)		(0.133)		(-0.171)		(0.304)
Asset contraction strategies	0.438	[410]	1.477***	[135]	-0.074	[275]	1.551**
	(0.211)		(1.005)**		(0.010)		(0.995)**
Employee changes	-0.804*	[375]	-0.720	[130]	-0.850	[245]	0.131
	(-0.505)*		(-0.537)		(-0.429)		(-0.108)
Expansion	0.144	[795]	0.226	[297]	0.095	[498]	0.131
	(0.042)		(-0.099)		(0.065)		(-0.164)
Unrelated acquisitions	0.439	[55]	-0.149	[20]	0.775	[35]	-0.924
	(0.382)		(-0.335)		(0.455)		(-0.791)
Related acquisitions	0.149	[280]	0.873	[105]	-0.291	[175]	1.164
	(-0.042)		(0.347)		(-0.113)		(0.460)
Internal expansion	-0.172	[221]	-0.839**	[88]	0.278	[133]	-1.118*
	(-0.488)		(-0.957)***		(0.059)		(-1.015)
CEO turnover	-0.977	[198]	-0.640	[65]	-1.143	[133]	0.503
	(-0.544)		(-0.076)		(-0.873)		(0.797)
Forced CEO turnover	-2.638**	[87]	-2.300	[23]	-2.759**	[64]	0.459
	(-1.283)*		(0.493)		(-1.560)*		(2.052)
Routine CEO turnover	-0.355	[117]	-0.642	[45]	-0.174	[72]	-0.468
	(-0.546)		(-0.193)		(-0.834)		(0.641)
Changing operating policy	-0.405	[129]	-0.101	[46]	-0.575	[83]	0.473
	(-0.226)		(-0.001)		(-0.395)		(0.394)
Becoming a target firm	7.937***	[250]	8.787***	[85]	7.484***	[165]	1.302
	(4.429)***		(4.586)***		(4.362)***		(0.224)

Table 6 OLS Regression of Cumulative Abnormal Returns (-1, 1) around Announcement Dates of Restructuring Activities during the Crisis

The table presents estimates of OLS regressions in which the dependent variable is cumulative abnormal returns from one day before to one day after restructuring announcements (CARs (-1, 1)) made during the 2007 to 2009 economic crisis. The sample consists of 2,537 uncontaminated announcements of restructuring activities made by 1,463 non-regulated firms in ExecuComp. We focus on a firm's first announcement of each type of restructuring activity during the crisis. Following Fahlenbrach and Stulz (2011) and Lins *et al.*, (2013), we define the economic crisis as the period from July 1, 2007 to March 31, 2009. We obtain information on restructuring activities by searching *Factiva* and supplementing it with the SDC Platinum and Audit Analytics databases. We obtain information on forced CEO turnover from Peters and Wagner (2014) and Jenter and Kanaan (2015). Daily abnormal returns are calculated using a market model with a 200-trading day estimation period beginning 210 days before and ending 11 days before the restructuring announcement date, using the CRSP value-weighted return as a proxy for the market return. Calendar quarter fixed effects are used to control for time trends. Table A.2 provides a detailed description of the variables. *P*-values reported in parentheses are based on standard errors adjusted for heteroscedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Effects of Family Firm Status on CARs (-1,1)

	Downsizing			Expansion				CEO turnover			Changing operating policy	Becoming a target firm
	All	Asset contraction	Employee changes	All	Unrelated acquisitions	Related acquisitions	Internal expansion	All	Forced turnover	Routine turnover		
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Family firm (indicator)	0.019*** (0.01)	0.022*** (0.01)	0.010 (0.30)	-0.005 (0.24)	-0.075** (0.04)	-0.001 (0.89)	-0.005 (0.30)	0.024 (0.15)	0.104*** (0.00)	0.028 (0.18)	-0.003 (0.85)	0.001 (0.95)
<i>Firm characteristics</i>												
Leverage	0.034 (0.29)	-0.002 (0.96)	0.052 (0.32)	0.009 (0.68)	0.033 (0.78)	-0.005 (0.91)	0.028 (0.24)	0.149** (0.02)	0.158 (0.11)	0.118 (0.14)	0.115 (0.22)	-0.164** (0.02)
Firm size	0.017 (0.24)	0.035** (0.05)	0.002 (0.92)	-0.017* (0.06)	-0.100 (0.17)	-0.005 (0.75)	-0.016 (0.19)	-0.068** (0.03)	-0.055 (0.42)	-0.041 (0.21)	-0.010 (0.73)	0.005 (0.91)
Tobin's <i>q</i>	-0.004 (0.49)	0.001 (0.88)	-0.013** (0.05)	0.001 (0.85)	-0.003 (0.92)	0.011* (0.08)	-0.001 (0.82)	0.003 (0.70)	-0.009 (0.42)	0.004 (0.75)	-0.003 (0.83)	-0.004 (0.77)
ROA	0.032 (0.59)	-0.024 (0.72)	0.171* (0.06)	-0.050 (0.25)	-0.461 (0.32)	-0.150** (0.05)	-0.031 (0.57)	0.219* (0.05)	-0.015 (0.95)	0.138 (0.21)	0.230 (0.23)	-0.218 (0.15)
R&D / sales	-0.007 (0.91)	0.034 (0.66)	0.064 (0.46)	0.024 (0.54)	-0.590** (0.03)	0.008 (0.91)	0.067 (0.17)	0.045 (0.74)	0.090 (0.62)	0.078 (0.60)	0.065 (0.60)	-0.028 (0.86)
Ln (Firm age)	0.000 (0.96)	0.003 (0.67)	0.003 (0.76)	-0.003 (0.45)	-0.052*** (0.00)	0.003 (0.74)	-0.004 (0.37)	-0.010 (0.45)	-0.042 (0.37)	0.003 (0.89)	0.027 (0.11)	-0.015 (0.37)
Diversification	-0.002 (0.68)	0.004 (0.42)	-0.004 (0.66)	-0.002 (0.61)	-0.008 (0.76)	0.005 (0.54)	-0.006* (0.09)	0.018* (0.05)	0.046** (0.04)	0.008 (0.49)	0.057*** (0.00)	-0.027* (0.08)
Stock return	0.014 (0.26)	0.024 (0.11)	-0.016 (0.50)	-0.016** (0.04)	-0.123** (0.01)	-0.048*** (0.01)	0.002 (0.85)	-0.032 (0.16)	0.029 (0.42)	-0.024 (0.36)	0.060 (0.12)	0.022 (0.45)
Cash flow volatility	0.157 (0.34)	0.095 (0.58)	0.498** (0.03)	-0.215* (0.05)	0.134 (0.85)	-0.067 (0.67)	-0.281* (0.06)	-0.366 (0.36)	-0.125 (0.80)	0.470 (0.39)	0.403 (0.40)	0.335 (0.48)
Whited-Wu index	0.255** (0.05)	0.348** (0.02)	0.121 (0.50)	-0.066 (0.37)	-0.634 (0.30)	-0.021 (0.89)	-0.075 (0.41)	-0.381 (0.18)	-0.198 (0.76)	-0.105 (0.71)	0.161 (0.58)	-0.348 (0.35)
<i>Corporate governance characteristics</i>												
Institutional blockholder ownership	-0.006 (0.83)	0.010 (0.77)	-0.021 (0.59)	-0.012 (0.47)	-0.121 (0.15)	-0.024 (0.47)	-0.020 (0.35)	-0.011 (0.81)	-0.137 (0.33)	-0.005 (0.92)	0.052 (0.55)	0.054 (0.48)
Ln (Board size)	0.016 (0.36)	-0.013 (0.51)	0.055** (0.04)	0.015 (0.14)	0.102** (0.05)	-0.001 (0.95)	0.014 (0.34)	0.016 (0.71)	-0.064 (0.29)	0.057 (0.21)	0.029 (0.59)	-0.007 (0.89)
Proportion of independent directors	-0.015 (0.68)	-0.055* (0.08)	0.031 (0.56)	-0.010 (0.49)	-0.066 (0.32)	-0.023 (0.49)	-0.012 (0.57)	0.178*** (0.01)	0.423*** (0.00)	0.120 (0.11)	-0.059 (0.38)	-0.022 (0.79)
<i>CEO characteristics</i>												
Scaled wealth-performance sensitivity	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001***	0.000***	0.000

	(0.78)	(0.86)	(0.18)	(0.18)	(0.51)	(0.94)	(0.34)	(0.41)	(0.32)	(0.00)	(0.01)	(0.96)
CEO-chair duality (indicator)	0.005	0.017**	-0.001	-0.000	0.000	-0.002	0.002	-0.015	0.010	-0.001	-0.014	0.014
	(0.50)	(0.04)	(0.90)	(0.92)	(0.99)	(0.82)	(0.71)	(0.34)	(0.78)	(0.97)	(0.44)	(0.54)
Ln (CEO age)	0.002	-0.067**	0.061	0.003	0.074	0.004	0.002	-0.006	0.156	0.040	0.083	0.013
	(0.94)	(0.03)	(0.17)	(0.84)	(0.65)	(0.91)	(0.94)	(0.92)	(0.19)	(0.63)	(0.33)	(0.84)
Constant	0.071	0.309**	-0.342	0.122	0.208	0.015	0.085	0.042	-0.495	-0.259	-0.354	-0.242
	(0.59)	(0.02)	(0.12)	(0.10)	(0.70)	(0.92)	(0.39)	(0.88)	(0.30)	(0.53)	(0.36)	(0.44)
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of observations	560	356	326	708	50	243	415	172	75	100	116	199
Adjusted R^2	0.035	0.055	0.029	0.008	0.356	-0.025	0.018	0.045	0.342	0.111	0.153	0.148

Panel B: Effects of Family Firm Status on CARs (-1, 1): Family Member CEOs versus Outsider CEOs

Independent variables	Downsizing			Expansion				CEO turnover			Changing operating policy	Becoming a target firm
	All	Asset contraction	Employee changes	All	Unrelated acquisitions	Related acquisitions	Internal expansion	All	Forced turnover	Routine turnover		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Family firm with a family member CEO (indicator)	0.017	0.030**	0.005	-0.004	-0.055***	-0.008	-0.004	0.044*	0.103*	0.049*	-0.026	0.002
	(0.13)	(0.01)	(0.75)	(0.42)	(0.01)	(0.49)	(0.62)	(0.05)	(0.08)	(0.08)	(0.35)	(0.95)
Family firm with an outsider CEO (indicator)	0.021**	0.015	0.014	-0.005	-0.114***	0.004	-0.006	0.008	0.105***	0.004	0.011	0.001
	(0.02)	(0.13)	(0.20)	(0.30)	(0.01)	(0.75)	(0.23)	(0.68)	(0.00)	(0.88)	(0.63)	(0.97)
Control variables in Panel A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of observations	560	356	326	708	50	243	415	172	75	100	116	199
Adjusted R^2	0.033	0.056	0.026	0.007	0.619	-0.027	0.015	0.052	0.317	0.130	0.153	0.142

Panel C: Effects of Family Firm Status on CARs (-1,1): Different Types of Family Member CEOs and Outsider CEOs

Independent variables	Downsizing			Expansion				CEO turnover			Changing operating policy	Becoming a target firm
	All	Asset contraction	Employee changes	All	Unrelated acquisitions	Related acquisitions	Internal expansion	All	Forced turnover	Routine turnover		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Family firm with a founder CEO (indicator)	0.008	0.032*	-0.006	-0.004	-0.055***	-0.002	-0.005	0.030	0.153	0.040	-0.025	0.020
	(0.58)	(0.05)	(0.76)	(0.50)	(0.01)	(0.87)	(0.55)	(0.28)	(0.12)	(0.17)	(0.47)	(0.48)
Family firm with a descendent CEO (indicator)	0.025*	0.028*	0.022	-0.005	-	-0.020	-0.001	0.085***	0.076	0.101***	-0.028	-0.051
	(0.08)	(0.08)	(0.25)	(0.59)	-	(0.25)	(0.95)	(0.00)	(0.39)	(0.01)	(0.45)	(0.12)
Family firm with an outsider CEO, but having a family member as its director and/or top executive (indicator)	0.021**	0.015	0.014	-0.006	-0.114***	-0.001	-0.005	0.008	0.110***	0.005	0.011	-0.004
	(0.02)	(0.14)	(0.20)	(0.26)	(0.01)	(0.91)	(0.35)	(0.69)	(0.00)	(0.84)	(0.66)	(0.90)
Family firm with an outsider CEO and having no family member as its director and/or top executive (indicator)	0.021	0.013	0.000	0.003	-	0.052***	-0.027*	-	-	-	-	0.049
	(0.54)	(0.79)	(0.99)	(0.84)	-	(0.00)	(0.09)	-	-	-	-	(0.52)
Control variables in Panel A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of observations	560	356	326	708	50	243	415	172	75	100	116	199
Adjusted R^2	0.031	0.049	0.023	0.004	0.619	-0.024	0.013	0.059	0.298	0.138	0.138	0.145

Table 7 OLS Regression of Cumulative Abnormal Returns (-1, 1) around Announcement Dates of Restructuring Activities during the Crisis: Subsample Analyses by Past Performance

The table presents estimates of OLS regressions in which the dependent variable is cumulative abnormal returns from one day before to one day after restructuring announcements (CARs (-1, 1)) made during the 2007 to 2009 economic crisis. The sample consists of 2,537 uncontaminated announcements of restructuring activities made by 1,463 non-regulated firms in ExecuComp. The sample is divided into two subgroups according to the sample median ROA as of the fiscal year-end immediately prior to the economic crisis. We focus on a firm's first announcement of each type of restructuring activity during the crisis. Following Fahlenbrach and Stulz (2011) and Lins et al., (2013), we define the economic crisis as the period from July 1, 2007 to March 31, 2009. We obtain information on restructuring activities by searching Factiva and supplementing it with the SDC Platinum and Audit Analytics databases. We obtain information on forced CEO turnover from Peters and Wagner (2014) and Jenter and Kanaan (2015). Daily abnormal returns are calculated using a market model with a 200-trading day estimation period beginning 210 days before and ending 11 days before the restructuring announcement date, using the CRSP value-weighted return as a proxy for the market return. Calendar quarter fixed effects are used to control for time trends. Table A.2 provides a detailed description of the variables. *P*-values reported in parentheses are based on standard errors adjusted for heteroscedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Effects of Family Firm Status on CARs (-1,1)

	Downsizing		Asset contraction		Employee changes	
	Firms with high ROA	Firms with low ROA	Firms with high ROA	Firms with low ROA	Firms with high ROA	Firms with low ROA
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
Family firm (indicator)	0.001 (0.95)	0.037*** (0.01)	0.015 (0.21)	0.036** (0.02)	-0.014 (0.30)	0.025 (0.19)
Control variables in Table 6	Y	Y	Y	Y	Y	Y
<i>P</i> -value (test for the equality of coefficients on <i>family firm</i>)	(0.01)**		(0.18)		(0.04)**	
No. of observations	275	285	166	190	159	167
Adjusted R^2	-0.023	0.016	-0.023	-0.017	0.061	-0.013

Panel B: Effects of Family Firm Status on CARs (-1, 1): Family Member CEOs versus Outsider CEOs

	Downsizing		Asset contraction		Employee changes	
	Firms with high ROA	Firms with low ROA	Firms with high ROA	Firms with low ROA	Firms with high ROA	Firms with low ROA
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
Family firm with a family member CEO (indicator)	0.002 (0.89)	0.030 (0.10)	0.021 (0.25)	0.044** (0.04)	-0.010 (0.70)	0.020 (0.43)
Family firm with an outsider CEO (indicator)	-0.000 (0.97)	0.043*** (0.00)	0.011 (0.45)	0.027 (0.15)	-0.016 (0.24)	0.031 (0.16)
Control variables in Table 6	Y	Y	Y	Y	Y	Y
<i>P</i> -value (test for the equality of coefficients on <i>family firm with a family member CEO</i>)	(0.18)		(0.32)		(0.31)	
<i>P</i> -value (test for the equality of coefficients on <i>family firm with an outsider CEO</i>)	(0.00)***		(0.43)		(0.03)**	
No. of observations	275	285	166	190	159	167
Adjusted R^2	-0.027	0.014	-0.031	-0.021	0.052	-0.020

Panel C: Effects of Family Firm Status on CARs (-1,1): Different Types of Family Member CEOs and Outsider CEOs

	Downsizing		Asset contraction		Employee changes	
	Firms with high ROA	Firms with low ROA	Firms with high ROA	Firms with low ROA	Firms with high ROA	Firms with low ROA
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
Family firm with a founder CEO (indicator)	-0.011 (0.59)	0.030 (0.29)	0.025 (0.22)	0.041 (0.20)	-0.034 (0.25)	0.027 (0.44)
Family firm with a descendent CEO (indicator)	0.019 (0.29)	0.034 (0.14)	0.017 (0.45)	0.052** (0.05)	0.051* (0.07)	0.012 (0.69)
Family firm with an outsider CEO, but having a family member as its director and/or top executive (indicator)	-0.002 (0.84)	0.048*** (0.00)	0.009 (0.57)	0.035* (0.06)	-0.015 (0.29)	0.032 (0.16)
Family firm with an outsider CEO and having no family member as its director and/or top executive (indicator)	0.020 (0.57)	-0.099*** (0.00)	0.040 (0.31)	-0.094*** (0.01)	-0.022 (0.55)	- -
Control variables in Table 6	Y	Y	Y	Y	Y	Y
<i>P</i> -value (test for the equality of coefficients on <i>family firm with a founder CEO</i>)	(0.18)		(0.62)		(0.10)*	
<i>P</i> -value (test for the equality of coefficients on <i>family firm with a descendent CEO</i>)	(0.59)		(0.21)		(0.24)	
<i>P</i> -value (test for the equality of coefficients on <i>family firm with an outsider CEO, but having a family member as its director and/or top executive</i>)	(0.00)***		(0.20)**		(0.03)**	
<i>P</i> -value (test for the equality of coefficients on <i>family firm with an outsider CEO and having no family member as its director and/or top executive</i>)	(0.01)***		(0.00)***		(0.45)	
No. of observations	275	285	166	190	159	167
Adjusted R^2	-0.028	0.018	-0.046	-0.019	0.077	-0.028

Table 8 Difference in Long-Term Performance over the Pre- and Post-crisis Periods between Downsizing Firms and Matched Non-downsizing Firms: Propensity Score Matching

The table presents results from OLS regressions in which the dependent variable is the industry-adjusted holding period return over the pre- and post-crisis periods (Panel A) and results from OLS regressions in which the dependent variable is the industry-adjusted ROA over the pre- and post-crisis periods (Panel B) for propensity-score matched samples of downsizing (treated) and non-downsizing (control) firms. Treated firms include only firms that undertake a downsizing but no other types of restructuring activities (e.g., acquisitions, internal expansions, CEO turnovers, becoming a target firm during the economic crisis). Following Fahlenbrach and Stulz (2011) and Lins *et al.* (2013), we define the economic crisis as the period from July 1, 2007 to March 31, 2009. We obtain information on restructuring activities by searching *Factiva* and supplementing it with the SDC Platinum and Audit Analytics databases. We obtain information on forced CEO turnover from Peters and Wagner (2014) and Jenter and Kanaan (2015). We match a treated family (non-family) firm with downsizing activity to a control family (non-family) firm that does not engage in downsizing using nearest-neighborhood matching without replacement. The variables used in the matching are firm size, leverage, Tobin's q , ROA, stock return, diversification, and industry indicators. In Panel A, the industry-adjusted holding period return is calculated by subtracting the value-weighted portfolio cumulating monthly returns of all firms in the same industry over the period indicated from a firm's monthly returns over the same period. In Panel B, industry-adjusted ROA is calculated by subtracting the median annual ROA of all firms in the same industry from a firm's annual ROA. In Panel A (B), Year_{*t-1*} and Year_{*t-2*} refer to one and two years (fiscal years) before July 1, 2007, and Year_{*t+1*} and Year_{*t+2*} refer to one and two years (fiscal years) after March 31, 2009, respectively. Table A.2 provides a detailed description of the variables. *P*-values reported in parentheses are based on standard errors adjusted for heteroskedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: OLS Regressions of Industry-adjusted Holding Period Returns over the Pre- and Post-crisis Periods

Independent variables	Industry-adjusted holding period returns			
	Family firms		Non-family firms	
	Year _{<i>t+1</i>} – Year _{<i>t-1</i>}	Year _{<i>t+1, t+2</i>} – Year _{<i>t-1, t-2</i>}	Year _{<i>t+1</i>} – Year _{<i>t-1</i>}	Year _{<i>t+1, t+2</i>} – Year _{<i>t-1, t-2</i>}
	(1)	(2)	(3)	(4)
Downsizing (indicator)	0.714* (0.08)	0.944** (0.05)	0.207 (0.51)	0.262 (0.51)
Control variables in Table 3	Y	Y	Y	Y
No. of observations	82	82	99	97
Adj. R^2	0.108	0.091	0.253	0.233

Panel B: OLS Regressions of Industry-adjusted ROA over the Pre- and Post-crisis Periods

Independent variables	Industry-adjusted ROA			
	Family firms		Non-family firms	
	Year _{<i>t+1</i>} – Year _{<i>t-1</i>}	Year _{<i>t+1, t+2</i>} – Year _{<i>t-1, t-2</i>}	Year _{<i>t+1</i>} – Year _{<i>t-1</i>}	Year _{<i>t+1, t+2</i>} – Year _{<i>t-1, t-2</i>}
	(1)	(2)	(3)	(4)
Downsizing (indicator)	0.037* (0.09)	0.046** (0.03)	-0.052* (0.07)	-0.029 (0.27)
Control variables in Table 3	Y	Y	Y	Y
No. of observations	82	80	98	94
Adj. R^2	0.555	0.535	0.715	0.755

Appendix Table A.1 Likelihood of Undertaking Restructuring Activities during the Crisis: Propensity Score Matching

The table presents estimates of logit regressions in which the dependent variable is an indicator that takes the value of one if a firm undertakes a particular type of restructuring during the crisis, and zero otherwise. The sample consists of propensity-score matched samples of 532 non-regulated family firms (treated firms) and 532 non-regulated non-family firms (control firms) in ExecuComp during the 2007 to 2009 economic crisis. Following Fahlenbrach and Stulz (2011) and Lins *et al.* (2013), we define the economic crisis as the period from July 1, 2007 to March 31, 2009. We obtain information on restructuring activities by searching *Factiva* and supplementing it with the SDC Platinum and Audit Analytics databases. We obtain information on forced CEO turnover from Peters and Wagner (2014) and Jenter and Kanaan (2015). We match a family firm with a non-family firm using nearest-neighborhood matching without replacement. The variables used in the matching are firm size, leverage, Tobin's q , ROA, stock return, diversification, and industry indicators. All control variables are measured as of the fiscal year-end immediately prior to the economic crisis. Table A.2 provides a detailed description of the variables. P -values reported in parentheses are based on standard errors adjusted for heteroscedasticity. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Family Firm Status and Likelihood of Undertaking Restructuring Activities

	Downsizing			Expansion				CEO turnover			Changing operating policy	Becoming a target firm
	All	Asset contraction	Employee changes	All	Unrelated acquisitions	Related acquisitions	Internal expansion	All	Forced turnover	Routine turnover		
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Family firm (indicator)	-0.066*	-0.070**	-0.072**	-0.020	-0.107**	0.020	0.004	-0.076***	-0.039**	-0.035*	-0.013	-0.022
	(0.09)	(0.03)	(0.03)	(0.58)	(0.05)	(0.57)	(0.89)	(0.00)	(0.03)	(0.08)	(0.50)	(0.39)
Control variables in Table 3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of observations	970	969	953	971	314	284	954	938	792	900	948	929
Pseudo R^2	0.174	0.202	0.189	0.130	0.246	0.311	0.145	0.070	0.089	0.099	0.171	0.094

Panel B: Family Firm Status and Likelihood of Undertaking Restructuring Activities: Family Member CEOs versus Outsider CEOs

	Downsizing			Expansion				CEO turnover			Changing operating policy	Becoming a target firm
	All	Asset contraction	Employee changes	All	Unrelated acquisitions	Related acquisitions	Internal expansion	All	Forced turnover	Routine turnover		
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Family firm with a family member CEO (indicator)	-0.125*** (0.01)	-0.133*** (0.00)	-0.116*** (0.01)	-0.040 (0.37)	-0.059 (0.36)	0.001 (0.98)	-0.002 (0.96)	-0.133*** (0.00)	-0.107*** (0.00)	-0.051** (0.04)	-0.026 (0.28)	-0.020 (0.54)
Family firm with an outsider CEO (indicator)	-0.005 (0.92)	-0.011 (0.80)	-0.033 (0.42)	0.002 (0.97)	-0.140** (0.02)	0.034 (0.39)	0.010 (0.79)	-0.020 (0.51)	0.006 (0.73)	-0.017 (0.48)	-0.002 (0.91)	-0.024 (0.44)
Control variables in Table 3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of observations	970	969	953	971	314	284	954	938	792	900	948	929
Pseudo R^2	0.177	0.207	0.191	0.130	0.250	0.313	0.145	0.079	0.123	0.101	0.172	0.094

Panel C: Family Firm Status and Likelihood of Undertaking Restructuring Activities: Different Types of Family Member CEOs and Outsider CEOs

	Downsizing			Expansion				CEO turnover			Changing operating policy	Becoming a target firm
	Asset contraction	Employee changes		Unrelated acquisitions	Related acquisitions	Internal expansion		Forced turnover	Routine turnover			
	All			All				All				
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Family firm with a founder CEO (indicator)	-0.153*** (0.01)	-0.163*** (0.00)	-0.099* (0.06)	0.003 (0.95)	-0.072 (0.28)	-0.021 (0.63)	-0.019 (0.67)	-0.142*** (0.00)	-0.134*** (0.00)	-0.051* (0.06)	-0.022 (0.49)	-0.018 (0.63)
Family firm with a descendent CEO (indicator)	-0.075 (0.31)	-0.093 (0.14)	-0.143** (0.03)	-0.116* (0.08)	-0.036 (0.71)	0.054 (0.44)	0.026 (0.62)	-0.112** (0.04)	-0.063* (0.06)	-0.049 (0.26)	-0.030 (0.39)	-0.025 (0.61)
Family firm with an outsider CEO, but having a family member as its director and/or top executive (indicator)	0.001 (0.98)	0.005 (0.90)	-0.029 (0.50)	-0.026 (0.58)	-0.118* (0.05)	0.021 (0.63)	0.007 (0.86)	-0.020 (0.52)	0.006 (0.70)	-0.018 (0.46)	0.002 (0.92)	-0.026 (0.41)
Family firm with an outsider CEO and having no family member as its director and/or top executive (indicator)	-0.054 (0.79)	-0.196 (0.29)	-0.109 (0.40)	0.476* (0.09)	- -	- -	0.071 (0.57)	-0.016 (0.89)	-0.004 (0.95)	-0.004 (0.96)	-0.082 (0.35)	0.004 (0.97)
Control variables in Table 3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of observations	970	969	953	971	307	277	954	938	792	900	948	929
Pseudo R ²	0.178	0.209	0.192	0.137	0.250	0.319	0.145	0.080	0.127	0.101	0.173	0.094

Appendix Table A.2 Variable Definitions

This table provides a detailed description of all the variables used in the tables.

Variable	Definition
<i>Firm Characteristics</i>	
Cash flow volatility	Standard deviation of quarterly operating cash flows over the previous ten years scaled by total assets.
CEO turnover during the crisis	One if the firm experiences a CEO turnover event during the crisis, and zero otherwise.
Diversification	Logarithm of the number of segments the firm operates in.
Family firm (indicator)	One if a firm satisfies one of the following criteria: 1) founding family members, either individually or as a group, have equity ownership more than 5% in the firm, 2) a firm's founder or a member of his family by blood or marriage is an officer or a director (Anderson and Reeb (2003), Villalonga and Amit (2006)).
Family firm with a descendent CEO (indicator)	One for family firms whose CEO is a founding family member other than the founder, and zero otherwise.
Family firm with a family CEO (indicator)	One for family firms whose CEO is a founding family member, and zero otherwise.
Family firm with a founder CEO (indicator)	One for family firms whose CEO is the founder, and zero otherwise.
Family firm with an outsider CEO (indicator)	One for family firms whose CEO is unrelated to the founding family by blood or marriage, and zero otherwise.
Family firm with an outsider CEO, but having a family member as its director and/or top executive (indicator)	One for family firms whose CEO is unrelated to the founding family by blood or marriage but whose director or top executive is a family member, and zero otherwise.
Family firm with an outsider CEO and having no family member as its director and/or top executive (indicator)	One for family firms whose CEO is unrelated to the founding family by blood or marriage and whose director or top executive is not a family member, and zero otherwise.
Firm size	Logarithm of book value of total assets.
Leverage	Book value of debt (current liabilities plus long-term debt) divided by market value of assets (book value of assets minus book value of equity plus market value of equity).
Ln (firm age)	Logarithm of Max (years in CRSP, years in Compustat).
R&D / sales	Ratio of Max (0, R&D expenses) to sales.
ROA	Ratio of operating income after depreciation to total assets.
Stock return	Compounded monthly returns over the year.
Tobin's q	Market value of assets (total book value of assets minus book value of equity plus market value of equity) over book value of assets.
Whited-Wu index	Measure of financial constraints index, computed as: $WW = -0.091 \times CF - 0.062 \times DIVPOS + 0.021 \times TLTD - 0.044 \times LNTA + 0.102 \times ISG - 0.035 \times SG$ (Whited and Wu (2006)).
<i>Corporate governance characteristics</i>	
Institutional block ownership	Number of shares held by institutional shareholders that own more than 5% of a firm's equity divided by total number of shares outstanding.
Ln (board size)	Logarithm of the number of directors on the board.
Proportion of independent directors	Ratio of the number of independent directors to the total number of directors on the board.
<i>CEO characteristics</i>	
CEO-chair duality (indicator)	One if the CEO is Chairman of the Board, and zero otherwise.
Ln (CEO age)	Logarithm of the age of the CEO in years.
Scaled wealth-performance sensitivity	Dollar change in CEO wealth for a one percentage point change in firm value, scaled by the CEO's annual pay (Edmans, Gabaix, and Landier (2009)).
<i>Restructuring characteristics</i>	
Downsizing (indicator)	One if the firm undertakes any downsizing activity during the crisis, and zero otherwise.

Essay three: Effects of Customer Industry Competition on Suppliers: Evidence from Product Market Competition Shocks

Abstract

Using major industry-level tariff reductions as the measure of customer industry competition, I examine the effect of such competition on customer-supplier trading relationships. I find that customers facing stiff competition strengthen their relationships with existing suppliers by increasing product purchases from the suppliers and maintaining post-tariff longer relationship duration, allowing the suppliers to improve their post-tariff performance. These results are concentrated in suppliers that have stronger pre-tariff relationship ties and those that are financially constrained. However, the increased purchases from financially constrained suppliers affect customer performance negatively in the post-tariff period. Overall, these results suggest that increased customer competition has both intended and unintended consequences for their trading relationships and their future performance.

Keywords: Product market competition, Import competition, Customer-supplier relationship, Relationship duration, Firm performance, Financial constraint.

JEL Classification: G30, L13, L14, L22

I. Introduction

How does product market competition affect a firm's relationship with its suppliers? Compared to suppliers, customers tend to have greater product market power, faster growth opportunities, and better access to capital markets, thus skewing the relative bargaining power of the trading partners (Helper (1990)). Therefore, product market competition in customer industries can have a significant impact on suppliers, in particular on their survival and viability.

Suppliers can affect customers' production efficiency and operating costs through various ways such as investing in relationship specific assets, keeping customers' firm-specific information confidential from the rivals, maintaining lower distress or bankruptcy risk to reduce production disruption uncertainty, having innovation and product development expertise to help increase customer product portfolio, and providing trade credit to help modify customer capacity or output levels. These investments and efforts by suppliers can influence the overall competitiveness of the customer in the product market and their effects on customers' production efficiency and value are expected to be pronounced when the customers face stiff product market competition.

When firms face increasing threat of new entrants in the product market, they are expected to take strategic actions in order to deter entry and effectively deal with increased competition, for example, making excess investments or increasing output levels to discourage rivals.⁵² However, in studying firms' responses to competition, past studies focus only on examining strategic responses within the boundaries of the firm alone, while ignoring how firms interact with their stakeholders and the possibility of leveraging such relationships to compete better in the product market. This study helps bridge the gap by examining the effect of increased product market threat on relationship ties with an important stakeholder, namely the suppliers who are vital to the production operation of a firm.

⁵² There are a variety of strategic responses that firms can adopt in response to product market competition. For example, to deter new entrants, firms may choose higher leverage and commit to aggressive output levels (Brander and Lewis (1986)), maintain excess capacity and increase investments (Spence (1977), Dixit (1980), Khanna and Tice (2000), Akdoğan and MacKay (2008)), and increase managerial effort (Schmidt (1997)). Firms can also try to balance the trade-off between revealing and not revealing information to rivals either by choosing to raise capital from investors or use internally generated funds (Gertner, Gibbons, and Scharfstein (1988)).

Specifically, I examine how an increase in competition in customer industry affects relationship ties with the supplier. When firms face an increase in competition, they may need to improve efficiency, seek relationship specific investments, protect trade secrets, and excel in new product development, and thus they have strong incentives to develop closer ties with their existing suppliers. These incentives are expected to be greater when customers have maintained close pre-existing ties with suppliers. However, given the fixed number of suppliers, customer industry competition increases the demand for healthy, financially unconstrained suppliers by incumbent and new rival customers, providing these suppliers with more opportunities to diversify their customer base and engage with more customers. Thus, customers facing high competition may be forced to continue the trading relationships with financially constrained suppliers. This unintended effect of customer competition can adversely affect customers' production efficiencies and their future performance.⁵³

Managing supplier relationships can be a crucial part of customer strategy, particularly when customers experience an exogenous increase in competition in their industries, since the suppliers can play an important role in lowering operating costs (Kalwani and Narayandas (1995)), making relationship specific investments (Titman (1984), Kale and Shahrur (2007), Banerjee, Dasgupta, and Kim (2008)), involving in new product development (Clark and Fujimoto (1991), Walter (2003)), and protecting trade secrets (Chen (2003), Anand and Goyal (2009)). In particular, when working closely with their customers, suppliers are exposed to their customer's internal operations and processes.⁵⁴ This exposure makes suppliers aware of their customer's trade secrets and other important proprietary information. Thus, losing the suppliers to rival customers increases the potential for the leakage of this valuable private information. Although non-disclosure and non-competition agreements can somewhat mitigate this risk, it would be difficult to safeguard all trade secrets. Therefore, maintaining durable long-term relationship with the suppliers can be an important issue in a highly competitive product market, where rivals are aggressively trying to learn about their peers through their suppliers.

⁵³ Poor choice of suppliers by customers can affect customer performance and firm value. Since a typical manufacturing firm spends about 65% of its revenue on purchased materials, any disruptions to the trading relationship can have adverse impact on its profitability (Leenders et al. (2001)).

⁵⁴ In some cases, suppliers have in-house office space for their representatives at their customer's location (Budden, Jones, and Budden (1996)), which allows suppliers to easily access to customers' trade secrets.

If suppliers can help lower customer's operating costs, then why increasing engagement with suppliers will not be the dominant strategy under all levels of competition is because at lower levels of competition, customers can achieve efficiency by engaging in supplier shopping i.e., seeking multiple bids and pitting one supplier against another in order to get the lowest price for each component without having to worry about information leakage along the supply chain. However, under higher levels of competition, seeking multiple bids from various suppliers can leak vital information about customer operations to rivals, thereby making increasing engagement with suppliers a preferable strategy. These arguments suggest that an exogenous increase in competition in the customer industry incentivizes the customer to work closely with its suppliers in an attempt to improve efficiency and to protect trade secrets.⁵⁵

The effects of customer industry competition on their trading relationships with the suppliers can differ depending on supplier characteristics. First of all, customers facing stiff competition are likely to prefer to maintain continued relationships with suppliers that have strong prior-relationship ties. There are several reasons for this preference. First, major supplier-customer relationships involve high levels of asset specificity, which makes it costly for suppliers and customers to switch trading partners (Williamson (1985, 1991)). Second, the suppliers with strong prior trading relationships are more likely to be aware of the customer's trade secrets. Therefore, for adequate protection of such trade secrets, the customer is incentivized to engage more with these customers. Third, given that the number of suppliers is limited and fixed, there will be an increase in demand for the suppliers when an exogenous shock increases customer competition. Therefore, it bodes well for the customers to maintain and improve their relationships ties with their existing important suppliers, so that these suppliers have less motivation to reach out to rival customers. Finally, to the extent that suppliers with strong prior ties have made higher levels of relationship specific investments, the customers may be better able to leverage on such investments by maintaining the relationships with such suppliers, particularly when competition increases. All these arguments suggest that to better compete in a

⁵⁵ The hypothesis is also consistent with the argument that increases in customer industry competition results in increase of supplier bargaining power. However, the channel through which supplier bargaining power improves is still related to the increased necessity to protect the customer's trade secrets.

crowded product market, customers have strong incentives to maintain and improve their ties with existing suppliers with whom they have strong prior trading relationships.

I also expect that financial constraints of suppliers affect customers' incentives to maintain continued relationships with suppliers. When competition in the customer industry increases, the demand for purchasing from suppliers also increases as the supply of firms that can provide raw materials, intermediary goods, and services to the customers is largely fixed and limited. This increase in demand for suppliers, however, will not be uniform across all the suppliers. Customers prefer to transact with suppliers that are stable and financially unconstrained since a loss of trading relationships with the suppliers can strongly impact customers' operating and investment policies (Titman (1984)). Such preference results in financially unconstrained suppliers to be more sought after by customers, as these suppliers have both the ability and means to follow conservative financial and investment policies and also can make new relationship specific investments for customer businesses. Thus, given the fixed number of suppliers in the industry, customer industry competition increases the demand for financially unconstrained suppliers. However, suppliers have preference to transact with many customers as it reduces their business risk by diversifying their customer base and reducing reliance on any single customer. This opportunity to do businesses with more customers is likely to be greater when suppliers are less financially constrained since these suppliers are more likely to be able to establish new relationships with rival customers, which puts large pressure on customers' existing trading relationships. Therefore, in order to make up the shortfall in purchases from financially unconstrained suppliers that sell to more customers, existing customers may be forced into purchasing more from financially constrained suppliers. This unintended consequence of customer industry competition can adversely affect future customer performance.

To test these predictions, I use the Business Information File of Compustat over the period 1990-2005 and manually identify principal customers that are defined as those who account for 10% or more of the supplier's total sales.⁵⁶ I restrict my analysis to the trading relationship between a supplier and its largest customer, as to minimize omitted variable bias, I use the matching customer-supplier

⁵⁶ I begin my sample in 1990 to coincide with the Business Information File of Compustat and end the sample in 2005 to coincide with tariff data availability.

relationship for the analysis of the effect of customer industry competition on its major suppliers. This approach also allows us to control for the customer characteristic and its relationship with the suppliers in the analysis. I measure product market competition using the industry level tariffs (at the four-digit Standard Industrial Classification (SIC) code) that are calculated as duties collected at U.S. Custom divided by the Free-On-Board custom value of imports.⁵⁷ Since industry level tariffs are relevant only for manufacturing industries (SIC codes 2000 – 3999), I restrict my analysis only to these industries.

Using industry level tariffs to examine the effect of customer industry competition on customer-supplier trading relationships has an important advantage in mitigating the potential endogeneity concern of customers' product market competition since unexpected changes in industry import tariffs can serve as a quasi-natural experiment.⁵⁸ Specifically, I define a competition shock as a decrease in tariff that is greater than three times the average tariff decrease in the customer industry (Frésard (2010), Valta (2012)). This definition allows us to capture a significant import tariff reduction in the customer industry that can affect customer-supplier relationships. I then examine how this competition shock impacts suppliers and their relationship with customers experiencing a competition shock in the post-tariff reduction period. I use a customer-supplier relationships that include customers whose industries experience a significant import tariff reduction and their matched sample that include customers whose industries do not experience any significant import tariff reduction.

Consistent with my predictions, I find that compared with the customers in the matched sample, customers in the treated sample who face significant tariff reductions develop stronger relationship ties with their suppliers as evidenced by both longer relationship duration and increase in sales to the customers following the competition shock. The increase in sales is observed both in absolute terms

⁵⁷ Global flow of trade across various industries has been dramatically affected by the increase in trade liberalization by the developed economies, through country and region specific treaties. Import tariff reductions lower the entry cost for local product markets, thereby allowing foreign rivals to compete domestically (Frésard and Valta (2015)). Therefore, tariff reduction leads to an exogenous increase in competition from foreign competitors, by attracting both new foreign rivals to export following the tariff reduction and existing foreign exporters to increase shipments (Bernard, Jensen, and Schott (2006), Valta (2012)).

⁵⁸ For studies that employ tariff reduction events as their empirical strategy to address endogeneity concerns, refer to Feenstra (1996), Feenstra, Romalis, and Schott (2002), Frésard (2010), Valta (2012), Dasgupta, Li, and Wang (2014), and Frésard and Valta (2015).

and the fraction of the supplier's total sales, suggesting that customer industry competition increase not only the value of supplier shipments, but also the relative importance of the supplier to the customer. I also find that the operational profitability of the suppliers marginally increase in the post-tariff reduction period, suggesting that customer industry competition also weakly benefits the suppliers.

Next, to examine how customer industry competition affects suppliers with strong and weak prior-relationship ties differently, I divide the suppliers into two subsamples according to their pre-shock trading relationships with the customers. I use an indicator for durable goods supplier industries and an indicator for high research and development (R&D) intensity that takes the value of one if a firm's R&D intensity (research and development expenses scaled by sales) is greater than the sample median R&D intensity, and zero otherwise, respectively, to divide the sample into two subgroups. Suppliers that operate in durable industries (SIC codes between 3400 and 3900) tend to be involved in stronger bilateral relationships with the customers as their post-sale product support is important for customer businesses (Titman (1984), Titman and Wessels (1988)). Suppliers that spend more on R&D expenses are expected to have stronger ties with customers as high R&D intensity may indicate their large relationship specific investment and involvement in the new product development for their customers (Bowen, DuCharme, and Shores (1995), Kale and Shahrur (2007), Raman and Shahrur (2008)). I find that customers facing stiff competition engage more with suppliers who have ex-ante strong relationship ties, suggesting that customers tighten their relationship with such suppliers to gain strategic advantage and protect trade secrets in the crowded product market.

I then examine how customer industry competition affects suppliers that are financially constrained and those that are financially unconstrained differently. I divide the sample suppliers according to their median Hadlock and Pierce (2010) financial constraints index, whether the supplier has a credit rating (Almeida, Campello, and Weisbach (2004)), and whether the supplier pays a dividend (Fazzari et al. (1988)), respectively. I find that financially unconstrained suppliers whose customers face tariff reduction are more likely to establish new customer relationships and increase the number of customers in the post-tariff reduction period, suggesting that these suppliers attract

more customers post-shock as valuable trading partners. More important, I find that customers facing stiff competition also purchase more raw materials and intermediate products from financially constrained suppliers, suggesting that an increase in customer industry competition forces the customer to transact with even weaker suppliers. I further find that customers that purchase more from financially constrained suppliers in the post-tariff reduction period experience a significant decrease in their profitability and sales to assets ratio. Thus, this unintended consequence of customer competition has a negative effect on customer future performance. However, I find no effect on customer performance when customers increase their purchases from financially unconstrained suppliers in the post-tariff reduction period.

Although using a tariff reduction as an exogenous shock can alleviate some endogeneity concerns in examining the effect of customer competition, it is possible that some unobservable omitted variables that are correlated with competition drive the results. For example, if labor costs are high, there could be a lack of political will to lower tariffs due to the fear that it would lead to loss of high paying jobs and low wages. On the other hand, if labor costs are low, it will be easier for politicians to lower tariffs because there may be less resistance from workforce in pursuing limited trade liberalization. At the same time, customers can also increase their purchasing of labor intensive goods from suppliers, who are able to offer attractive prices due to lower labor costs. This gives rise to a spurious correlation between import competition and supplier relationships. To alleviate this concern, I use instrumental variables to capture the exogenous variation in import competition. First, following Bertrand (2004) and Xu (2012), I use import penetration to measure the level of foreign competition in the customer industry and use it to test customers' relationship ties with the suppliers, where import penetration is computed as the ratio of imports to the sum of total shipments and net traded goods in the customer's four-digit SIC industry. Second, I use two instrumental variables for import competition, namely, the tariff level in the industry and foreign exchange rates (Revenga (1992), Bertrand (2004), Xu (2012)). Both the relevance and exclusion criteria for these instruments are discussed later in Section IV.A.

I find that the fraction of a supplier's sales to the largest customer to its total sales is higher when customers operate in industries with high import penetration levels, which is robust to using instrumental variables.

This paper contributes to the literature at least in two important ways. First, this study contributes to the literature on product market relationships by extending the strategic ramifications of product market competition to stakeholders beyond the boundaries of the firm. Prior studies focus their analyses only on the effect of competition on firm-level outcomes and find that competition shocks lead to increases in firms' cost of debt (Valta (2012)), decreases in investment (Frésard and Valta (2015)), increases in M&A activity (Breinlich (2008), Aktas and Dupire-Declerck (2015)), increases in incentive pay and forced CEO turnovers (Cuñat and Guadalupe (2009), Dasgupta, Li, and Wang (2014)), increases in market share for ex-ante cash-rich firms (Frésard (2010)), decreases in profitability (Xu (2012)), decreases in hierarchy within the firm (Guadalupe and Wulf (2009)), decreases in financial misreporting (Balakrishnan and Cohen (2013)), increases in CSR activities ((Flammer (2015))), and changes in incentives to innovate (Im, Park, and Shon (2015))). This paper adds to these studies by extending our understanding of the wide ranging implications of competition on firm interactions in the product market. Second, this study contributes to the literature on customer-supplier relationships. Fee and Thomas (2004) and Bhattacharyya and Nain (2011) show that horizontal mergers, which decrease industry competition, affect suppliers negatively due to increased buying power of the customers. My results not only complement their findings, but also extend the explanation for why horizontal mergers can have a negative effect on suppliers: to the extent that horizontal mergers reduce competition, they may lower the strategic importance of supplier relationships in the customer product market and thus weaken relationship ties.

The paper proceeds as follows. Section II describes the sample of customer-supplier relationships and the measures of tariff reductions in customer industry, and provides summary statistics for key variables. Section III investigates the effects of tariff reductions on trading relationships and the profitability of suppliers and customers in the post-tariff reduction period. I also examine how these effects vary depending on the strength of past customer-supplier relationship ties and supplier

financial constraints. Section IV examines the effect of competition on customer-supplier relationship using import penetration index in the customer industry. Section V summarizes and concludes the paper.

II. Data and Methodology

A. Import Tariff Data and Identifying Significant Tariff Reductions

I compute import tariff rates at the four-digit SIC code level using product level import data compiled by Feenstra (1996), Feenstra, Romalis, and Schott (2002), and Schott (2010).⁵⁹ The tariff data span the period 1974-2005 covering 504 manufacturing industries. The ad-valorem tariff rate is computed at the four-digit SIC industry-year level by dividing the duties collected by the U.S. custom with the Free-on-Board value of imports. I merge the tariff rate data with firm-level Compustat data, having 108 manufacturing industries. Following Frésard (2010), I characterize tariff reductions in terms of the deviations in the yearly changes in tariffs from their mean level and consider a tariff reduction event being taken place in a specific industry-year when a negative change in yearly tariff rate is three times larger than the average reduction in the industry over the sample period. This consideration makes sure that tariff reduction events I use capture a significant, meaningful increase in foreign competition and thus represent a sizable variation in barriers to trade. To further make sure that these large tariff reductions truly reflect non-transitory and significant changes in competitive environments, tariff reductions that are followed by equivalently large increases in tariffs over the subsequent two years and instances where tariff pre-reduction are below 1% are excluded. These procedures yield a total of 108 tariff reduction events that occur in 57 unique 4-digit SIC industries as shown in Appendix II.

Figure 1 shows the distribution of the sample tariff reduction events. The maximum number of tariff reductions happens in 1995 during which 20 industries undergo significant tariff reductions. In

⁵⁹ U.S. authorities code imported products are coded based on the Harmonized System (HS) where each product is assigned a ten-digit HS code. Feenstra (1996) and Schott (2010) develop concordance tables that map each HS product code into four-digit SIC codes.

contrast, there is no identified tariff reduction event in 2002. The distribution is more sparse in the second half of the sample period than in the first half of the sample period.

B. Identifying Customer-Supplier Relationships

I use the Business Segment File of Compustat to identify customer-supplier relationships involving customers from the manufacturing industries (primary SIC codes between 2000 and 3990). The Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 14 (SFAS No. 14 - "Financial Reporting for Segments of Business Enterprise") mandates a firm to disclose the sales to its customers if the revenue generated from them exceeds 10% of the firm's total revenue or if the firm considers the sale important to its business.⁶⁰ Following Fee and Thomas (2004) and Banerjee, Dasgupta, and Kim (2008), the customer names in the Business Segment File are matched with the historical names file in the CRSP/Compustat merged data file to identify public customers.⁶¹ The final sample consists of 18,941 pair-year observations of customer-supplier relationships. For the tests that focus on only the largest customer of each supplier, the sample consists of 10,468 pair-year observations.

C. Methodology

I do not use conventional competition measures such as the Herfindahl index and the concentration ratio since these measures are subject to endogeneity. For example, a firm's decision to vertically integrate with an upstream supplier through an acquisition can affect both its market share in the product market, leading to higher Herfindahl index, and the acquired supplier's relationships with other customers. Using the changes in import tariffs as a quasi-natural experiment for industry

⁶⁰ In 1997, SFAS 131 superseded SFAS 14, which mandates firms to report sales to significant customers, but no longer requires firms to reveal their identity. However, Securities and Exchange Commission (SEC) Regulation S-K still requires a publicly traded firm to disclose the identity of its customers if they account for 10% or more of its sales and if their loss have a material adverse impact on the firm (Ellis, Fee, and Thomas (2012), Banerjee et al. (2014)).

⁶¹ If the matching cannot be done, we use SEC filings to help determine a customer's true identity. Information concerning large customers is typically disclosed in the Management Discussion and Analysis section of the 10-K, as well as in the business description and the risk sections of the prospectus. We also use Lexis/Nexis Academic Universe, Factiva, and company websites to further ascertain the customer identity. If the customer name refers to a public firm's subsidiary, then the parent firm in CRSP/Compustat is used as the matched firm.

competition can overcome this concern since the change in import tariffs are unlikely to be in response to individual firm choices such as acquiring suppliers (Frésard (2010), Valta (2012), Dasgupta, Li, and Wang (2014), Frésard and Valta (2015)). After identifying significant tariff reduction events, as I discuss below in detail, I then construct a propensity-score matched sample of customer-supplier relationships in which the customer that faces a significant tariff reduction is matched to the customer that does not face such a reduction.

To examine the effect of customer industry competition on customer-supplier relationships and suppliers, I estimate the following regression specifications:

$$h(t)_{i,j} = h_0(t)_{i,j} \exp(\alpha + \beta \text{Tariff Reduction}_{i,t} + \gamma X_{i,j,t-1} + \rho Y_{i,t-1} + \sigma Z_{j,t-1} + \epsilon_{i,j,t}), \quad (1)$$

$$\Delta R_{i,j} = \beta \text{Tariff Reduction}_{i,t} + \gamma X_{i,j,t-1} + \rho Y_{i,t-1} + \sigma Z_{j,t-1} + \epsilon_{i,j,t}, \quad (2)$$

Eq. (1) is a Cox Proportional hazard model in which the dependent variable is the observed future relationship duration of the customer i – supplier j pair. In other words, $h(t)_{i,j}$ is the customer–supplier pair’s hazard (probability) at time t that the relationship will be terminated within a certain time interval, given that the relationship has survived until the beginning of the interval. $h_0(t)_{i,j}$ is the baseline hazard function in the absence of any explanatory variable. I control for relationship-specific characteristics (X), customer characteristics (Y), and supplier characteristics (Z).

In Eq. (2), $\Delta R_{i,j}$ is the change in supplier sales and profitability from one year before to one year (two years) after the tariff reduction, as measured by the change in the fraction of supplier sales to its total sales to the customer (change in the logarithm of supplier sales to the customer) and the change in a supplier’s EBIT scaled by its total assets in year -1, respectively.

In both regressions, the key independent variable of interest is $\text{Tariff Reduction}_{i,t}$ that takes the value of one for if the industry of customer i faces a significant tariff reduction in year t , and zero otherwise, where a significant tariff reduction is defined as a reduction in tariff that is three times greater than the average reduction in tariff in the industry during the sample period of 1990-2005.

D. Control Variables

A variety of variables can significantly affect customer-supplier relationships observed, including past relationship characteristics and supplier and customer characteristics. To control for past relationship characteristics, I include past relationship duration since durable customer-supplier ties tend to have lower levels of relationship friction and higher flexibility (Fichman and Levinthal (1991), Kotabe, Martin, and Domoto (2003)). I also include the fraction of supplier sales to its total sales to the customer prior to tariff reduction since this supplier is likely to be an important trading partner for the customer (Raman and Shahrur (2008)).

To control for customer and supplier characteristics, I include firm size, leverage, Tobin's q , return on assets (ROA), and R&D intensity of both suppliers and customers. I also include the ratio of cash to total assets of the customers. I include firm size measured by the logarithm of total assets since the larger the customer (supplier) is, the greater is the need to diversify its supplier (customer) base to reduce supply disruptions (customer dependence). I include leverage measured as the ratio of long term debt to total assets since highly levered customers tend to have an incentive to shift some of their default risk to suppliers through trade credit and delayed payments, thereby lowering suppliers' incentive to transact with these customers (Hertzel et al. (2008)). Similarly, customers might also be reluctant to engage with highly levered suppliers as customers who employ very specialized inputs suffer more significant relationship breakup costs in the event of their suppliers' financial distress or bankruptcy (Titman (1984), Maksimovic and Titman (1991)). I include Tobin's q (measured as the ratio of the market value of assets over the book value of assets) since customers with better investment opportunities are likely to transact more with their suppliers. Similarly, suppliers with better investment opportunities are likely to be more sought after by customers. I measure firm profitability as ROA and include it to control for the business viability of the trading partners. R&D intensity (R&D expenses / total sales) is included since firms with high R&D intensity involve high levels of asset specificity, which makes it costly for suppliers and customers to switch trading partners (Williamson (1985, 1991)). Finally, I control for excess cash holding since Frésard (2010) argues that firms are effectively able to deal with increased entry threat in the form of lower tariffs if ex-ante they hold excess cash reserves, thus mitigating the effect of the exogenous competition shock on customer-

supplier relationships. I measure excess cash as the ratio of a customer's cash holding to its total assets. I also include year fixed effects and supplier industry (two-digit SIC code) fixed effects.⁶²

E. Propensity-Score Matched Sample of Customer-Supplier Relationships

Constructing a matched sample of customer-supplier relationship pairs is expected to improve the reliability of my tests, as it allows us to compare treated customer-supplier relationship pairs in which customers' industries are affected by a tariff reduction with control customer-supplier relationship pairs in which customers' whose industries are not affected by a tariff reduction. To construct the matched sample, I employ a propensity score matching approach (Heckman, Ichimura, and Todd (1998)). I experiment with the nearest neighborhood approach. First, I use a logit model to estimate the probability (i.e., propensity score) of facing a tariff reduction in which the dependent variable is an indicator for tariff reduction and independent variables are relationship-, customer-, and supplier-characteristics discussed in the previous section. I then match, without replacement, a customer-supplier pair in a customer industry that faces tariff reduction with a customer-supplier pair in a customer industry that does not face a tariff reduction. I obtain a propensity score-matched sample of 840 pairs (420 tariff reduced pairs and 420 control pairs without a tariff reduction from 1990 to 2005).

Table I compares the matching variables between the treated and the control relationship pairs. None of the matching variables are significantly different between the treated and control groups, suggesting that the matching identifies the control relationship pairs that are highly similar to the treated relationship pairs in most aspects prior to a tariff reduction. I use bootstrapped standard errors based on 50 replications to conduct statistical inferences.

Figure 2 shows the distribution of the average tariffs in the seven years around the significant tariff reduction of customer industries of treated pairs and those of matched pairs that do not undergo any reduction. As expected, customer industries in the treated sample witness higher tariffs in the pre-

⁶² We do not control for customer industry fixed effects as the key explanatory variable of interest, *Tariff reduction*, is a customer industry-level measure.

tariff reduction period and subsequent lower tariffs in the post-tariff reduction period. In contrast, customer industries in the control sample do not show any change in tariff levels.

Table II shows the distribution of customer industries in the treated and control customer-supplier pairs according to its two-digit SIC code. There are a total of 17 industries in the sample. For the treated sample, the number of customers is highest in the transportation equipment industry, followed by petroleum refining and related, industrial, commercial machinery and computer equipment, and chemical and allied products industries. For the control sample, the number of customers is highest in the petroleum refining and related industries, followed by chemical and allied products, electronic, other electrical equipment, and components (except computer equipment), and industrial, commercial machinery, and computer equipment industries.

III. Main Results

In this section, using the propensity-score matched sample above, I examine how an exogenous competition shock affects the relationship duration, a supplier's sales to the customer, and supplier profitability in the post-shock periods. I also examine whether such effects differ across relationship strength and supplier financial constraints prior to the tariff reduction. Next, I examine how tariff reductions in customer industries change the customer base (i.e., number of customers and whether the suppliers are engaged with new customers) of financially constrained and unconstrained suppliers differently. Finally, I examine how tariff reductions and the changes in a customer's post-tariff purchase dependence on suppliers affect post-tariff customer operating performance.

A. Effect of Tariff Reductions on Customer-Supplier Relationships in the Post-reduction Period: Using Full Sample

Table III presents estimates of the regression specifications *Eq. 1* and *Eq. 2* using the matched sample of customer-supplier relationship pairs. In Panel A, the key explanatory variable of interest is an indicator that takes the value of one if a reduction in tariff is three times greater than the average reduction in tariff in the industry during the sample period of 1990-2005, and zero otherwise. In

column (1), the dependent variable is the duration of the observed relationship of the customer-supplier pair in the post-reduction period.⁶³ The coefficients reported are hazard ratios, so the value greater than one implies that the variable of interest shifts the hazard function up. Therefore, a coefficient above one is analogous to a negative coefficient in an OLS regression. The *z*-statistics based on standard errors adjusted for heteroskedasticity (White (1980)) is reported in parentheses. I find that the coefficient on *Tariff reduction* is lower than one, significant at the 5% level, implying that the customer-supplier relationship in the treated pair last significantly longer than in the matched pair. In column (2) ((3)), the dependent variable is the change in the ratio of a supplier's sales to largest customer to its total sales from year -1 to year 1 (year 2), where year 0 is the year of tariff reduction. The *t*-statistics based on standard errors adjusted for heteroskedasticity (White (1980)) is reported in brackets. The coefficient estimate of *Tariff reduction* is positive and significant at the 10% (5%) level in column (2) ((3)). In columns (4) and (5), I replace the dependent variable in column (2) and (3)) with the change in the logarithm of the amount of a supplier's sales to the largest customer and find that the coefficient estimate on *Tariff reduction* is positive and significant at 10% in both columns. In column (6) ((7)), the dependent variable is the change in supplier EBIT from year -1 to year 1 (year 2), scaled by its total assets in year -1. The coefficient estimate of *Tariff reduction* is positive in both columns but significant at the 10% level only in column (7).

In sum, the results in Panel A of Table III support my hypothesis that an increase in competition in the customer industry strengthens customer-supplier relationships by increasing relationship duration between the customers and the suppliers, supplier sales to the customers, and supplier operating profitability in the post-tariff reduction period.

In Panels B and C of Table III, I use new propensity-score matched samples that are constructed based on alternate measures of industry competition by defining *Tariff reduction* as a decrease in a tariff rate that is greater than one and two times the average reduction in the tariff rate in the industry during the sample period, respectively. I obtain samples of 1,708 and 1,336 relationship pairs respectively. I find that in Panel B, none of the coefficient on *Tariff reduction* is significant, whereas

⁶³ The relationship duration is right censored as all the years a relationship lasts cannot be observed for all future years as the customer-supplier relationship data ends until 2013.

in Panel C, the corresponding coefficient is positive and significant in columns (3), (5), (6) and (7). These results suggest that the effects of tariff reductions in the customer industry on suppliers can be manifested only when there is a meaningful threat of increased imports.

*B. Effect of Tariff Reductions on Customer-Supplier Relationships in the Post-reduction Period:
Subsample Analyses according to Relationship Strength in the Pre-tariff Reduction Period*

In this subsection, I examine the effect of tariff reduction in customer industry on supplier relationships by splitting suppliers into two groups according to relationship strength in the pre-tariff reduction period. I use an indicator for durable goods supplier industries and an indicator for suppliers' high R&D intensity to measure the strength of their relationships with suppliers and reestimate the regressions in Panel A of Table III separately for these subsamples.

Table IV shows the results. Panel A shows the results using suppliers in durable goods industries and those in non-durable goods industries, and Panel B shows the results using suppliers with high R&D intensity and those with low R&D intensity. In both Panels, columns (1)–(7) report the results using the subsamples of suppliers with strong trading relationships with the customers and columns (8)–(14) report the results using the subsamples of suppliers with weak trading relationships with the customers. In Panel A, I find that among the subsample of suppliers in durable goods industries, the coefficient on *Tariff reduction* is positive and significant at the 10% level or better in all columns except for column (1). These results suggests that following tariff reductions in customer industries, suppliers in durable goods industries are able to develop stronger relationships with the customers, which helps improve their operating performance. However, in columns (9)–(14) that use the subsample of suppliers in non-durable goods industries, I find that none of the coefficient on *Tariff reduction* is significant. The *Wald* test for the difference in coefficients on *Tariff reduction* between the two subsamples is significant at the 10% (5%) level for the change in a supplier's sales fraction (total sales to the customer) from year -1 to year 2

In Panel B, I further find that suppliers that have strong pre-shock relationships with the customers (i.e., suppliers with high R&D intensity) can maintain longer durable relationship and sell more to the customer in the post-shock period.

Overall, the results in Tables III and IV show that customers facing higher competition have stronger incentives to actively manage their relationships with suppliers by increasing relationship duration and purchasing more from the suppliers. These incentives are stronger when suppliers are important for customer businesses such as when suppliers operate in durable goods industry or when they involve high levels of asset specificity. These improved relationships help increase supplier performance.

C. Effect of Tariff Reductions on Customer-Supplier Relationships in the Post-reduction Period: Subsample Analyses according to Supplier Financial Constraints in the Pre-tariff Reduction Period

In this subsection, I examine the effect of tariff reduction in customer industry on supplier relationships by splitting the suppliers into two subsamples according to various measures of supplier financial constraints. Specifically, I split the sample suppliers into financially constrained and unconstrained suppliers according to the sample median of Hadlock and Pierce (2010) financial constraints index (*HP* index),⁶⁴ whether a supplier has a credit rating, and whether it pays a dividend. I then reestimate the regressions in Panel A of Table III separately for these subsamples.

The results using the subsamples of suppliers with high and low *HP* index are presented in Panel A of Table V. The results in columns (1)–(7) (columns (8)–(14)) pertain to those for financially constrained (unconstrained) suppliers. I find that among the subsample of financially constrained suppliers (i.e., suppliers with high *HP* index), the coefficient on *Tariff reduction* is significantly positive in columns (1)–(5) and insignificantly positive in columns (6) and (7). Thus, following tariff reductions, financially constrained suppliers are able to have longer relationship duration with their largest customers and secure more sales than them, but these strengthened relationships do not

⁶⁴ The *HP* index is measured as $-0.737 \times \ln(\text{Assets}) + 0.043 \times \ln(\text{Assets})^2 + 0.04 \times \text{Firm Age}$.

contribute to performance improvement. For the subsample of financially unconstrained suppliers (i.e., suppliers with low *HP* index), the coefficient on *Tariff reduction* is insignificant in columns (8)–(13). However, as shown in column (14), these suppliers experience an increase in operating performance in the second year following tariff reductions. The *Wald* test for the difference in coefficients on *Tariff reduction* between the two subsamples is significant at the 5% level or better when the dependent variables are the change in a supplier’s sales fraction and the change in the logarithm of its sales to the largest customer.

Panel B of Table V shows the results using the subsamples of suppliers with and without having credit rating in the year prior to tariff reduction and Panel C of Table V shows the results using the subsamples of suppliers that pay and do not pay dividends in the year prior to tariff reduction.⁶⁵ The results mirror those in Panel A of Table V: following tariff reductions, only financially constrained suppliers (i.e., suppliers without having credit rating and those that do not pay dividend) can have longer relationship duration with their largest customers and sell more to them, but without experiencing performance improvement.

In sum, the results in Table V show that customers facing higher competition maintain durable relationships with financially constrained suppliers and also purchase more from them. These results support the argument that an increase in competition in the customer industry has an unintended consequence to its trading relationship by forcing it to purchase more from weaker suppliers relative to the customer that does not face such an increase in competition, possibly due to a high demand for financially strong suppliers by both incumbent and rival customers.

In untabulated tests, to examine how customers treat financially constrained and unconstrained suppliers differently when they do not face any increase in competition (i.e., normal time periods),⁶⁶ I

⁶⁵ We cannot estimate the regressions in columns (10) and (12) of Panel B due to a small number of suppliers that have a credit rating (123 firms compared with 717 firms that do not have a credit rating). Of 123 firms, only 25 continuously maintain the relationship with the largest customer in the second year following tariff reduction, preventing us to estimate the regressions using sales data in year 2.

⁶⁶ Customers bear significant indirect costs from supplier financial difficulties because a financially weak supplier has fewer incentives to maintain its strong reputation for product quality and fulfilling implicit contracts with its customers (Maksimovic and Titman (1991)). Supporting this view, several studies show that firms that

compare the changes in the ratio of a supplier's sales made to the largest customer to its total sales between financially constrained and unconstrained suppliers from year -1 to year 1 and from year -1 to year 2 for the sample of control customer-supplier pairs that do not face any tariff reduction. I find that the mean and median changes in the supplier's sales fraction are significantly higher for financially unconstrained suppliers than for financially constrained suppliers except when I use credit rating as a measure of financial constraints. These results suggest that during the normal period where customers do not face any competition shock, they are more likely to rely on financially unconstrained suppliers than on financially constrained suppliers, further supporting the hypothesis that an increase in competition in the customer industry forces customers to purchase more from financially constrained suppliers.

I also conduct placebo tests by assuming that the tariff reduction takes place in year -3 instead of year 0. In other words, I examine whether the key results in Tables III, IV, and V hold when there is no competition shock (i.e., year -3).⁶⁷ I find that the *Tariff reduction* indicator is insignificantly positive in all the models except for using *HP* index as the measure of financial constraints and the change in a supplier's sales fraction as the dependent variable, suggesting that when there is no competition shock, the changes in relationship strength for the full sample of suppliers, the subsamples of suppliers with strong and weak relationships with the customers, the subsamples of financially constrained and unconstrained suppliers are similar between treated and control pair samples.

*D. Effect of Tariff Reductions on Customer-Supplier Relationships in the Post-reduction Period:
Subsample Analyses according to Relationship Strength and Supplier Financial Constraints in the
Pre-tariff Reduction Period*

produce unique products and those that maintain bilateral customer-supplier relations have low leverage (Titman and Wessels (1988), Kale and Shahrur (2007), Banerjee, Dasgupta, and Kim (2008)).

⁶⁷ We are not able to estimate the regressions that use relationship duration as the dependent variable since the sample size for the analysis is reduced substantially if we assume that a tariff reduction occurs in year -3 instead of year 0.

In this subsection, I further examine the change in supplier sales fraction in the post-tariff reduction period by dividing the sample according to relationship strength and supplier financial constraints in the pre-tariff reduction period.⁶⁸ I focus on the subsample of financially constrained suppliers with high relationship strength and compare it with the subsample of financially unconstrained suppliers or suppliers with low relationship strength.

Results are reported in Table VI. In the first four columns of Panel A, I report the results using the subsample of financially constrained suppliers with high relationship strength (suppliers having high *HP* index and belonging to the durable industries in columns (1) and (2) and suppliers having both high *HP* index and high R&D intensity in columns (3) and (4)). In the next four columns, I report the results using the subsample of financially unconstrained suppliers or suppliers with low relationship strength (suppliers having low *HP* index or belonging to the non-durable industries in columns (5) and (6) and suppliers having low *HP* index or low R&D intensity in columns (7) and (8)).⁶⁹ In Panels B and C of Table VI, I replace *HP* index with the other financial constraint variables: whether suppliers have a credit rating and whether they pay dividends, respectively.

I find that as shown in all three panels, the positive coefficients on *Tariff reduction* documented in columns (2) and (3) of Table III are mainly concentrated in the subsamples of financially constrained suppliers with high relationship strength in the pre-tariff reduction period (i.e., . suppliers with high *HP* index that belong to the durable industries, suppliers with no credit trading that belong to the durable industries, suppliers with no credit trading and high R&D intensity, no dividend-paying suppliers that that belong to the durable industry, and no dividend-paying suppliers with high R&D intensity). These results suggest that financially constrained suppliers, especially those operating in durable industries or those that have R&D intensive, are able to sell more to their customer facing an increase in competition. Thus, an increase in competition in customer industries makes the customers

⁶⁸ We replace change in supplier sales fraction with change in logarithm of sales to customer, and find similar results, with the increase in customer sales consistently higher in the subsample of financially constrained suppliers that belong to the durable industry.

⁶⁹ We do not divide the suppliers that are not used in columns (1)-(4) of Table VI into three different supplier groups (i.e., financially constrained suppliers having low relationship strength, financially unconstrained suppliers having high relationship strength, and financially unconstrained suppliers having low relationship strength) because of the problem of small sample size for each subgroup.

purchase more from their weaker suppliers, particularly those that have maintained strong past relationships. In the next section, to examine whether this result is due to the fact that customers facing high competition are forced to purchase more from financially constrained suppliers with high relationship strength in the pre-tariff reduction period because there are strong demands for their financially unconstrained suppliers by rival customers, I test whether financially unconstrained suppliers are able to increase their customer base following the competition shock.

E. Effect of Tariff Reductions on Number of Customer base and Likelihood of Having New Customers in Post-Tariff Reduction Periods

In this subsection, using a subsample of financially constrained (unconstrained) suppliers whose largest customer faces a tariff reduction and a control subsample of financially constrained (unconstrained) suppliers whose largest customer do not face a tariff reduction, I examine whether tariff reduction affects the number of customers that these suppliers have and the likelihood of having a new customer in the post tariff reduction period.

The results using *HP* index, credit rating, and dividend payment as financial constraint measures are reported in Panels A, B, and C of Table VII, respectively. In all Panels, columns (1)–(4) use the subsample of financially constrained suppliers and columns (5)–(8) use the subsample of financially unconstrained suppliers. The dependent variables are the number of all customers in years +1 and +2, respectively, in columns (1) and (2) (columns (5) and (6)) and an indicator that takes the value of one if the supplier firm reports a new customer (i.e., Compustat Business Segment file reports a firm’s sales to the new customer for the first time), and zero otherwise in columns (3) and (4) (columns (7) and (8)).

In Panel A of Table VII, I find that financially unconstrained suppliers (i.e., suppliers with low *HP* index) of the largest customers facing high competition have a larger number of customers in the post tariff reduction period than matched financially unconstrained suppliers whose largest customer does not face tariff reduction (columns (5) and (6)). The *Wald* test for the difference in coefficients on *Tariff reduction* between suppliers with high *HP* index and those with low *HP* index (i.e., column (1)

versus column (5) and column (2) versus column (6)) is significant. However, I do not find any difference in the likelihood of having new customers between these two groups in the post tariff reduction period.

In Panels B and C, I find that financially unconstrained suppliers (as measured by having credit rating and paying dividends) of the largest customers facing high completion have a larger number of customers and are also more likely to have new customers in the post-tariff reduction period than financially unconstrained suppliers whose largest customer does not face a tariff reduction. *Wald* test for the difference in coefficients on *Tariff reduction* between financially unconstrained and constrained suppliers is significant in all pairs at least at the 10% level or better.

Overall, the results in Table VII show that healthy suppliers of customers facing high competition are able to have a larger number of customer base and are also more likely to land new customers in the post-tariff reduction period, which helps explain why incumbent customers increase purchases from financially weaker suppliers when their industry competition increases. These results, together with those in Tables V and VI support the hypothesis that an increase in customer industry competition has an unintended consequence that customers in such an industry are forced to purchase more from financially weaker suppliers.

F. Effect of Tariff Reductions on Customer Performance in Post-Tariff Reduction Periods

In this subsection, I examine how the change in customers' purchases from financially constrained and unconstrained suppliers around tariff reduction (year -1 to year 1 and year -1 to year 2) have a differential effect on customer operational performance in the post-tariff reduction period. I perform the propensity score matching analysis using as matching variables customer characteristics used earlier, the logarithm of the number of suppliers that the customer has, and the ratio of a customer's total purchases from suppliers to its cost of goods sold (COGS). I follow the matching technique using the nearest neighborhood algorithm without replacement. I obtain a propensity score-matched sample of 596 customers (298 customers experiencing tariff reduction and 298 matched customers without experiencing tariff reduction) from 1990 to 2005. Panel A of Table VIII compares

the matching variables between the treated and control customers. I find that none of the matching variables is significantly different between the treated and control customers, indicating that the propensity-score matching approach has identified control customers that are very similar to treated customers.

Panel B of Table VIII reports the results from regressing the change in customer ROA (ratio of sales to assets), from year -1 to year 1 (year 2), where year 0 is the year when a tariff reduction occurs, on *Tariff reduction*, the change in the ratio of a customer's total purchases from financially constrained suppliers to its COGS during the same period, the ratio of a customer's total purchases from financially unconstrained suppliers to its COGS, interaction terms between *Tariff reduction* and these two change variables, customer characteristics used in Panel A of Table II, and year fixed effects. The key explanatory variables of interest are the interaction terms between *Tariff reduction* and the change in the ratio of a customer's total purchases from financially constrained suppliers to its COGS and between *Tariff reduction* and the change in the ratio of a customer's total purchases from financially unconstrained suppliers to its COGS.

In columns (1)-(6), I use the change in customer ROA as the dependent variable and in columns (7)-(12), I use the change in the ratio of customer sales to assets as the dependent variable. In columns (1), (2), (6), and (7), I classify the suppliers into financially constrained and unconstrained suppliers according to their *HP* index and use these subsamples of suppliers to compute the change in the ratio of a customer's total purchases from financially constrained and unconstrained suppliers to its COGS, respectively. I find the interaction term between *Tariff reduction* and the change in the ratio of a customer's total purchases from financially constrained suppliers to its COGS is negative and significant at the 1% level in both columns, suggesting that customers who face a tariff reduction and also increase their purchases from financially constrained suppliers experience a decrease in their operating performance in the post-tariff reduction period.

In columns (3), (4), (8), and (9), I use suppliers' credit rating to classify them into financially constrained and unconstrained suppliers and in columns (5), (6), (7), and (8), I use whether suppliers pay dividends to classify them into financially constrained and unconstrained suppliers. I find similar

results as those in columns (1), (2), (6), and (7). Thus, customers that increase their purchases from financially constrained suppliers in response to the tariff reduction suffer adversely in the post-tariff reduction period, supporting the hypothesis that customer industry competition has an unintended negative consequence on customer future performance.

The above results can also be interpreted as a realignment of financially constrained suppliers with customers who are less equipped to survive in a more competitive product market, thereby making them unattractive trading partners for financially unconstrained suppliers. Therefore, in untabulated tests I compare customers' who increase purchases from financially constrained suppliers more than from financially unconstrained suppliers with customers' who do not increase purchases from financially constrained suppliers more than from financially unconstrained suppliers and with customers' who increase purchases from financially constrained suppliers more than from financially unconstrained suppliers but do not face a tariff reduction, respectively, using measures of performance and leverage in the post-tariff reduction period. Specifically, using the same propensity-score matched sample as in Table VIII, I find that mean and median measures of ROA, annual stock return, Tobin's q , and leverage of the customers who increase purchases from financially constrained suppliers more than from financially unconstrained suppliers is insignificantly different from comparable customers who do not increase purchases in a similar manner or from comparable customers who increase purchases similarly but do not face a competition shock. This suggests that customers who respond to the competition shock by increasing purchases from financially constrained suppliers do not face significantly higher risk of survival in the post-tariff reduction period than other customers.

IV. Additional Tests

A. Import Penetration Index as an Alternative Measure of Customer Industry Competition

To further alleviate omitted variables bias, in this subsection I use the universe of customer-supplier relationship pairs in Compustat where customers operate in the manufacturing industries as

the sample and import penetration index as an alternative measure of customer industry competition.⁷⁰ Since some unobservable variables (e.g., labor costs) may simultaneously affect tariffs and supplier relationships in an industry, following Xu (2012), I use an instrumental variables approach in which I use the industry tariff level (*Tariff*) and the *Foreign exchange rate*⁷¹ as the instruments for import penetration. *Tariff* measures the level of industry protection and is therefore expected to be strongly negatively associated with any measure of foreign competition. Since foreign exchange rates indicate the attractiveness of the U.S. market to the foreign exporter, *Foreign exchange rate* is likely to be positively associated with foreign competition. Thus, both of the instruments satisfy the relevance requirement of instrumental variables. However, to the extent that these measures are exogenous to firm decisions and beyond firm control, they are unlikely to affect firms' product market trading relationships, thus satisfying the instrumental variables' exclusion criterion.

Panel A of Table IX reports summary statistics for all relationship pairs involving the suppliers and their largest customers belonging to the manufacturing industry (SIC codes between 2000 and 4000). Splitting the sample into high (more competitive) and low (less competitive) import penetration index groups based on its sample median, I find that compared with the suppliers of customers that operate in a less competitive industry, the suppliers of customers that operate in a more competitive industry sell more to their largest customers but their sales dependence measured as the ratio of their sales to the largest customers to their total sales is lower, mainly due to their larger sales and a larger number of their customer base. I also find that the suppliers of customers that operate in a more competitive industry have longer past relationship duration and are likely to maintain longer future relationship duration. They are on average larger, more levered, and more profitable (ROA), and invest more in relationship-specific assets (R&D expenses / sales). All these differences in mean values are significant at the 1% level. Turning to customers, I find that the customers in more competitive industries are larger, more levered, and less profitable than customers in less competitive

⁷⁰ Import penetration is computed as the ratio of imports to the sum of total shipments and net traded goods at four-digit SIC industry. Following the concordance tables developed by Feenstra, Romalis, and Schott (2002) and Pierce and Schott (2009), we map the imports data coded based on the Harmonized System (HS) to four-digit SIC code. Import and shipments data are obtained from Bernard, Jensen, and Schott (2006).

⁷¹ Foreign exchange rate is measured as foreign currency per dollar using country trading weights that are calculated based on the country's share of imported goods in the industry as of 1990.

industries. They also have lower growth opportunities, hold more cash, and invest more in R&D activities. These results are largely consistent with the previous findings on the positive association between customer industry competition and supplier engagement.

In Panel B of Table IX, I run multivariate regressions using the import penetration index as the key independent variable of interest. The dependent variable in columns (1) and (2) is the supplier sales fraction measured as a supplier's sales made to the largest customer divided by its total sales. I find that the coefficient of *Import penetration index* is positive and significant at the 5% level in both columns. These results suggest that a higher level of import penetration index in customer industry is associated with larger supplier sales fraction.

In columns (3) and (4), I report the results using two-stage least squares (2SLS) regressions in which I employ Tariff and Foreign exchange rate as instrumental variables. The first-stage regression results are reported in column 3, and the second-stage regression results are reported in Column 4. In Column 3, I use adjusted CSR as the dependent variable and the two instrumental variables discussed in Subsection 2.3, acquirer characteristics, and industry and year fixed effects as the independent variables. As expected, both instrumental variables (religion rank and blue state) have positive and significant coefficients. In column (3), I use import penetration index as the dependent variable and the two instrumental variables, past relationship duration, supplier characteristics, customer characteristics, and supplier and customer industry fixed effects as the independent variables. As expected, *Tariff* is negatively associated with import penetration index while *Foreign exchange rate* is positively associated, both of which are significant at the 1% level. The p -value for the Cragg-Donald (1993) instrument relevance test is less than 0.01, rejecting the null hypothesis of weak instruments. In column (4), I use the supplier sales fraction as the dependent variable and the predicted variable for import penetration index and the variables used in column (3) as the independent variables. I find that the coefficient on the instrumented import penetration index variable is positive and significant at the 1% level. The p -value for the test of overidentifying restrictions is greater than 0.39, indicating that the two instrumental variables pass the Sargan (1958) overidentification test. Thus, the finding that

suppliers sell a larger fraction of their sales to the customer when customers belong to industries with high import penetration index appears to be robust to controlling for potential endogeneity bias.

B. Difference-in-Differences Specification

As a further robustness test, I estimate Eq. 2 with a differences-in-differences specification (Bertrand and Mullainathan (2003)).⁷² Specifically, using a propensity score matched sample of customer-supplier relationship pairs used in Table III, I estimate the following regression:

$$R_{i,j,t+n} = \beta \text{Tariff Reduction}_{i,t} + \delta \text{After}_{i,j} + \tau \text{Tariff Reduction}_{i,t} \times \text{After}_{i,j} + \gamma X_{i,j,t-1} + \rho Y_{i,t-1} + \sigma Z_{j,t-1} + \phi \text{Firm}_j + \theta \text{Industry}_i \times \text{Year}_t + \epsilon_{i,j,t} \quad (3)$$

where $\text{After}_{i,j}$ is an indicator that takes the value of one if the relationship specific parameter is observed in the post-tariff reduction period, and zero otherwise. All other variables are the same as those used in Eq. 2. In addition, I include supplier fixed effects (Firm_j) and industry-year fixed effects ($\text{Industry}_i \times \text{Year}_t$) to further control for unobservable time-invariant firm characteristics and time trends. The key independent variable of interest is the interaction term between $\text{Tariff Reduction}_{i,t}$ and $\text{After}_{i,j}$ indicators.

The results are presented in Table X. In columns (1) and (3) (columns (2) and (4)), the dependent variable is the supplier sales fraction in year 1 (2), respectively. In columns (1) and (2), I control for supplier industry fixed effects. I find the coefficient on the interaction term between Tariff Reduction and After is positive and significant at the 10% and 1% levels, respectively, suggesting that following tariff reductions, suppliers are able to sell a larger fraction of their sales to their customers. In columns (3) and (4), I control for supplier fixed effects and industry-year fixed effects and find qualitatively similar results as those in columns (1) and (2).

⁷² As the data is an unbalanced panel with observations being conditional on the supplier reporting its sales to its major customer in a year, I do not employ this difference-in-differences specification in the main tests except here. The original specification allows me to focus more acutely on the smaller group of customer-supplier pairs that are captured in the data.

In columns (5) through (8), I replace the supplier sales fraction In columns (1) through (4) with the logarithm of a supplier's total sales to the largest customer as the dependent variable and reestimate the regressions. I find that the coefficient on the interaction term is positive and significant at the 5% level or better.

In columns (9) and (10), I estimate a Cox proportional hazards model where the dependent variable is the observed relationship duration of the customer-supplier pair. I find that coefficient on the interaction term is less than one in both columns and highly significant. Thus, following tariff reductions, suppliers and their customers are more likely to have longer relationship duration than control pairs. In columns (11) and (12), I use an indicator that takes the value of one if the customer-supplier relationship is continued in year 1 and year 2, respectively, and zero otherwise, and estimate the regressions using a logit model. I find that the coefficient on the interaction term is positive and significant at the 1% level in both columns, suggesting that the customer-supplier relationship is more likely to be observed when customer industry competition is higher.

V. Summary and Conclusion

In this paper, I investigate the impact of customer industry product market competition on customer-supplier relationships. I hypothesize that to compete effectively in a crowded product market, increased competition in their industries encourages customers to engage more with their suppliers, which helps lower operating costs, improve efficiency, and protect trade secrets. These effects are expected to be stronger for customers that have strong trading relationships with their suppliers, particularly financially unconstrained suppliers, prior to competition shock. However, due to the limited number of suppliers in each industry, financially unconstrained suppliers are expected to be particularly in more demand when customer industry competition increases, which inevitably forces incumbent customers to purchase more from financially constrained suppliers and thus suffer negative performance in the future.

Using a propensity-score matched sample of customer-supplier pairs in which the treated sample consists of customers suffering a significant tariff reduction and the control sample consists of customers that do not suffer such a reduction, I find strong support for my hypothesis. Specifically, I find that customer industry competition leads to an improvement in customer-supplier relationship as evidenced by an increase in both customer-supplier relationship duration and suppliers' sales made to the customer in the post-tariff reduction period. This improvement in relationships translates into better operational performance for the suppliers. I also find that suppliers with ex-ante strong relationship ties with customers and financially constrained suppliers are able to sell more to the customer affected by a tariff reduction. Financially unconstrained suppliers, which tend to be more attractive to rival customers, are also able to transact with more customers in the post-tariff reduction period. However, I find that customers that increase their purchases from financially constrained suppliers experience a decrease in their operating performance in the post-tariff reduction period, suggesting that unintended consequence of purchasing more from financially constrained suppliers due to industry competition adversely affects customers.

My additional tests using the import penetration index of the customer industry as the alternative measure of product market competition, and the tariff level in the customer industry and foreign exchange rates as the instrumental variables for import competition also show that suppliers whose customers operate in competitive industries sell a larger fraction of their sales to the customers. Overall, the results suggest that competition in the customer industry is generally beneficial to both financially unconstrained and constrained suppliers by increasing their sales to the customers. However, the increased purchases from financially constrained suppliers affect customer operating performance negatively in the post-tariff period, suggesting that increased customer competition has both intended and unintended consequences for their trading relationships and customer future performance.

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Table I
Descriptive Statistics

This table presents descriptive statistics (mean) for customer-supplier pairs used in the propensity-score matching analysis. The sample consists of 420 customer-supplier relationship pairs in which the largest customers in the manufacturing industry (Standard Industrial Classification (SIC) codes between 2000 and 4000) experience a significant tariff reduction during the 1990 to 2005 period, and 420 control customer-supplier relationship pairs in which the largest customers do not experience a significant tariff reduction. A significant tariff reduction is considered being taken place if the negative change in yearly tariff rate is three times larger than the average reduction in the industry over the sample period. I experiment with the nearest neighborhood approach. First, I use a logit model to estimate the probability (i.e., propensity score) of facing a significant tariff reduction. The dependent variable is an indicator for a significant tariff reduction and independent variables are relationship-, customer-, and supplier-characteristics. I consider as relationship characteristics the ratio of a supplier's sales to the largest customer to its total sales and the past relationship duration of the customer and supplier. Customer characteristics I consider include firm size, tangibility, leverage, Tobin's q , return on assets (ROA), R&D intensity, and cash ratio. Supplier characteristics I consider include firm size, tangibility, leverage, Tobin's q , ROA, and R&D intensity. I then match, without replacement, a customer-supplier pair that includes customers whose industries experience a significant tariff reduction with a customer-supplier pair that include customers whose industries do not experience a significant tariff reduction. Appendix I provides a detailed description of all the variables used in the tables. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Variable	Treated customer-supplier pair (N = 420)	Control customer-supplier pair (N = 420)	Test of difference (p -value)
<i>Customer firm characteristics</i>			
Firm size (in \$billion)	7.925	7.379	0.545 (0.56)
Tangibility	0.352	0.360	-0.008 (0.71)
Leverage	0.304	0.308	-0.004 (0.36)
Tobin's q	1.962	1.882	0.080 (0.27)
ROA	0.108	0.100	0.008 (0.49)
R&D expenditures / sales	0.050	0.055	-0.005 (0.65)
Cash / assets	0.110	0.114	-0.004 (0.41)
<i>Supplier firm characteristics</i>			
Firm size (in \$million)	65.464	73.451	-7.988 (0.87)
Tangibility	0.341	0.343	-0.003 (0.33)
Leverage	0.260	0.246	0.014 (0.78)
Tobin's q	2.415	2.468	-0.052 (0.97)
ROA	-0.035	-0.034	-0.001 (0.64)
R&D expenditures / sales	2.327	1.350	0.977 (0.64)
<i>Customer-supplier relationship characteristics</i>			
Supplier sales fraction	0.179	0.174	0.006 (0.85)
Past relationship duration (years)	1.767	1.793	-0.026 (0.59)

Table II
Industry Distribution of Customers in the Propensity-score Matched Sample

This table presents industry distribution of customers in the propensity-score matched sample. The sample consists of 420 customer-supplier relationship pairs in which the largest customers in the manufacturing industry (Standard Industrial Classification (SIC) codes between 2000 and 4000) experience a significant tariff reduction during the 1990 to 2005 period, and 420 control customer-supplier relationship pairs in which the largest customers do not experience a significant tariff reduction. A significant tariff reduction is considered being taken place if the negative change in yearly tariff rate is three times larger than the average reduction in the industry over the sample period. I experiment with the nearest neighborhood approach. First, I use a logit model to estimate the probability (i.e., propensity score) of facing a significant tariff reduction. The dependent variable is an indicator for a significant tariff reduction and independent variables are relationship-, customer-, and supplier-characteristics. I consider as relationship characteristics the ratio of a supplier's sales to the largest customer to its total sales and the past relationship duration of the customer and supplier. Customer characteristics I consider include firm size, tangibility, leverage, Tobin's q , return on assets (ROA), R&D intensity, and cash ratio. Supplier characteristics I consider include firm size, tangibility, leverage, Tobin's q , ROA, and R&D intensity. I then match, without replacement, a customer-supplier pair that includes customers whose industries experience a significant tariff reduction with a customer-supplier pair that include customers whose industries do not experience a significant tariff reduction.

Two-digit SIC	Customer industry	Customer in industry affected by Tariff Reduction	Customer in industry not affected by Tariff Reduction
		Sample size (%)	Sample size (%)
20	Food & Kindred Products	6 (1.4)	15 (3.6)
21	Tobacco Products	0 (0.0)	3 (0.7)
22	Textile Mill Products	0 (0.0)	1 (0.2)
24	Lumber & Wood Products (Except Furniture)	2 (0.5)	2 (0.5)
26	Paper & Allied Products	0 (0.0)	9 (2.1)
27	Printing Publishing & Allied Products	1 (0.2)	3 (0.7)
28	Chemicals & Allied Products	58 (13.8)	76 (18.1)
29	Petroleum Refining & Related Industries	91 (21.7)	86 (20.5)
30	Rubber & Miscellaneous Plastics Products	2 (0.5)	4 (1.0)
32	Stone, Clay, Glass, & Concrete Products	1 (0.2)	1 (0.2)
33	Primary Metal Industries	3 (0.7)	6 (1.4)
34	Fabricated Metal Products (Except Machinery & Transportation Equipment)	1 (0.2)	1 (0.2)
35	Industrial, Commercial Machinery, & Computer Equipment	72 (17.1)	59 (14.0)
36	Electronic, Other Electrical Equipment, & Components (Except Computer Equipment)	38 (9.0)	61 (14.5)
37	Transportation Equipment	103 (24.5)	47 (11.2)
38	Measuring, Analyzing, & Controlling Instruments; Photographic, Medical, & Optical Goods; Watches & Clocks	36 (8.6)	46 (11.0)
39	Miscellaneous Manufacturing Industries	6 (1.4)	0 (0.0)
Total		420 (100.0)	420 (100.0)

Table III
Effect of Tariff Reductions on Customer-Supplier Relationships

This table presents estimates of Cox proportional hazard model of customer-supplier relationship duration and estimates of OLS regressions of the change in the ratio of a supplier's sales to the largest customer to its total sales, the change in the logarithm of its sales to the largest customer, and the change in its earnings before income and taxes (EBIT) in the post-tariff reduction period for a propensity-score matched sample of customer-supplier pairs. The samples consist of customer-supplier relationship pairs in which the largest customers in the manufacturing industry (Standard Industrial Classification (SIC) codes between 2000 and 4000) experience a significant tariff reduction during the 1990 to 2005 period, and control customer-supplier relationship pairs in which the largest customers do not experience a significant tariff reduction. In Panels A, B, and C, a significant tariff reduction is considered being taken place if the negative change in yearly tariff rate is three, one, or two times larger than the average reduction in the industry over the sample period, respectively. I experiment with the nearest neighborhood approach. First, I use a logit model to estimate the probability (i.e., propensity score) of facing a significant tariff reduction. The dependent variable is an indicator for a significant tariff reduction and independent variables are relationship-, customer-, and supplier-characteristics. I consider as relationship characteristics the ratio of a supplier's sales to the largest customer to its total sales and the past relationship duration of the customer and supplier. Customer characteristics I consider include firm size, tangibility, leverage, Tobin's q , return on assets (ROA), R&D intensity, and cash ratio. Supplier characteristics I consider include firm size, tangibility, leverage, Tobin's q , ROA, and R&D intensity. I then match, without replacement, a customer-supplier pair that includes customers whose industries experience a significant tariff reduction with a customer-supplier pair that include customers whose industries do not experience a significant tariff reduction. The change in EBIT is measured as the difference in cumulated earnings before income and taxes between year 1 (year 2) and year -1, scaled by total assets in year -1. All control variables are measured as of the fiscal year immediately prior to tariff reduction, except in columns (6) and (7), where ROA measured two years prior to tariff reduction is used. Two-digit SIC code indicators are used to control for industry fixed effects. The numbers in parentheses are t -statistics (z -statistics) based on standard errors adjusted for heteroskedasticity in OLS (Cox) regressions. Appendix I provides a detailed description on the construction of the variables. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Defining *Tariff Reduction* as When the Negative change in yearly Tariff Rate Is Three Times Greater Than the Average Tariff Reduction in Customer Industry

	Cox	OLS					
	Relationship duration	Change in supplier sales fraction		Change in log (sales to customer)		Change in supplier EBIT	
		Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tariff reduction (indicator)	0.840** (-2.20)	0.041* (1.67)	0.074** (2.23)	0.247* (1.79)	0.309* (1.89)	0.015 (0.54)	0.093* (1.66)
Past relationship duration	0.978 (-0.94)	-0.001 (-0.12)	-0.002 (-0.27)	-0.057* (-1.97)	-0.074* (-1.92)	-0.006 (-1.11)	-0.009 (-0.80)
Supplier sales fraction	0.588*** (-2.74)			-0.766*** (-2.81)	-0.641* (-1.90)	-0.096 (-1.37)	-0.156 (-0.93)
Supplier characteristics							
Firm size	0.963 (-0.68)	0.004 (0.31)	0.002 (0.13)	0.043 (0.70)	-0.036 (-0.46)	-0.049** (-2.52)	0.006 (0.17)
Leverage	0.871 (-0.63)	-0.013 (-0.24)	0.017 (0.23)	-0.399 (-1.55)	-0.503 (-1.65)	0.136** (2.10)	-0.027 (-0.17)
Tobin's q	1.013 (0.99)	-0.006 (-0.60)	-0.003 (-0.35)	-0.006 (-0.23)	0.013 (0.59)	-0.003 (-0.31)	-0.039 (-1.33)
ROA	0.681** (-2.25)	0.003 (0.04)	0.057 (0.68)	0.042 (0.14)	0.192 (0.48)	-0.022 (-0.27)	0.088 (0.33)
R&D expenditures / sales	0.957 (-0.80)	-0.028 (-1.06)	-0.014 (-0.70)	0.135 (1.17)	0.256** (2.43)	-0.019 (-0.86)	-0.213*** (-3.46)
Customer characteristics							
Firm size	0.947 (-1.09)	0.046*** (2.95)	0.069*** (2.87)	0.031 (0.36)	0.014 (0.14)	-0.040** (-2.08)	-0.046 (-1.10)
Leverage	0.749	0.068	0.014	0.907* (1.97)	0.403	-0.072	-0.453** (-2.08)

	(-0.73)	(0.80)	(0.11)	(1.66)	(0.60)	(-0.72)	(-2.05)
Tobin's q	0.972	0.009	0.023*	0.070	0.050	-0.027	-0.074*
	(-0.49)	(1.09)	(1.95)	(1.36)	(0.82)	(-1.64)	(-1.96)
ROA	0.392**	0.018	-0.563**	0.200	-0.742	0.216*	0.147
	(-2.04)	(0.29)	(-2.02)	(0.72)	(-0.53)	(1.68)	(0.37)
R&D expenditures / sales	0.622	-0.117	-0.306	-1.546**	-1.022	-0.209	-0.344
	(-1.14)	(-1.18)	(-0.73)	(-2.08)	(-0.46)	(-1.21)	(-1.16)
Cash / assets	1.192	0.123	0.284*	0.255	1.089	-0.047	0.066
	(0.42)	(1.19)	(1.82)	(0.45)	(1.44)	(-0.37)	(0.25)
Constant		-0.422**	-0.628***	-0.439	0.588	0.850***	0.849
		(-2.53)	(-2.80)	(-0.45)	(0.65)	(3.47)	(1.58)
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	840	357	231	359	247	781	741
Pseudo/Adjusted R^2	0.023	0.109	0.183	0.148	0.230	0.063	0.147

Panel B: Defining *Tariff Reduction* as When the Negative change in yearly Tariff Rate Is One Time Greater Than the Average Tariff Reduction in Customer Industry

	Cox	OLS					
	Relationship duration	Change in supplier sales fraction		Change in log (sales to customer)		Change in EBIT	
		Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tariff reduction (indicator)	0.952	0.010	0.010	0.082	0.069	0.037	0.051
	(-0.86)	(0.71)	(0.59)	(1.17)	(0.89)	(1.46)	(0.96)
Controls in Panel A	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,720	767	501	770	529	1,602	1,508
Pseudo/Adjusted R^2	0.016	0.048	0.044	0.083	0.128	0.064	0.125

Panel C: Defining *Tariff Reduction* as When the Negative change in yearly Tariff Rate Is Two Times Greater Than the Average Tariff Reduction in Customer Industry

	Cox	OLS					
	Relationship duration	Change in supplier sales fraction		Change in log (sales to customer)		Change in EBIT	
		Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tariff reduction (indicator)	0.958	0.022	0.043**	0.097	0.187*	0.048*	0.098*
	(-0.65)	(1.37)	(2.00)	(1.14)	(1.84)	(1.65)	(1.66)
Controls in Panel A	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,336	587	380	589	403	1,245	1,171
Pseudo/Adjusted R^2	0.018	0.065	0.122	0.129	0.179	0.079	0.170

Table IV
Effect of Tariff Reductions on Customer-Supplier Relationships: Subsample Analysis According to Past Relationship Strength

This table presents estimates of Cox proportional hazard model of customer-supplier relationship duration and estimates of OLS regressions of the change in a supplier's sales to the largest customer to its total sales, the change in the logarithm of its sales to the largest customer, and the change in its earnings before income and taxes (EBIT) in the post-tariff reduction period for a propensity-score matched sample of customer-supplier pairs. The sample consists of 420 customer-supplier relationship pairs in which the largest customers in the manufacturing industry (Standard Industrial Classification (SIC) codes between 2000 and 4000) experience a significant tariff reduction during the 1990 to 2005 period, and 420 control customer-supplier relationship pairs in which the largest customers do not experience a significant tariff reduction. The customer-supplier pairs are split into subsamples using whether the supplier belongs to the durable industry (firms with SIC code between 3400 and 3990) (Panel A) and whether the ratio of supplier R&D expenditures to sales is above or below the sample median (Panel B). A significant tariff reduction is considered being taken place if the negative change in yearly tariff rate is three times larger than the average reduction in the industry over the sample period. I experiment with the nearest neighborhood approach. First, I use a logit model to estimate the probability (i.e., propensity score) of facing a significant tariff reduction. The dependent variable is an indicator for a significant tariff reduction and independent variables are relationship-, customer-, and supplier-characteristics. I consider as relationship characteristics the ratio of a supplier's sales to the largest customer to its total sales and the past relationship duration of the customer and supplier. Customer characteristics I consider include firm size, tangibility, leverage, Tobin's q , return on assets (ROA), R&D intensity, and cash ratio. Supplier characteristics I consider include firm size, tangibility, leverage, Tobin's q , ROA, and R&D intensity. I then match, without replacement, a customer-supplier pair that includes customers whose industries experience a significant tariff reduction with a customer-supplier pair that include customers whose industries do not experience a significant tariff reduction. The change in EBIT is measured as the difference in cumulated earnings before income and taxes between year 1 (year2) and year -1, scaled by total assets in year -1. All control variables are measured as of the fiscal year immediately prior to tariff reduction, except in columns (6), (7), (13), and (14), where ROA measured two years prior to tariff reduction is used. Two-digit SIC code indicators are used to control for industry fixed effects. The numbers in parentheses are t -statistics (z -statistics) based on standard errors adjusted for heteroskedasticity in OLS (Cox) regressions. Appendix I provides a detailed description on the construction of the variables. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Subsample Analysis According to Whether the Supplier Operates in Durable Industries

	Suppliers in Durable Industry							Suppliers in Non-durable Industry						
	Cox	OLS						Cox	OLS					
	Relationship duration	Change in supplier sales fraction		Change in log (sales to customer)		Change in EBIT		Relationship duration	Change in supplier sales fraction		Change in log (sales to customer)		Change in EBIT	
		Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2		Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Tariff reduction (indicator)	0.860	0.315*	0.572***	0.074**	0.136***	0.056*	0.148**	0.861	0.127	0.090	0.036	0.040	-0.027	-0.013
	(-1.26)	(1.96)	(3.06)	(2.22)	(3.08)	(1.96)	(2.29)	(-1.29)	(0.48)	(0.36)	(0.71)	(0.90)	(-0.42)	(-0.12)
Wald χ^2 test for Tariff reduction (<i>p</i> -value)									Columns (2) vs. (9) 0.47	Columns (3) vs. (10) 0.06*	Columns (4) vs. (11) 0.45	Columns (5) vs. (12) 0.05**	Columns (6) vs. (13) 0.21	Columns (7) vs. (14) 0.16
Controls in Table III	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	370	183	127	181	118	349	329	470	176	120	176	113	432	412
Pseudo/Adjusted <i>R</i> ²	0.033	0.179	0.282	0.066	0.238	0.082	0.148	0.031	0.158	0.277	0.096	0.282	0.060	0.140

Panel B: Subsample Analysis According to Supplier R&D Intensity (R&D Expenditures / Sales)

	Suppliers with High R&D Intensity							Suppliers with Low R&D Intensity						
	Cox	OLS						Cox	OLS					
	Relationship duration	Change in supplier sales fraction		Change in log (sales to customer)		Change in EBIT		Relationship duration	Change in supplier sales fraction		Change in log (sales to customer)		Change in EBIT	
		Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2		Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Tariff reduction (indicator)	0.736**	0.280	0.265	0.087*	0.106*	0.012	0.152	1.070	0.202	0.343	0.009	0.034	-0.014	-0.004
	(-2.48)	(1.27)	(0.96)	(1.89)	(1.73)	(0.27)	(1.51)	(0.51)	(1.01)	(1.62)	(0.28)	(0.85)	(-0.47)	(-0.06)
Wald χ^2 test for Tariff reduction (p -value)									Columns (2) vs. (9)	Columns (3) vs. (10)	Columns (4) vs. (11)	Columns (5) vs. (12)	Columns (6) vs. (13)	Columns (7) vs. (14)
									0.10*	0.22	0.76	0.77	0.60	0.15
Controls in Table III	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	420	165	109	164	101	391	368	420	194	138	193	130	390	373
Pseudo/Adjusted R^2	0.026	0.229	0.362	0.134	0.271	-0.019	0.155	0.043	0.153	0.162	0.084	0.192	0.271	0.218

Table V
Effect of Tariff Reductions on Customer-Supplier Relationships: Subsample Analysis According to Supplier Financial Constraints

This table presents estimates of Cox proportional hazard model of customer-supplier relationship duration and estimates of OLS regressions of the change in the ratio of a supplier's sales to the largest customer to its total sales, the change in the logarithm of its sales to the largest customer, and the change in its earnings before income and taxes (EBIT) in the post-tariff reduction period for a propensity-score matched sample of customer-supplier pairs. The sample consists of 420 customer-supplier relationship pairs in which the largest customers in the manufacturing industry (Standard Industrial Classification (SIC) codes between 2000 and 4000) experience a significant tariff reduction during the 1990 to 2005 period, and 420 control customer-supplier relationship pairs in which the largest customers do not experience a significant tariff reduction. The customer-supplier pairs are split into subsamples according to whether the supplier financial constraints index (Hadlock and Pierce (2010) index (*HP* index)) is above the sample median (Panel A), whether the supplier has a S&P long term issuer credit rating (Panel B), and whether the supplier pays dividends in the previous year (Panel C). A significant tariff reduction is considered being taken place if the negative change in yearly tariff rate is three times larger than the average reduction in the industry over the sample period. I experiment with the nearest neighborhood approach. First, I use a logit model to estimate the probability (i.e., propensity score) of facing a significant tariff reduction. The dependent variable is an indicator for a significant tariff reduction and independent variables are relationship-, customer-, and supplier-characteristics. I consider as relationship characteristics the ratio of a supplier's sales to the largest customer to its total sales and the past relationship duration of the customer and supplier. Customer characteristics I consider include firm size, tangibility, leverage, Tobin's q , return on assets (ROA), R&D intensity, and cash ratio. Supplier characteristics I consider include firm size, tangibility, leverage, Tobin's q , ROA, and R&D intensity. I then match, without replacement, a customer-supplier pair that includes customers whose industries experience a significant tariff reduction with a customer-supplier pair that includes customers whose industries do not experience a significant tariff reduction. The change in EBIT is measured as the difference in cumulated earnings before income and taxes between year 1 (year2) and year -1, scaled by total assets in year -1. All control variables are measured as of the fiscal year immediately prior to tariff reduction, except in columns (6), (7), (13), and (14), where ROA measured two years prior to tariff reduction is used. Two-digit SIC code indicators are used to control for industry fixed effects. The numbers in parentheses are t -statistics (z -statistics) based on standard errors adjusted for heteroskedasticity in OLS (Cox) regressions. Appendix I provides a detailed description on the construction of the variables. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Subsample Analysis According to Supplier Financial Constraints Index

	Suppliers with High <i>HP</i> Index							Suppliers with Low <i>HP</i> Index						
	Cox	OLS						Cox	OLS					
		Change in supplier sales fraction		Change in log (sales to customer)		Change in EBIT			Change in supplier sales fraction		Change in log (sales to customer)		Change in EBIT	
		Relationship duration	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1		Year -1 to year 2	Relationship duration	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Tariff reduction (indicator)	0.798*	0.103**	0.200***	0.606***	0.986***	0.024	0.144	0.849	-0.005	0.006	-0.052	-0.140	0.036	0.100*
	(-1.87)	(2.22)	(3.47)	(2.73)	(3.82)	(0.51)	(1.48)	(-1.40)	(-0.16)	(0.16)	(-0.28)	(-0.65)	(1.37)	(1.83)
Wald χ^2 test for Tariff reduction (<i>p</i> -value)									Columns (2) vs. (9)	Columns (3) vs. (10)	Columns (4) vs. (11)	Columns (5) vs. (12)	Columns (6) vs. (13)	Columns (7) vs. (14)
									0.02**	0.00***	0.01***	0.00***	0.80	0.67
Controls in Table III	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier ind. fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	420	178	122	179	127	393	379	420	179	109	180	120	388	362
Pseudo/Adjusted <i>R</i> ²	0.035	0.099	0.201	0.165	0.375	0.068	0.139	0.030	0.052	0.403	0.045	0.228	-0.004	0.103

Panel B: Subsample Analysis According to Whether Suppliers Have Credit Rating

	Suppliers without Having Credit Rating							Suppliers Having Credit Rating						
	Cox	OLS						Cox	OLS					
	Relationship duration	Change in supplier sales fraction		Change in log (sales to customer)		Change in EBIT		Relationship duration	Change in supplier sales fraction		Change in log (sales to customer)		Change in EBIT	
		Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2		Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Tariff reduction (indicator)	0.829** (-2.14)	0.058** (2.04)	0.093** (2.47)	0.249 (1.57)	0.354* (1.86)	0.010 (0.30)	0.104 (1.56)	1.520 (1.62)	0.042 (0.62)	- (-)	0.284 (0.64)	- (-)	0.017 (0.59)	-0.002 (-0.03)
Wald χ^2 test for Tariff reduction (p -value)									Columns (2) vs. (9) 0.67	- (-)	Columns (4) vs. (11) 0.87	- (-)	Columns (6) vs. (13) 0.85	Columns (7) vs. (14) 0.18
Controls in Table III	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	-	Yes	Yes
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	-	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	-	Yes	Yes
Observations	717	311	206	313	218	665	629	123	46	-	46	-	116	112
Pseudo/Adjusted R^2	0.023	0.109	0.180	0.154	0.243	0.054	0.135	0.113	-0.342	-	0.709	-	0.500	0.271

Panel C: Subsample Analysis According to Whether Suppliers Pay Dividends

	Suppliers Paying No Dividends							Suppliers Paying Dividends						
	Cox	OLS						Cox	OLS					
	Relationship duration	Change in supplier sales fraction		Change in log (sales to customer)		Change in EBIT		Relationship duration	Change in supplier sales fraction		Change in log (sales to customer)		Change in EBIT	
		Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2		Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Tariff reduction (indicator)	0.791** (-2.54)	0.062* (1.76)	0.115** (2.34)	0.336* (1.80)	0.476** (2.12)	0.009 (0.24)	0.089 (1.23)	2.528*** (3.33)	-0.019 (-0.71)	-0.019 (-0.27)	0.028 (0.16)	0.146 (0.44)	0.012 (0.39)	0.077 (1.06)
Wald χ^2 test for Tariff reduction (p -value)									Columns (2) vs. (9) 0.02**	Columns (3) vs. (10) 0.01**	Columns (4) vs. (11) 0.13	Columns (5) vs. (12) 0.20	Columns (6) vs. (13) 0.94	Columns (7) vs. (14) 0.89
Controls in Table III	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	649	259	166	261	177	595	560	191	98	65	98	70	186	181
Pseudo/Adjusted R^2	0.022	0.083	0.187	0.150	0.262	0.043	0.131	0.110	0.042	-0.252	0.132	-0.109	0.349	0.342

Table VI
Effect of Tariff Reductions on Customer-Supplier Relationships: Subsample Analysis According to Past Relationship Strength and Supplier Financial Constraints

This table presents estimates of OLS regressions of the change in the ratio of a supplier's sales to the largest customer to its total sales in the post-tariff reduction period for a propensity-score matched sample of customer-supplier pairs. The sample consists of 420 customer-supplier relationship pairs in which the largest customers in the manufacturing industry (Standard Industrial Classification (SIC) codes between 2000 and 4000) experience a significant tariff reduction during the 1990 to 2005 period, and 420 control customer-supplier relationship pairs in which the largest customers do not experience a significant tariff reduction. The customer-supplier pairs are split into subsamples according to whether the supplier financial constraints index (Hadlock and Pierce (2010) index (HP index)) is above the sample median and whether the past relationship with its largest customer is strong (Panel A), whether the supplier has a S&P long term issuer credit rating and whether the past relationship with its largest customer is strong (Panel B), and whether the supplier pays dividends in the previous year and whether the past relationship with its largest customer is strong (Panel C). In Panels A, B, and C, past relationship strength is measured according to whether the supplier belongs to the durable industry (firms with SIC code between 3400 and 3990) and whether the ratio of supplier R&D expenditures to sales is above the sample median. A significant tariff reduction is considered being taken place if the negative change in yearly tariff rate is three times larger than the average reduction in the industry over the sample period. I experiment with the nearest neighborhood approach. First, I use a logit model to estimate the probability (i.e., propensity score) of facing a significant tariff reduction. The dependent variable is an indicator for a significant tariff reduction and independent variables are relationship-, customer-, and supplier-characteristics. I consider as relationship characteristics the ratio of a supplier's sales to the largest customer to its total sales and the past relationship duration of the customer and supplier. Customer characteristics I consider include firm size, tangibility, leverage, Tobin's q , return on assets (ROA), R&D intensity, and cash ratio. Supplier characteristics I consider include firm size, tangibility, leverage, Tobin's q , ROA, and R&D intensity. I then match, without replacement, a customer-supplier pair that includes customers whose industries experience a significant tariff reduction with a customer-supplier pair that includes customers whose industries do not experience a significant tariff reduction. All control variables are measured as of the fiscal year immediately prior to tariff reduction. Two-digit SIC code indicators are used to control for industry fixed effects. The numbers in parentheses are t -statistics based on standard errors adjusted for heteroskedasticity. Appendix I provides a detailed description on the construction of the variables. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Subsample Analysis According to Relationship Strength and Supplier Financial Constraints Index

	Change in supplier sales fraction							
	Suppliers in Durable Industry That Have High <i>HP</i> Index		Suppliers with both High <i>HP</i> Index and High R&D expenditures / sales		Suppliers in Non-durable Industry or Suppliers with Low <i>HP</i> Index		Suppliers with Low <i>HP</i> Index or Suppliers with Low R&D expenditures / sales	
	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tariff reduction (indicator)	0.108** (2.16)	0.199*** (2.99)	0.126 (1.33)	0.164 (1.45)	0.018 (0.59)	0.007 (0.20)	0.021 (0.81)	0.042 (1.19)
Wald χ^2 test for Tariff reduction (p -value)					Columns (1) vs. (5) 0.07*	Columns (2) vs. (6) 0.00***	Columns (3) vs. (7) 0.16	Columns (4) vs. (8) 0.11
Controls in Table III	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	100	70	88	58	257	161	269	173
Adjusted R^2	0.033	0.201	0.058	0.197	0.118	0.259	0.078	0.240

Panel B: Subsample Analysis according to Relationship Strength and Supplier Credit Rating

	Change in supplier sales fraction							
	Suppliers without Having Credit Rating That are in Durable Industry		Suppliers without Having Credit Rating and with High R&D expenditures / sales		Suppliers with Credit Rating or Suppliers in Non-durable Industry		Suppliers with Credit Rating or Suppliers with Low R&D expenditures / sales	
	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tariff reduction (indicator)	0.082** (2.31)	0.143*** (2.94)	0.118** (2.09)	0.150* (1.87)	0.026 (0.59)	0.030 (0.73)	0.006 (0.21)	0.031 (0.76)
Wald χ^2 test for Tariff reduction (p -value)					Columns (1) vs. (5) 0.25	Columns (2) vs. (6) 0.03**	Columns (3) vs. (7) 0.04**	Columns (4) vs. (8) 0.08*
Controls in Table III	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	158	106	139	87	199	125	218	144
Adjusted R^2	0.075	0.235	0.128	0.293	0.094	0.267	0.108	0.208

Panel C: Subsample Analysis According to Relationship Strength and Supplier Dividend Payment

	Change in supplier sales fraction							
	Suppliers Not Paying Dividend and in Durable Industry		Suppliers Not Paying Dividend and with High R&D expenditures / sales		Suppliers Paying Dividends or in Non-durable Industry		Suppliers Paying Dividends or with Low R&D expenditures / sales	
	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tariff reduction (indicator)	0.083* (1.78)	0.145** (2.13)	0.102* (1.92)	0.123* (1.69)	0.017 (0.49)	0.037 (1.03)	0.007 (0.26)	0.021 (0.52)
Wald χ^2 test for Tariff reduction (p -value)					Columns (1) vs. (5) 0.18	Columns (2) vs. (6) 0.07*	Columns (3) vs. (7) 0.06*	Columns (4) vs. (8) 0.11
Controls in Table III	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	125	80	138	85	232	151	219	146
Adjusted R^2	0.001	0.155	0.118	0.303	0.132	0.330	0.065	0.143

Table VII
Effect of Tariff Reductions on the Number of Customers That Suppliers Maintain in the Post-Tariff Reduction Period

This table presents estimates of OLS regressions of the number of customers that suppliers maintain and logit regressions of having a new customer in the post-tariff reduction period for a propensity-score matched sample of customer-supplier pairs. The sample consists of 420 customer-supplier relationship pairs in which the largest customers in the manufacturing industry (Standard Industrial Classification (SIC) codes between 2000 and 4000) experience a significant tariff reduction during the 1990 to 2005 period, and 420 control customer-supplier relationship pairs in which the largest customers do not experience a significant tariff reduction. The customer-supplier pairs are split into subsamples according to whether the supplier financial constraints index (Hadlock and Pierce (2010) index (*HP* index)) is above the sample median (Panel A), whether the supplier has a S&P long term issuer credit rating (Panel B), and whether the supplier pay dividends in the previous year (Panel C). A significant tariff reduction is considered being taken place if the negative change in yearly tariff rate is three times larger than the average reduction in the industry over the sample period. I experiment with the nearest neighborhood approach. First, I use a logit model to estimate the probability (i.e., propensity score) of facing a significant tariff reduction. The dependent variable is an indicator for a significant tariff reduction and independent variables are relationship-, customer-, and supplier-characteristics. I consider as relationship characteristics the ratio of a supplier's sales to the largest customer to its total sales and the past relationship duration of the customer and supplier. Customer characteristics I consider include firm size, tangibility, leverage, Tobin's q , return on assets (ROA), R&D intensity, and cash ratio. Supplier characteristics I consider include firm size, tangibility, leverage, Tobin's q , ROA, and R&D intensity. I then match, without replacement, a customer-supplier pair that includes customers whose industries experience a significant tariff reduction with a customer-supplier pair that includes customers whose industries do not experience a significant tariff reduction. All control variables are measured as of the fiscal year immediately prior to tariff reduction. Two-digit SIC code indicators are used to control for industry fixed effects. The numbers in parentheses are t -statistics (z -statistics) based on standard errors adjusted for heteroskedasticity in OLS (logit) regressions. Appendix I provides a detailed description on the construction of the variables. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Subsample Analysis According to Supplier *HP* Index

	Suppliers with High <i>HP</i> Index				Suppliers with Low <i>HP</i> Index			
	Number of all customers		New customers (indicator)		Number of all customers		New customers (indicator)	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tariff reduction (indicator)	-0.047	-0.011	0.045	0.097	0.318**	0.463**	0.302	0.541
	(-0.43)	(-0.10)	(0.13)	(0.29)	(2.19)	(2.51)	(0.70)	(1.43)
Wald χ^2 test for Tariff reduction (p -value)					Columns (1) vs. (5)	Columns (2) vs. (6)	Columns (3) vs. (7)	Columns (4) vs. (8)
					0.02**	0.01***	0.64	0.38
Controls in Table III	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	295	210	365	364	273	190	352	358
Adjusted/Pseudo R^2	0.030	0.063	0.108	0.115	0.198	0.078	0.116	0.193

Panel B: Subsample Analysis According to Whether Suppliers Have Credit Rating

	Suppliers Without Having Credit Rating				Suppliers Having Credit Rating			
	Number of all customers		New customers (indicator)		Number of all customers		New customers (indicator)	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Independent variables								
Tariff reduction (indicator)	0.051 (0.56)	0.041 (0.41)	0.065 (0.25)	0.081 (0.34)	0.599 (1.35)	1.190 (1.72)	5.251* (1.89)	13.785*** (3.16)
Wald χ^2 test for Tariff reduction (p -value)					Columns (1) vs. (5) 0.06*	Columns (2) vs. (6) 0.00***	Columns (3) vs. (7) 0.06*	Columns (4) vs. (8) 0.00***
Controls in Table III	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	485	343	666	653	83	57	54	62
Adjusted/Pseudo R^2	0.199	0.141	0.068	0.102	0.054	-0.033	0.406	0.526

Panel C: Subsample Analysis according to Whether Suppliers Pay Dividends

	Suppliers Paying No Dividends				Suppliers Paying Dividends			
	Number of all customers		New customers (indicator)		Number of all customers		New customers (indicator)	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Independent variables								
Tariff reduction (indicator)	0.023 (0.24)	0.004 (0.03)	-0.105 (-0.42)	0.071 (0.30)	0.414** (2.05)	0.691** (2.45)	4.330** (2.54)	7.914*** (3.13)
Wald χ^2 test for Tariff reduction (p -value)					Columns (1) vs. (5) 0.03**	Columns (2) vs. (6) 0.00***	Columns (3) vs. (7) 0.00***	Columns (4) vs. (8) 0.00***
Controls in Table III	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplier industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	417	288	609	600	151	112	109	113
Adjusted/Pseudo R^2	0.325	0.114	0.061	0.096	0.320	0.329	0.393	0.442

Table VIII
Effect of Tariff Reductions on Customer Future Operating Performance and Sales

This table presents descriptive statistics (mean) for customers in the propensity-score matched sample (Panel A) and estimates of OLS regressions of the changes in customer operating performance and sales on tariff reduction and the changes in customer purchases from financially constrained and unconstrained suppliers (Panel B). The sample consists of 298 customers in the manufacturing industry (Standard Industrial Classification (SIC) codes between 2000 and 4000) that experience a significant tariff reduction during the 1990-2005 period, and 298 control customers that do not experience a significant tariff reduction. A significant tariff reduction is considered being taken place if the negative change in yearly tariff rate is three times larger than the average reduction in the industry over the sample period. I experiment with the nearest neighborhood approach. First, I use a logit model to estimate the probability (i.e., propensity score) of facing a significant tariff reduction. The dependent variable is an indicator for a significant tariff reduction and independent variables are aggregate supplier- and customer-characteristics. I consider as aggregate supplier-characteristics the logarithm of the total number of suppliers of a customer and the ratio of a customer's purchases from all its suppliers to its cost of goods sold (COGS). Customer characteristics I consider include firm size, tangibility, leverage, Tobin's q , return on assets (ROA), R&D intensity, and cash ratio. I then match, without replacement, a customer in industries that experience a significant tariff reduction with a customer in industries that do not experience a significant tariff reduction. In Panel B, the change in the ratio of a customer's total purchases from suppliers to its COGS is computed separately for financially constrained and financially unconstrained suppliers. Suppliers are grouped as financially unconstrained (constrained) suppliers if their Hadlock and Pierce (2010) index (HP index) is below (above) the sample median (columns (1) and (2)), if the supplier has (does not have) a credit rating (columns (3) and (4)), and if the supplier pays (does not pay) dividends (columns (5) and (6)). All control variables are measured as of the fiscal year immediately prior to tariff reduction, except for ROA, which is measured two years prior to tariff reduction, and the change in the ratio of a customer's total purchases from financially constrained (unconstrained) suppliers to its COGS ratio, which is measured as the change in the ratio from year -1 to year +1 in the odd numbered columns and from year -1 to year +2 in the even numbered columns. The numbers in parentheses are t -statistics based on standard errors adjusted for heteroskedasticity. Appendix I provides a detailed description on the construction of the variables. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Descriptive Statistics (Mean) for Customers in the Propensity-Score Matched Sample

Matching variables	Treated customers (N = 298)	Control customers (N = 298)	Test of difference (p -value)
Firm size	9.315	9.234	0.081 (0.29)
Tangibility	0.321	0.314	0.007 (0.62)
Leverage	0.317	0.314	0.003 (0.85)
Tobin's q	1.881	1.833	0.048 (0.65)
ROA	0.079	0.079	0.000 (0.96)
R&D expenditures / sales	0.299	0.064	0.235 (0.33)
Cash / total assets	0.119	0.122	-0.003 (0.75)
Log (number of suppliers)	0.397	0.374	0.023 (0.38)
Ratio of a customers' purchases from all suppliers to its COGS	0.031	0.062	-0.031 (0.14)

Panel B: OLS Regression of the Changes in Customers Performance and Sales On Tariff Reductions And Changes in Customer Purchases from Financially Constrained and Unconstrained Suppliers

	Change in customer ROA						Change in customer sales / assets					
	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2	Year -1 to year 1	Year -1 to year 2
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Tariff reduction (indicator): a	-0.006 (-0.73)	0.005 (0.58)	-0.003 (-0.39)	0.009 (1.08)	-0.001 (-0.17)	0.010 (1.23)	0.007 (0.25)	0.004 (0.13)	0.010 (0.40)	0.010 (0.37)	0.010 (0.36)	0.009 (0.31)
<i>Financial constraint using supplier HP index</i>												
Change in the ratio of a customer's total purchases from financially constrained suppliers to its COGS: b	0.142* (1.66)	0.090 (1.33)					0.279*** (3.25)	0.258*** (5.07)				
Change in the ratio of a customer's total purchases from financially unconstrained suppliers to its COGS: c	-0.002 (-0.76)	0.000 (0.16)					-0.044*** (-7.94)	-0.030*** (-6.52)				
a x b	-0.842*** (-4.59)	-0.675*** (-3.52)					-0.817*** (-3.64)	-0.761*** (-3.25)				
a x c	0.095 (0.48)	0.195 (1.05)					0.391 (0.82)	0.616 (1.22)				
<i>Financial constraint using supplier credit rating</i>												
Change in the ratio of a customer's total purchases from financially constrained suppliers to its COGS: d			0.034 (1.13)	0.039 (1.06)					0.056 (0.94)	0.090 (1.21)		
Change in the ratio of a customer's total purchases from financially unconstrained suppliers to its COGS: e			0.006 (1.49)	0.004 (1.62)					-0.025*** (-2.73)	-0.018*** (-3.00)		
a x d			-0.432*** (-2.83)	-0.377*** (-2.71)					-0.354* (-1.96)	-0.399** (-2.28)		
a x e			0.026 (0.16)	0.055 (0.27)					0.481 (0.72)	0.653 (0.85)		
<i>Financial constraint using supplier dividend policy</i>												
Change in the ratio of a customer's total purchases from financially constrained suppliers to its COGS: f					0.004 (1.49)	0.003 (1.52)					-0.031*** (-3.82)	-0.021*** (-3.37)
Change in the ratio of a customer's total purchases from financially unconstrained suppliers to its COGS: g					0.434 (1.42)	0.291 (0.85)					-1.710 (-1.30)	-1.750 (-1.18)
a x f					-0.410* (-1.96)	-0.365* (-1.84)					-0.219 (-0.74)	-0.217 (-0.70)
a x g					-0.571 (-1.16)	-0.335 (-0.73)					1.948 (1.31)	2.243 (1.42)
Customer Characteristics in Panel A of Table III	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	566	521	566	521	566	521	566	521	566	521	566	521
Adjusted R ²	0.265	0.302	0.235	0.282	0.226	0.273	0.123	0.152	0.116	0.143	0.114	0.138

Table IX
Robustness Tests: Effect of Import Penetration Index on Customer-Supplier Relationships

This table presents summary statistics for customer-supplier pairs that include customers operating in highly competitive industries and customer-supplier pairs that include customers operating in less competitive industries (Panel A) and estimates of OLS and 2SLS regressions of the ratio of a supplier's sales to the largest customer to its total sales (Panel B). The sample consists of 8,358 customer-supplier-year pairs of suppliers and their largest customers in the manufacturing industry (Standard Industrial Classification (SIC) codes between 2000 and 4000) during the 1990 to 2005 period. The *Import penetration index* is computed as the ratio of the value of imports in the four-digit SIC to the sum of value of shipments and net traded goods in the same four-digit SIC. In Panel A, customers are split into high and low competitive industries using the median lagged Import Penetration Index. In Panel B, the instrumental variable, *Tariff*, is measured as the ratio of duties collected by U.S. Custom divided by the Free-On-Board custom value of total imports in the industry. The instrumental variable, *Foreign exchange rate*, is the foreign exchange rate expressed as foreign currency per dollar using country trading weights that are calculated based on the country's share of imported goods in the industry as of 1990. Both instruments are lagged by two years. All control variables are lagged by one year. Two-digit SIC code indicators are used to control for industry fixed effects. The numbers in parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity and firm clustering in columns (1) and (2) and *t*-statistics in columns (3) and (4). Appendix I provides a detailed description on the construction of the variables. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Summary Statistics

Variable	Full sample (N = 8,358)		Customers in high import penetration index industry (N = 4,182)		Customers in low import penetration index industry (N = 4,176)		Test of difference	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Import penetration index	0.188	0.170	0.296	0.281	0.079	0.075	0.217***	0.207***
<i>Relationship characteristics</i>								
Sales to customer (in \$million)	131.132	11.613	212.279	20.457	49.868	5.815	162.410***	14.642***
Supplier sales to customer / total sales	0.282	0.200	0.263	0.198	0.300	0.200	-0.036***	-0.002*
Past relationship duration (in years)	1.851	1.000	2.173	1.000	1.528	1.000	0.645***	0.000***
Future relationship duration (in years)	2.583	1.000	3.034	2.000	2.130	1.000	0.904***	1.000***
<i>Customer characteristics</i>								
Total assets (in \$billion)	56.774	14.893	90.815	23.895	20.541	10.642	70.274***	13.253***
Leverage	0.251	0.230	0.267	0.235	0.241	0.228	0.026***	0.007***
Tobin's <i>q</i>	2.236	1.570	1.983	1.283	2.510	1.800	-0.526***	-0.517***
ROA	0.095	0.087	0.077	0.066	0.115	0.110	-0.037***	-0.044***
Cash / assets	0.126	0.073	0.139	0.080	0.112	0.060	0.027***	0.020***
R&D expenditures / sales	0.151	0.046	0.158	0.047	0.143	0.037	0.015	0.011***
<i>Supplier characteristics</i>								
Number of customers	1.529	1.000	1.676	1.000	1.381	1.000	0.295***	0.000***
Total assets (in \$million)	716.870	66.239	906.087	101.237	527.165	41.634	378.922***	59.603***
Leverage	0.277	0.226	0.299	0.248	0.254	0.198	0.045***	0.049***
Tobin's <i>q</i>	3.033	1.538	3.187	1.442	2.873	1.673	0.314	-0.231***
ROA	-0.086	0.044	-0.050	0.064	-0.121	0.015	0.071***	0.049***
R&D expenditures / sales	1.162	0.027	0.391	0.030	1.940	0.021	-1.549***	0.009

Panel B: OLS and 2SLS Regressions of the Ratio of a Supplier's Sales to the Largest Customer to Its Total Sales on Import Penetration Index

	OLS		2SLS	
	Supplier's sales to the largest customer / total sales		1st stage (import penetration index)	2nd stage (supplier's sales to the largest customer / total sales)
Independent variables	(1)	(2)	(3)	(4)
Import penetration index	0.082** (2.15)	0.109** (2.07)		
Instrumented import penetration index				0.333*** (2.81)
Tariff			-0.012*** (-13.21)	
Foreign exchange rate			0.400*** (17.10)	
Past relationship duration	0.010*** (5.64)	0.010*** (4.05)	-0.001 (-1.12)	0.011*** (6.90)
<i>Supplier firm characteristics</i>				
Firm size	-0.066*** (-10.31)	-0.075*** (-10.27)	0.001 (0.46)	-0.076*** (-15.86)
Leverage	-0.077*** (-3.68)	-0.090*** (-3.64)	0.018** (2.47)	-0.099*** (-5.61)
Tobin's q	-0.001*** (-4.51)	-0.001*** (-4.48)	0.000** (2.30)	-0.001*** (-6.28)
ROA	-0.039*** (-3.97)	-0.040*** (-3.81)	0.004 (1.36)	-0.040*** (-5.53)
R&D expenditures / sales	0.001*** (3.94)	0.001*** (3.39)	-0.000 (-0.13)	0.001*** (5.20)
<i>Customer firm characteristics</i>				
Firm size		0.000 (0.01)	-0.012*** (-5.18)	-0.003 (-0.47)
Leverage		-0.047 (-1.14)	0.112*** (8.32)	-0.084** (-2.36)
Tobin's q		0.001 (0.31)	0.001* (1.81)	0.000 (0.02)
ROA		0.092** (2.19)	-0.010 (-0.67)	0.088** (2.53)
R&D expenditures / sales		-0.002 (-1.08)	-0.001* (-1.95)	-0.002 (-1.13)
Cash / assets		-0.012 (-0.31)	0.077*** (6.14)	-0.049 (-1.52)
Constant	0.830*** (8.07)	0.962*** (7.30)	-0.146*** (-3.87)	1.035*** (12.76)
Supplier industry fixed effects	Yes	Yes	Yes	Yes
Customer industry fixed effects	No	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
First-stage Cragg-Donald statistic (identification test)	(Weak		F -statistic: 207.49 (0.00)	
Second-stage Sargan statistic (Overidentification test)				χ^2 -square: 0.75 (0.39)
Observations	6,437	4,501	3,975	3,975
Adjusted R^2	0.208	0.252	0.623	0.250

Table X
Robustness Tests: Difference-in-Differences Tests

This table presents estimates of OLS regressions of a supplier's sales to the largest customer to its total sales and the logarithm of its sales to the largest customer, Cox proportional hazard model of customer-supplier relationship duration, and logit regressions of future relationship continuance in the post-tariff reduction period for a propensity-score matched sample of customer-supplier pairs. The initial sample consists of 420 customer-supplier relationship pairs in which the largest customers in the manufacturing industry (Standard Industrial Classification (SIC) codes between 2000 and 4000) experience a significant tariff reduction in a given year during the 1990 to 2005 period, and 420 control customer-supplier relationship pairs in which the largest customers do not experience a significant tariff reduction. I then include customer-supplier relationship pairs in all the other years during which customer-supplier relationship continue. The final sample consists of 2,694 customer-supplier-year observations. A significant tariff reduction is considered being taken place if the negative change in yearly tariff rate is three times larger than the average reduction in the industry over the sample period. I experiment with the nearest neighborhood approach. First, I use a logit model to estimate the probability (i.e., propensity score) of facing a significant tariff reduction. The dependent variable is an indicator for a significant tariff reduction and independent variables are relationship-, customer-, and supplier-characteristics. I consider as relationship characteristics the ratio of a supplier's sales to the largest customer to its total sales and the past relationship duration of the customer and supplier. Customer characteristics I consider include firm size, tangibility, leverage, Tobin's q , return on assets (ROA), R&D intensity, and cash ratio. Supplier characteristics I consider include firm size, tangibility, leverage, Tobin's q , ROA, and R&D intensity. I then match, without replacement, a customer-supplier pair that includes customers whose industries experience a significant tariff reduction with a customer-supplier pair that includes customers whose industries do not experience a significant tariff reduction. *After* is an indicator that takes the value of one if the year in which the customer-supplier pair is observed is in the post-tariff reduction period. All control variables are measured as of the fiscal year immediately prior to tariff reduction. Two-digit SIC code indicators are used to control for industry fixed effects. One-digit SIC code-year indicators are used to control for industry-year fixed effects. The numbers in parentheses are t -statistics (z-statistics) based on standard errors adjusted for heteroskedasticity for OLS (Cox and logit) regressions. Appendix I provides a detailed description on the construction of the variables. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	OLS: Supplier's sales to the largest customer / total sales				OLS: Log (supplier sales to the largest customer)				Cox: Relationship duration		Logit: Indicator for Relationship continue	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2			Year 1	Year 2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Independent variables												
Tariff reduction (indicator): a	-0.004 (-0.31)	-0.017 (-0.92)			0.049 (0.70)	-0.031 (-0.37)						
After (indicator): b	0.004 (0.29)	-0.017 (-1.10)			0.109 (1.51)	0.035 (0.41)						
a x b	0.032* (1.72)	0.064*** (2.86)	0.026* (1.78)	0.049*** (2.70)	0.248** (2.36)	0.449*** (3.70)	0.160** (2.07)	0.320*** (3.34)	0.643*** (-8.32)	0.868** (-2.25)	2.046*** (3.74)	1.459*** (3.07)
Past relationship duration	0.004* (1.96)	0.004 (1.54)	-0.004 (-1.54)	-0.009*** (-2.83)	0.025*** (2.77)	0.021** (2.20)	-0.006 (-0.35)	-0.017 (-0.93)	1.030*** (2.78)	2.459*** (15.11)	-0.791*** (-5.50)	-0.899*** (-6.99)
Supplier sales fraction									0.642*** (-3.89)	0.757*** (-3.28)	0.201 (0.34)	-0.055 (-0.10)
Supplier firm characteristics												
Firm size	-0.064***	-0.056***	-0.069**	-0.020	1.939***	1.973***	0.547***	0.436***	0.972	0.807**	-0.094	0.238

	(-9.86)	(-7.15)	(-2.28)	(-0.62)	(51.85)	(47.80)	(3.27)	(2.72)	(-0.90)	(-2.11)	(-0.14)	(0.33)
Leverage	-0.071***	-0.056*	-0.072**	-0.059	0.499***	0.477***	-0.378*	-0.271	0.634***	1.450***	0.359	-0.743
	(-2.67)	(-1.88)	(-2.17)	(-1.43)	(3.36)	(2.70)	(-1.87)	(-1.16)	(-3.83)	(2.67)	(0.37)	(-0.80)
Tobin's q	0.004	0.005	-0.004	0.000	0.025**	0.026**	-0.012	0.002	1.000	1.004	0.006	0.044
	(1.26)	(1.57)	(-1.25)	(0.14)	(2.47)	(2.19)	(-0.98)	(0.15)	(-0.05)	(0.49)	(0.13)	(0.76)
ROA	-0.047*	-0.064*	0.042	-0.028	0.862***	0.777***	0.079	-0.420**	0.660***	1.162	0.557	0.016
	(-1.66)	(-1.85)	(1.04)	(-0.74)	(6.51)	(5.23)	(0.46)	(-2.25)	(-5.44)	(1.60)	(0.81)	(0.02)
R&D expenditures / sales	0.001	0.000	-0.001	-0.005***	0.000	0.004	0.000	-0.008	1.000	1.001	0.015	0.002
	(1.37)	(0.04)	(-1.05)	(-2.98)	(0.11)	(0.74)	(0.01)	(-1.02)	(0.30)	(0.57)	(0.65)	(0.37)
<i>Customer firm characteristics</i>												
Firm size	-0.005	-0.010	0.018	-0.026	0.012	-0.027	0.346**	0.113	0.985	2.523***	-1.216	-1.861**
	(-0.65)	(-0.99)	(0.86)	(-0.98)	(0.27)	(-0.48)	(2.10)	(0.63)	(-0.50)	(4.52)	(-1.18)	(-2.25)
Leverage	0.086**	0.087*	0.025	-0.038	-0.347	-0.164	-0.616*	-0.371	0.638**	1.231	-2.827	-1.602
	(2.01)	(1.74)	(0.44)	(-0.59)	(-1.42)	(-0.59)	(-1.68)	(-0.98)	(-2.19)	(0.67)	(-1.50)	(-0.89)
Tobin's q	0.013**	0.012*	0.008	0.002	0.017	0.020	0.052**	0.022	0.992	1.033	-0.136	-0.242**
	(2.20)	(1.82)	(1.39)	(0.44)	(0.59)	(0.58)	(2.11)	(0.76)	(-0.34)	(1.49)	(-1.04)	(-1.96)
ROA	0.198***	0.227***	0.028	-0.044	-0.212	-0.101	0.329	0.661	0.391***	0.394***	-0.787	2.169
	(3.75)	(2.81)	(0.34)	(-0.49)	(-0.66)	(-0.23)	(0.80)	(1.24)	(-3.44)	(-3.10)	(-0.57)	(1.46)
R&D expenditures / sales	0.000	0.182	-0.209	-0.346	-1.839***	-0.795	0.598	1.171	1.467	1.934***	-2.603**	-4.010
	(0.00)	(1.49)	(-1.08)	(-0.76)	(-3.12)	(-1.44)	(0.58)	(0.64)	(1.53)	(3.60)	(-2.06)	(-1.20)
Cash / assets	-0.032	-0.137**	-0.128**	-0.146**	0.104	-0.241	-1.277***	-1.210***	0.686	3.386***	-2.146	-2.489
	(-0.64)	(-2.10)	(-1.99)	(-2.10)	(0.32)	(-0.63)	(-3.35)	(-3.09)	(-1.49)	(4.13)	(-1.19)	(-1.38)
Constant	0.695***	0.696***	0.648**	0.806**	-13.167***	-12.826***	-3.509*	-0.112			16.952	21.693**
	(8.45)	(7.12)	(2.07)	(2.19)	(-27.44)	(-23.80)	(-1.75)	(-0.05)			(1.36)	(2.14)
Supplier industry fixed effects	Yes	Yes	No	No	Yes	Yes	No	No	Yes	No	No	No
Supplier firm fixed effects	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes
Year fixed effects	No	No	No	No	No	No	No	No	Yes	No	No	No
Supplier industry-year fixed effects	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes
Observations	1,808	1,278	1,808	1,278	1,951	1,449	1,951	1,449	2,694	2,694	2,009	1,979
Pseudo/Adjusted R^2	0.193	0.182	0.704	0.736	0.743	0.741	0.900	0.908	0.020	0.105	0.395	0.466

Appendix I Variable Definitions

This appendix provides a detailed description of the variables used in the tables.

Variable	Definition
Cash / assets	Ratio of cash to total assets.
Firm size	Logarithm of the book value of total assets.
Future relationship duration	Number of years the customer-supplier relationship lasts post tariff reduction.
<i>HP</i> index	Following Hadlock and Pierce (2010), <i>HP</i> index measured as $-0.737 \times \log(\text{assets}) + 0.043 \times \log(\text{assets})^2 + 0.04 \times \text{firm age}$.
Leverage	Book value of debt (current liabilities plus long-term debt) divided by the market value of assets (book value of assets minus book value of equity plus market value of equity).
Log (number of suppliers)	Logarithm of the total number of suppliers in a year that the customer maintains as identified from the Business Segment File of Compustat.
New customers	Indicator that takes the value of one if the customer-supplier pair is observed for the first time in the Business Segment File of Compustat, and zero otherwise.
Number of all customers	Total number of customers in a given year identified from the Business Segment File of Compustat.
Past relationship duration	Number of years the customer-supplier relationship lasts prior to tariff reduction.
R&D expenditures / sales	Ratio of research and development expenses to total sales.
Ratio of a customers' purchases from all suppliers to its COGS	Ratio of a customer's total purchases from all suppliers identified from the Business Segment File of Compustat to its cost of goods sold.
ROA	Ratio of operating income after depreciation to total assets.
Sales / assets	Ratio of total sales to total assets.
Supplier sales fraction	Ratio of a supplier's sales to the largest customer to its total sales.
Tangibility	Ratio of net property, plant, and equipment to total assets.
Tariff reduction	Indicator that takes the value of one if a reduction in tariff is three times greater than the average reduction in tariff in the industry during the sample period of 1990-2005.
Tobin's <i>q</i>	Market value of assets (total book value of assets minus book value of equity plus market value of equity) over book value of assets.

Appendix II

Availability of Tariff Data by Industry

This table reports the availability of tariff data for manufacturing industries (Standard Industrial Classification (SIC) codes between 2000 and 4000). The industry level tariffs are calculated as duties collected at U.S. Custom divided by the Free-On-Board custom value of imports. A significant tariff reduction is considered being taken place if the negative change in yearly tariff rate is three times larger than the average reduction in the industry over the sample period from 1990 to 2005.

Description	Sample size
Number of manufacturing industries with tariff data	507
Number after merging with Compustat	108
Number of significant tariff reductions	108
Unique number of industries with significant tariff reductions	57

Figure 1
Distribution of Tariff Reductions by Year

This figure shows annual industry distribution of significant tariff reductions for 420 largest customers in the manufacturing industry (Standard Industrial Classification (SIC) codes between 2000 and 4000) during the 1990 to 2005 period. A significant tariff reduction is considered being taken place if the negative change in yearly tariff rate is three times larger than the average reduction in the industry over the sample period.

Figure 2
Tariff Rates Around Tariff Reduction Year

This figure shows the average tariff rate in customer industries that undergo a significant tariff reduction compared to the average tariff rate in customer industries that do not undergo a significant tariff reduction in the years around tariff reduction in the propensity-score matched sample. The sample consists of 420 customer-supplier relationship pairs in which the largest customers in the manufacturing industry (Standard Industrial Classification (SIC) codes between 2000 and 4000) experience a significant tariff reduction during the 1990 to 2005 period, and 420 control customer-supplier relationship pairs in which the largest customers do not experience a significant tariff reduction. A significant tariff reduction is considered being taken place if the negative change in yearly tariff rate is three times larger than the average reduction in the industry over the sample period. I experiment with the nearest neighborhood approach. First, I use a logit model to estimate the probability (i.e., propensity score) of facing a significant tariff reduction. The dependent variable is an indicator for a significant tariff reduction and independent variables are relationship-, customer-, and supplier-characteristics. I consider as relationship characteristics the ratio of a supplier's sales to the largest customer to its total sales and the past relationship duration of the customer and supplier. Customer characteristics I consider include firm size, tangibility, leverage, Tobin's q , return on assets (ROA), R&D intensity, and cash ratio. Supplier characteristics I consider include firm size, tangibility, leverage, Tobin's q , ROA, and R&D intensity. I then match, without replacement, a customer-supplier pair that includes customers whose industries experience a significant tariff reduction with a customer-supplier pair that include customers whose industries do not experience a significant tariff reduction.