TO SAVE OR TO INVEST?
STRATEGIC MANAGEMENT DURING THE FINANCIAL CRISIS

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January 2018

ABSTRACT

We exploit the credit crunch of 2007 to empirically examine how companies adjusted their investments in key strategic resources—i.e., their workforce, capital expenditures, R&D, and corporate social responsibility (CSR)—in response to the financial crisis. In August 2007, the cost of credit sky-rocketed due to the collapse of the asset-backed securities market. We compare companies whose long-term debt matured shortly before and after August 2007 to obtain (quasi-) random variation in the extent to which companies were hit by the financial crisis. We find that companies that were adversely affected followed a "two-pronged" approach of curtailing their workforce and capital expenditures, while maintaining their investments in R&D and CSR. We further document that firms that followed this two-pronged approach performed better once the economy recovered.

Keywords: financial crisis; innovation; corporate social responsibility; employment; capital expenditures; financial performance.

* We are grateful to Ruth Aguilera, Juan Alcacer, Pratima Bansal, Mary Benner, Julian Birkinshaw, Alex Edmans, Andrew Ellul, Kira Fabrizio, Emilie Feldman, Xavier Giroud, Olga Hawn, Rebecca Henderson, Burak Konduk, Philipp Krueger, Jiao Luo, Costas Markides, Anoop Menon, Frank Nagle, Judy Samuelson, Henri Servaes, Freek Vermeulen, as well as seminar participants at the Annual Meeting of the Strategic Management Society, the BYU-Utah Winter Strategy Conference, the Annual Meeting of the Academy of Management, the Ackerman Corporate Governance Conference, Cardiff University, George Washington University, and London Business School for helpful comments and suggestions. An earlier version of this paper was circulated under the title "The dog that didn't bark: Long-term strategies in times of economic crisis."

INTRODUCTION

The financial crisis and economic meltdown of 2007-2009—the so-called "Great Recession"—was disruptive for firms across industries, markets, and geographies.[1] It resulted *inter alia* in the collapse of the financial sector, radical changes in the regulatory and policy environment, and a severe contraction of the world economy (e.g., Brunnermeier, 2009; Gorton, 2010; Mian and Sufi, 2009, 2010, 2011, 2014; Mian, Rao, and Sufi, 2013). In short—and in contrast to regular macroeconomic business cycles—an economic meltdown of this magnitude fundamentally affects all aspects of firms' business environment, unsettles their stakeholder relationships (such as relationships with customers, employees, suppliers, and local communities), and generates a major shift in the competitive landscape. Accordingly, companies are likely to fundamentally rethink and reshape their strategic investments to ensure survival and sustain (or even enhance) their competitiveness.

Despite the severity of economic meltdowns, we know little about their impact on firm-level decision-making and, in particular, on how firms adjust their resource base as they navigate through the shifting landscape and new economic realities brought about by the meltdown. While there is a large literature on organizational decline and corporate turnaround (for a review, see Trahms et al., 2013), this literature focuses on very different sources of organizational decline (e.g., technology shocks, environmental jolts, regular business cycle fluctuations, etc.). This is in sharp contrast to economic meltdowns—such as the Great Recession of 2007-2009—that leave virtually no aspect of firms' operations unaffected and fundamentally challenge the way

[1] The 2007-2009 crisis has been named the "Great Recession" because it was the worst post-World War II contraction on record. According to the U.S. Department of Labor, the U.S. gross domestic product (GDP) contracted by approximately 5.1% between December 2007 and June 2009. About 8.7 million jobs were lost, while the unemployment rate climbed from 5.0% in December 2007 to 9.5% by June 2009, and peaked at 10.0% by October of the same year.

companies would adjust their resource base to maintain competitiveness.

To provide an impetus for scholars to research this understudied, yet very important, phenomenon and its implications for companies, we set out to investigate how companies adjusted their strategic investments during the Great Recession of 2007-2009. In so doing, we respond to the recent call for research that studies firms' strategic actions during the Great Recession (e.g., Agarwal, Barney, Foss, and Klein, 2009; Garcia-Sanchez et al., 2014). In keeping with the objective of this special issue on phenomenon-based empirical strategy research, we focus on documenting the impact of this phenomenon on firm-level decision-making. As such, this study is exploratory in nature (as opposed to hypotheses-driven). More specifically, we examine whether and in which direction firms adjusted their workforce, capital expenditures (CAPEX), as well as their investments in R&D and corporate social responsibility (CSR)—all of which are identified in the literature as key strategic firm resources that enable firms to create long-term value (Barney, 1991).

Whether firms would decrease, maintain, or increase their strategic investments in these resources is not *a priori* obvious given that an economic meltdown presents firms with both challenges as well as opportunities. On one hand, an economic crisis may severely undermine firms' ability to undertake investments (e.g., because of liquidity constraints). As a result, firms may lay off employees, divest from their physical assets, postpone or even cancel R&D projects, or eliminate CSR programs in order to maintain cash flows. In other words, firms may try to *save their way out of the crisis*. On the other hand, an economic crisis may present an opportunity for firms to expand their investments, that is, they may try to *invest their way out of the crisis*. For example, an economic crisis might generate opportunities to acquire new equipment at lower cost or hire employees at lower wages. Moreover, firms could invest in their innovative capabilities

and CSR to strengthen their competitiveness for when the economy recovers.[2]

From an empirical perspective, the question of how companies adjust their resource base during an economic meltdown is difficult to answer. There are two main obstacles. First, economic meltdowns are (fortunately) rare events—the last two economic meltdowns were the Great Depression of 1929 and the Great Recession of 2007-2009.[3] While the lack of historical data makes it difficult to study the Great Depression—and likely explains the scant evidence from prior research—the Great Recession of 2007-2009 lends itself to this analysis.

The second obstacle is that all companies are affected (i.e., "treated") by an economic meltdown; thus, there is no natural "control" group that provides a counterfactual of how companies would have behaved had they not been affected by the meltdown. Having a control group is important to rule out potential confounds. For example, a "naive" approach to examine how companies adjusted their resource base during the crisis would be to compute the average change in firm resources (e.g., the firm's workforce, R&D, or CSR) from 2007-2009. Yet, such comparison might pick up latent trends in these variables. For example, several articles document an upward trend in CSR over the years (e.g., Flammer, 2013). Observing an increase in CSR from 2007-2009 could be reflective of this trend, as opposed to being evidence that companies strategically expanded their CSR in order to "invest their way out of the crisis." Similarly, the secular decline of the U.S. manufacturing sector has led to a trend towards a service- and knowledge-based economy along with a rise in intangibles such as R&D (e.g., Falato, Kadyrzhanova, and Sim, 2013). As a result, computing changes in the workforce and R&D from

[2] Relatedly, the practitioner literature highlights the need for companies to "invest their way out of a crisis" (e.g., Ghemawat, 2009; Gulati, Nohria, and Wohlgezogen, 2010).

[3] This does not mean that economic meltdowns are unlikely. In their review of economic crises over the past 800 years, Reinhart and Rogoff (2009) note that—over a long horizon—economic meltdowns are surprisingly frequent, and will inevitably happen again.

2007-2009 could be picking up (some of) these trends. Ultimately, as these examples illustrate, to assess the *causal* impact of the crisis on firms' investment strategy, we need a control group to account for such latent trends.

Studying the Great Recession helps overcome this second obstacle as well. In particular, an important feature of the Great Recession was the collapse of the market for asset-backed securities (ABS) that led to the "panic" of August 2007 (also known as the "credit crunch"). Gorton (2010) and Almeida et al. (2011) provide a description of the forces that led to the panic of August 2007. Importantly, in this panic episode, the cost of credit skyrocketed due to a sharp reassessment of credit risk. This is best seen in Figure 1, which plots the evolution of the TED spread around that period.[4] In July 2007, the TED spread was about 50 basis points. It jumped to about 200 basis points in August 2007 and remained high thereafter.

This sharp discontinuity in the TED spread—and hence in firms' financing costs—provides a useful quasi-experiment, which can be illustrated with a simple example. Consider two firms (firm A and firm B) that borrowed a large amount of debt around mid-1997. This long-term debt is scheduled to mature (and be rolled over) in ten years, i.e. around mid-2007. Assume that firm A's debt matures in July 2007, while firm B's debt matures in August 2007. Arguably, whether the firm contracted this debt in July or August 1997 is as good as random. Yet, the sharp discontinuity in the TED spread around August 2007 has dramatic consequences for the financing costs faced by both companies when rolling over their debt. While firm A faces pre-crisis financing costs, firm B faces financing costs that are about four times higher. In other words, this setup provides a (quasi-)random assignment of high versus low financing costs—and hence the extent

[4] The TED spread is the difference between the 3-month LIBOR rate (pertaining to short-term interbank loans) and the 3-month Treasury bill rate (pertaining to short-term U.S. government debt). It is the most commonly used benchmark in the pricing of commercial loans.

to which companies are hit by the financial crisis—that can be used to identify the causal impact of the crisis on firms' investment strategies.[5]

------Insert Figure 1 about here------

In this setup, the *control group* consists of companies whose long-term debt matures shortly before August 2007 (such as firm A in the above example), while the *treatment group* consists of companies whose long-term debt matures shortly thereafter (such as firm B). Using a difference-in-differences methodology, we then examine how companies adjusted their workforce, capital expenditures (CAPEX), R&D, and CSR in response to the crisis.

We find that companies significantly reduced their workforce and CAPEX. Yet, and remarkably, they maintained the same level of R&D and CSR. These findings indicate that companies, on average, responded to the crisis by following a "two-pronged" approach of simultaneously "saving their way out of the crisis" by reducing their workforce and CAPEX, and "investing their way out of the crisis" by sustaining their investments in R&D and CSR.[6] This suggests that innovation capability and stakeholder relationships were seen as instrumental in sustaining firms' competitiveness during the Great Recession.

Importantly, we observe considerable heterogeneity across industries. In particular, while we find that *on average* firms did not reduce their investments in R&D and CSR, we document that some firms did—namely firms operating in less R&D-intensive and less CSR-sensitive

[5] This setup is similar in spirit to a regression discontinuity design (RDD). In an RDD, outcomes are compared just above versus below a discontinuity threshold, where the assignment on either side of the threshold is "as good as random." The RDD methodology is often seen as the sharpest tool of causal inference since it approximates very closely the ideal setting of randomized control experiments (see Lee and Lemieux, 2010: 282).

[6] Anecdotal evidence is consistent with this two-pronged approach. In particular, commentators were puzzled as to why companies did not seem to reduce their R&D and CSR during the Great Recession, despite the massive cuts in employment. For example, the *Wall Street Journal* noted that "[m]ajor U.S. companies are cutting jobs and wages. But many are still spending on innovation." (*Wall Street Journal*, 2009). Similarly, *Fortune* noted that "[a]s companies cut costs, social responsibility may seem like an easy target. But many big names are sticking with the program" (*Fortune*, 2009).

industries, respectively. This result is intuitive since, in these industries, firms' competitiveness is less likely to depend on their innovative capability and stakeholder relations, respectively. More broadly, this heterogeneity highlights the importance of industry characteristics in understanding how firms adjust their resource base in response to an economic meltdown.

We further examine the moderating role of financing constraints, slack resources, and the industry's time horizon. Arguably, "richer" companies—i.e., companies that are less financially constrained and have ample organizational slack—are better positioned to pursue the two-pronged approach that emerges from the data (i.e., reducing their workforce and CAPEX, while sustaining their investments in R&D and CSR). In contrast, "poorer" companies may have no choice but to cut resources across the board. Similarly, we expect companies in short-cycle industries to be less able to pursue the two-pronged approach (compared to companies in long-cycle industries) given their greater exposure to the economic meltdown. Consistent with these arguments, we find that companies that i) are more financially constrained, ii) have less organizational slack, and iii) operate in short-cycle industries are more likely to cut investments across the board, including R&D and CSR.

Finally, we examine whether companies that sustained their investments in R&D and CSR perform better in the years following the economic meltdown. We find that indeed they do. Specifically, they exhibit higher operating performance—as measured by the return on assets (ROA)—in the post-crisis years. In contrast, we find that companies that maintained their workforce and CAPEX did not achieve higher performance. Moreover, we find that firms that pursue the two-pronged approach of simultaneously maintaining their R&D and CSR while reducing their workforce and CAPEX achieve an even higher performance in the post-crisis years.

The remainder of this manuscript is organized as follows. In the next section, we describe

the methodology, along with the data used for the analysis. We then present the results. Finally, we discuss the implications for theory as well as avenues for future research.

DATA AND METHODOLOGY

Data sources and variable definitions

Dependent variables

The firm-level data are obtained from Standard & Poor's Compustat. Compustat contains accounting data for U.S. publicly-traded companies, along with industry codes and information on the company's location. In the following, we describe the computation of the main dependent variables.

Workforce. We measure the size of the company's workforce annually by taking the natural logarithm of the number of employees from Compustat.

CAPEX. To measure annual investments in physical capital, we compute the ratio of capital expenditures (CAPEX) to property, plant & equipment (PPE). To mitigate the impact of outliers, we winsorize this ratio at the 5th and 95th percentiles of its distribution.

R&D. We measure annual investments in R&D by computing the ratio of R&D expenses to total assets. We winsorize this ratio at the 5th and 95th percentiles of its distribution.

CSR. To measure CSR, we use the KLD-index. This index is obtained from the Kinder, Lydenberg, and Domini (KLD) database, and is widely used in the CSR literature (e.g., Chatterji and Toffel, 2010; Choi and Wang, 2009; Flammer, 2015a).[7] KLD is an independent social choice investment advisory firm that compiles ratings on companies' performance in addressing the needs of their stakeholders. These ratings are based on multiple data sources including annual

[7] Chatterji, Levine, and Toffel (2009: 127) note that "KLD's social and environmental ratings are among the oldest and most influential and, by far, the most widely analyzed by academics."

questionnaires sent to companies' investor relations offices, firms' financial statements, annual and quarterly reports, general press releases, government surveys, and academic publications. To construct the composite KLD-index, we add up the number of all CSR strengths with respect to employees, customers, the natural environment, and society at large (community and minorities).[8]

Changes during the Great Recession. In the empirical analysis, we examine how companies adjusted the four different types of strategic resources during the Great Recession. Accordingly, we compute the change in these variables from 2007-2009, which we denote by *Δ log(employees)*, *Δ CAPEX/PPE*, *Δ R&D/Assets*, and *Δ KLD-index*, respectively.[9]

Control variables

In our baseline specification, we control for numerous firm characteristics measured in 2006 (i.e., prior to the Great Recession), all of which are obtained from Compustat. *Size* is the natural logarithm of the book value of total assets. *Return on assets* (ROA) is the ratio of operating income before depreciation to the book value of total assets. *Tobin's Q* is the ratio of the market value of total assets (obtained as the book value of total assets plus the market value of common stock minus the sum of the book value of common stock and balance sheet deferred taxes) to the book value of total assets. *Cash holdings* is the ratio of cash and short-term investments to the book value of total assets. *Leverage* is the ratio of debt (long-term debt plus debt in current liabilities) to the book value of total assets. To mitigate the impact of outliers, all ratios are winsorized at the 5th and 95th percentiles of their distribution. These covariates capture differences in firm size (*size*),

[8] In addition to CSR strengths, the KLD database also contains a list of CSR weaknesses, labeled "concerns." Accordingly, an alternative approach is to construct a "net" KLD index by subtracting the number of concerns from the number of strengths. However, recent research suggests that this approach is methodologically questionable. More specifically, KLD strengths and concerns lack convergent validity—using them in conjunction fails to provide a valid measure of CSR (e.g., Mattingly and Berman, 2006). Nevertheless, in robustness checks we show that we obtain similar results if we use the net KLD-index.

[9] For example, $\Delta\ log(employees) = log(employees_{2009}) - log(employees_{2007})$.

profitability (*ROA*), investment opportunities (*Tobin's Q*), financing (*leverage*) and liquidity (*cash holdings*), which may affect subsequent investments in strategic resources.

Loan data

The loan information is obtained from Thomson Reuters Loan Pricing Corporation's (LPC) Dealscan, which contains detailed information on large commercial loans filed with the Securities and Exchange Commission (SEC).[10] For each loan, Dealscan provides a wealth of information including the issue date, maturity date, and loan amount. We match Dealscan to Compustat using the bridge of Chava and Roberts (2008).

Methodology

The (quasi-)experiment

The financial crisis started with a sharp drop in house prices in 2006, which in turn triggered a wave of default of subprime mortgages going into 2007. The increase in subprime defaults in the first half of 2007 led to massive losses on asset-backed securities (ABS) and ultimately the collapse of the ABS market.[11]

One of the triggering events was the run on the assets of three ABS-based structured investment vehicles (SIV) of BNP Paribas at the beginning of August. This run informed investors that ABS were no longer safe, which led to a major reassessment of the risk of debt instruments and the "panic" of August 2007. Almost overnight, the cost of borrowing sky-rocketed. This is best seen in the aforementioned Figure 1 that shows a sharp discontinuity in the TED spread at the beginning of August. While the TED spread was around 40-50 basis points in the pre-crisis period,

[10] Many of these loans are syndicated (i.e., they are issued by a "syndicate" of two or more banks). For a more detailed description of the Dealscan dataset, see Chava and Roberts (2008).
[11] See Acharya et al. (2009), Brunnermeier (2009), and Gorton (2010) for a detailed description of the various factors that led to the financial crisis.

it jumped to about 200 basis points in August 2007 and remained high thereafter (peaking at about 460 basis points in October 2008).

This sharp discontinuity in borrowing costs during the panic of 2007 provides the (quasi-) experimental setting we exploit in this paper. Companies whose long-term debt matures shortly before August 2007 are able to roll over their debt at pre-crisis conditions, whereas companies whose long-term debt matures shortly after August 2007 face refinancing costs that are an order of magnitude higher. Importantly, there is no reason to expect any systematic differences between companies whose debt was set to mature shortly before versus shortly after August. In experimental terms, this implies that the "assignment to treatment" (i.e., to high versus low borrowing costs) is (quasi-)random. In turn, this allows us to study the causal impact of the financial crisis on firms' investments in their key strategic resources.

More specifically, we define the *control group* as those firms in the matched Compustat-Dealscan universe who have debt that matures within 6 months prior to August 2007 (382 firms). Similarly, we define the *treatment group* as those firms whose debt matures within 6 months after August 2007 (288 firms). In robustness checks, we show that our results are similar if we use different time windows (3, 9, and 12 months, respectively). An advantage of using Dealscan is that it only includes large loans that are filed with the SEC. By construction, this guarantees that the debt position that needs to be rolled over is substantial (the average loan amount is $547M).[12]

Covariate balance

The identifying assumption behind our analysis is that the assignment to the treatment versus control group is "as good as random." Importantly, this identifying assumption is testable—to the

[12] If a company has multiple loans that mature during the same period, we cumulate the amounts. If a company has loans that mature during both the control and treatment periods, we assign the firm to the control or treatment group depending on which amount is larger. Our results are similar if we drop the latter firms.

extent that the assignment is (quasi-)random, there should be no *ex ante* differences between firms in the treatment versus control group. To examine whether this is the case, in Panel (A) of Table 1, we contrast various characteristics measured in 2006 (i.e., prior to the crisis). As can be seen from the last two columns (which report the *p*-value of the difference-in-means and difference-in-medians, respectively), there is no significant difference between the two groups, which lends support to our identification. Finally, Panel (B) reports the average loan amount in either group. As is shown, the amount is slightly larger in the treatment group. Yet, and importantly, the difference is not significant.

------Insert Table 1 about here------

Difference-in-differences specification

We estimate companies' responses to the treatment by estimating the following regression:

$$\Delta y_i = \alpha_j + \beta \times treatment_i + \boldsymbol{\gamma}'\mathbf{X_i} + \varepsilon_i, \quad (1)$$

where i indexes firms and j indexes industries (2-digit SIC major groups); α_j are industry fixed effects; $\Delta\ y$ is the change in the variable of interest—i.e., *log(employees)*, *CAPEX/PPE*, *R&D/Assets*, *KLD-index*—from 2007-2009; *treatment* is the treatment dummy that is equal to one for companies in the treatment group (and zero for companies in the control group); **X** is the vector of control variables, which includes *size*, *cash holdings*, *leverage*, *ROA*, and *Tobin's Q* (all measured in 2006); ε is the error term. Throughout the analysis, we cluster standard errors at the industry level. (The results are similar if standard errors are clustered at the firm level.) The coefficient of interest is β, which captures the difference-in-differences, that is, the difference between $\Delta\ y$ among the treated firms and $\Delta\ y$ among the control firms.

RESULTS

Main results

Table 2 reports estimates from the difference-in-differences specification in equation (1), that is, a regression of the four dependent variables (which all capture *changes* in firms' resources) on the treatment dummy.

------Insert Table 2 about here------

In column (1), we find that treated companies—i.e., companies that are hit more strongly by the financial crisis—laid off more employees. The coefficient of –0.023 (p-value = 0.014) implies that treated firms reduced their workforce by 2.3% compared to control firms.

In column (2), we observe a similar pattern for physical investment. Specifically, the coefficient of –0.021 (p-value = 0.042) implies that treated firms reduced their capital expenditures by 2.1% of PPE compared to control firms. This indicates that employment and physical investment were adjusted in a similar manner during the financial crisis.

In contrast, in columns (3) and (4), we find virtually no change in R&D spending and CSR. Both coefficients are small in economic terms and statistically insignificant (p-values of 0.677 and 0.838, respectively). Overall, the findings in Table 2 are consistent with a "two-pronged" response: companies responded to the crisis by reducing their workforce and CAPEX, while they sustained their investments in R&D and CSR. This suggests that innovation and stakeholder relations may enable firms to maintain competitiveness during an economic meltdown.[13]

Robustness

In Tables 3 and 4, we present several robustness checks that are variants of the baseline specification used in Table 2.

[13] We discuss potential rationales underlying this two-pronged response in the discussion section.

Alternative windows around August 2007. In Table 3, we consider alternative time windows around the panic of August 2007. Specifically, in lieu of considering debt maturing 6 months before and after August 2007, we consider windows of 3, 9, and 12 months, respectively. As is shown, our results are very similar for these alternative time windows.[14]

------Insert Table 3 about here------

Common sample. In our baseline regressions, the analysis of R&D spending and the KLD-index is based on a smaller number of observations (due to missing values of R&D in Compustat and the less comprehensive coverage of the KLD database). Hence, one potential concern is that companies with non-missing R&D and KLD data may systematically differ from the average firm in our sample. If these companies did not reduce employment and capital expenditures during the crisis, then our results might be driven by selection. To address this concern, we re-estimate our baseline regressions in the subsample for which none of the dependent variables is missing. The results are provided in Panel A of Table 4. As is shown, we find that these companies reduced their workforce and CAPEX to a similar extent compared to the average company in our full sample while, once again, the effect on R&D and the KLD-index remains small and insignificant.[15]

------Insert Table 4 about here------

Pre-crisis levels and pre-trends. Another potential concern is that firms may reduce their workforce and CAPEX during the Great Recession because they have expanded "too much" prior to the crisis. We address this point in Panel B of Table 4 by re-estimating our baseline regressions controlling for the 2006 level along with the 2002-2006 change (i.e., the "pre-trend") in the

[14] These tests are similar in spirit to considering narrower windows around the discontinuity in an RDD setting. Narrower windows provide a tighter identification (since the randomization assumption is more likely to hold), but at the cost of lower power (since fewer observations are used).

[15] The common sample analysis further alleviates the possibility that, in our baseline analysis, the effect on R&D and the KLD-index might be insignificant due to the smaller sample size (and hence the lower power of the test). Since the reduction in employment and capital expenditures remains significant in the common sample, this indicates that our non-results for R&D and CSR are indeed well-estimated zero effects.

dependent variable—e.g., in the first column of Panel B, we include as controls $log(employees)_{2006}$ and $\Delta\ log(employees)_{2002\text{-}2006}$. (We include analogous controls for the respective dependent variables in the other three columns.) As is shown, our results are robust to the inclusion of these additional controls as well.

Survivorship. By construction, our sample includes all firms in the matched Dealscan-Compustat universe that have debt maturing around August 2007, and have available Compustat data for 2007-2009. Hence, companies with a different borrowing schedule, and companies that exit Compustat during this period (e.g., as they go private or cease their operations altogether) are excluded from the analysis. To mitigate a potential survivorship bias, we use Heckman's correction. In the selection regression, we regress the survivorship dummy on several covariates—the set of pre-crisis controls, as well as the pre-crisis levels (e.g., $log(employees)_{2006}$) and the pre-trends (e.g., $\Delta\ log(employees)_{2002\text{-}2006}$) used in Panel B—for all companies that appear in Compustat in 2006. We then re-estimate our baseline regressions including the inverse Mills ratio from the selection equation as additional control. As can be seen from Panel C of Table 4, our results are robust to this inclusion.

Seemingly unrelated regressions (SUR). In the analysis so far, we examined each of the four dependent variables in a separate regression. That being said, to the extent that the Great Recession may affect all dimensions of firm behavior, there might be significant cross-equation dependence in the error term. This is confirmed by the Breusch-Pagan test, which rejects the null hypothesis of no cross-equation correlation at all conventional significance levels ($p = 0.000$). To examine how such cross-equation correlation may affect our results, we re-estimate our baseline regressions using the SUR estimator. The results are presented in Panel D of Table 4. As is shown, the results are very similar to our baseline results.

Alternative dependent variables. In the baseline analysis, capital expenditures and R&D expenses are scaled by PPE and assets, respectively. While such normalization is common in the literature, one potential concern is that the results may be affected by changes in the scaling variable. Moreover, *Δ KLD-index* is specified as an index change as opposed to a percentage change. In the first three columns of Panel E of Table 4, we consider alternative dependent variables that address these issues: *Δ log(1 + CAPEX)*, *Δ log(1 + R&D)*, and *Δ log(1 + KLD-index)*, which represent the growth in CAPEX, R&D expenses, and the KLD-index, respectively. Note that we add one to each variable to account for observations with a zero value of the respective variable. As is shown, the results based on these alternative dependent variables mirror those obtained in our baseline specification. Finally, in the last column of Panel E, we replace the KLD-index by the "net" KLD-index (i.e., the number of KLD strengths minus the number of KLD concerns). Again, we obtain similar results.

Patenting. R&D expenditures is an imperfect measure of innovation. In particular, some companies may invest their R&D more smartly than others—i.e., the same dollar amount invested into R&D may lead to more innovation in some firms than others. To address this issue, we use patent-based measures of innovation in the first two columns of Panel F of Table 4. Specifically, we use the number of patents filed by the company (to capture the "quantity" of innovation) and the number of citations garnered by these patents (to capture the "quality" of innovation).[16] The results mirror those for R&D, that is, we observe no significant change in these measures.

Input versus output measures. A related issue is that, while the workforce, CAPEX, and R&D represent inputs in the firm's production function, the KLD-index may capture an output—the realized social performance. To address this potential inconsistency, we decompose the KLD-

[16] The NBER patent database ends in 2006, but can be extended to the subsequent years by using the raw files of the U.S Patent and Trademark Office (USPTO). We thank Deepak Hegde for sharing the post-2006 data with us.

index into an "input KLD-index" and "output KLD-index." To do so, we review each of the KLD provisions and classify those pertaining to the implementation of stakeholder programs as "inputs" (e.g., the offering of childcare, elder care, or flextime—provision DIV-STR-D in the KLD database), and those pertaining to the company's social performance as "outputs" (e.g., showing superior performance as an employer for the disabled—provision DIV-STR-F in the KLD database).[17] As is shown in the last two columns of Panel F of Table 4, our results are robust to using the input KLD-index (and output KLD-index, respectively).

Industry-specific investment strategies

Our baseline analysis shows that, on average, companies followed a two-pronged approach in response to the financial crisis: while they curtailed their workforce and capital expenditures, they sustained their investments in R&D and CSR. This suggests that innovation and stakeholder relations may help maintain firms' competitiveness during an economic meltdown.

Arguably, this need not apply to all industries uniformly. In particular, in industries with low R&D intensity, firms' competitiveness is less likely to depend on their innovative capability, and hence companies may be more inclined to cut R&D budgets during an economic meltdown. Similarly, companies operating in less CSR-sensitive industries might be more inclined to curtail their CSR. We explore such industry-specific responses in Table 5.

------Insert Table 5 about here------

R&D-intensive industries. In column (1) of Table 5, we examine whether companies in less R&D-intensive industries reduced their R&D during the meltdown. We construct a measure

[17] The majority of the KLD provisions are "output" provisions. The "input" provisions are charitable giving (COM-STR-A); non-U.S. charitable giving (COM-STR-F); CEO (DIV-STR-A); board of directors (DIV-STR-C); work/life benefits (DIV-STR-C); women and minority contracting (DIV-STR-E); no-layoff policy (EMP-STR-B); cash profit sharing (EMP-STR-C); communications (ENV-STR-E); management systems (ENV-STR-G).

of R&D intensity at the industry level by computing the ratio of R&D expenses to total assets for all Compustat firms in 2006. We then compute the average across all firms in any given 2-digit SIC industry (*R&D intensity*), and re-estimate our baseline R&D regression, interacting *treatment* with a dummy variable that indicates whether *R&D intensity* is in the bottom quartile across all industries. Consistent with the above arguments, we find that companies in less R&D-intensive industries did significantly reduce their R&D (*p*-value = 0.012).

CSR-sensitive industries. Relatedly, the strategic value of CSR is likely lower in industries that are less CSR-sensitive—i.e., industries where stakeholder support plays a marginal role for firms' competitiveness and survival.[18] A prime example of industries that are less CSR-sensitive are B2B industries (e.g., Corey, 1991; Lev, Petrovits, and Radhakrishnan, 2010).[19] We examine this dimension in column (2) of Table 5, where we contrast B2B versus B2C industries. Specifically, we re-estimate our baseline CSR regression, interacting *treatment* with a dummy variable indicating whether the company operates in the B2B sector (the classification of B2B versus B2C industries is obtained from Lev et al., 2010: 188). As is shown, we find that firms in the B2B sector significantly decreased their CSR (*p*-value = 0.034).

Overall, the results presented in this section indicate that—although on average companies did not reduce their R&D and CSR during the crisis—they did so in industries where innovation

[18] Anecdotal evidence is consistent with this argument. Indeed, in commenting on the fact that companies seemed to hold on to their CSR programs during the Great Recession, Eric Biel, managing director of corporate responsibility at global public relations firm Burson-Marsteller stated that "[t]hose that still see environmental and social performance as largely divorced from their core business model and overall reputation are more likely to cut back in these tough times" (*Fortune*, 2009).

[19] Lev et al. (2010) show that individual consumers are more sensitive to companies' CSR engagement than industrial buyers, which reflects inherent differences in the purchasing decision-making process. More precisely, "[t]he purchasing decision of an individual consumer is affected not only by product attributes, but also by social group forces, psychological factors, and the consumer's situational forces. In contrast, in industrial purchasing, the decision-making process is highly formalized, using defined procurement procedures, and subject to economic (cost/value) analysis" (Lev et al., 2010: 186, adapted from Corey, 1991).

and stakeholder relations, respectively, are less core to the firms' operations and competitiveness.[20]

Heterogeneity across firms

In Table 6, we explore how firms' adjustments of their workforce, CAPEX, R&D, and CSR in response to the Great Recession vary depending on several moderators that may affect firms' ability to engage in the two-pronged approach that emerges from our baseline results.

Financing constraints. In Panel A of Table 6, we examine the moderating role of financing constraints. Arguably, companies that are less financially constrained are better positioned to pursue the two-pronged approach (that is, reducing their workforce and CAPEX, while maintaining their investments in R&D and CSR), whereas financially constrained firms may have no choice but to cut investments across the board. We examine the role of financing constraints in Panel A of Table 6. Specifically, we re-estimate our baseline specifications from Table 2, interacting *treatment* with a dummy variable indicating whether the company faces high financing constraints (*high FC*). High FC is equal to one if the index of financing constraints of Kaplan and Zingales (1997), the *KZ-index*, is in the top quartile across all firms.[21] As can be seen, financially constrained firms are significantly more likely to reduce investments across the board (including R&D and CSR), which is consistent with the above arguments.[22]

[20] Note that these findings help rule out the possibility that companies maintained their R&D and CSR for reasons unrelated to competitiveness, e.g., because they may be "sticky" and hence difficult to reduce in the short run—in this case, we should not observe any adjustment in R&D and CSR, even for companies operating in industries with low R&D intensity and low CSR sensitivity, respectively.

[21] The KZ-index index is a linear combination of several Compustat items that capture the difficulty of raising resources to finance new projects. The computation of the KZ-index is described in Cheng, Ioannou, and Serafeim (2014: 22).

[22] An alternative interpretation of our findings is that R&D may proxy for risk-taking—when the meltdown hits, desperate managers engage in excessive risk-taking because only large bets can save the company (similar to a "gambling for resurrection" argument in the spirit of Downs and Rocke, 1994). To the extent that R&D investments are riskier, this could explain why managers sustain their R&D (but not their workforce nor CAPEX). Nevertheless, our finding that financially constrained companies—i.e., companies whose managers are likely more "desperate" during the crisis and hence more prone to engage in excessive risk-taking—*reduced* their R&D is inconsistent with this alternative interpretation.

------Insert Table 6 about here------

Organizational slack. In Panel B of Table 6, we examine the moderating role of organizational slack. The rationale is similar to the one about financial constraints—companies that have little slack may not have the luxury to engage in the two-pronged approach; instead, they may have to curtail all their investments. Following Wan and Yiu (2009), we focus on unabsorbed slack—"unabsorbed slack" represents uncommitted resources that are discretionary in nature, whereas "absorbed slack" refers to resources that are tied up with ongoing operations and hence are much harder to redeploy. We use Wan and Yiu's (2009: 795) measure of unabsorbed slack, which is constructed by taking the factor score from i) the equity to debt ratio and ii) cash flow divided by sales, which we obtain from Compustat. We then code a company as having low organizational slack if this measure is in the bottom quartile across all firms (*low slack*), and re-estimate our baseline regressions interacting *treatment* with *low slack*. As is shown, we find that companies with low organizational slack are indeed significantly more likely to cut investments across the board.

Short- versus long-cycle industries. A similar rationale may apply to companies in short- versus long-cycle industries. Short-cycle industries are industries with a short product life cycle and a short development cycle (i.e., requiring little time to develop and bring a new product to the market). During an economic meltdown, companies in short-cycle industries might be more compelled to reduce investments across the board. First, the revenues from an entire product cycle might be wiped out by the meltdown, threatening the very existence of the firm and further exacerbating resource constraints. Second, R&D investments are more likely to be curtailed since the new products resulting from the R&D effort might lack consumer demand and be obsolete by the time the economy recovers. Consequently, companies in short-cycle industries (e.g., steel

production) might be more inclined to cut investments across the board compared to companies in long-cycle industries (e.g., airplane production) that are better able to adjust their resource base according to the two-pronged approach we observe for the average firm. We examine this potential heterogeneity in Panel C of Table 6. Specifically, we classify an industry as a short-cycle industry (*short cycle*) if it has either a short product development cycle or a short product life cycle based on the classification of Bushman, Indjejikian, and Smith (1996).[23] We then interact *treatment* with *short cycle*. Consistent with the above arguments, we find that companies in short-cycle industries tend to not only reduce their workforce and CAPEX, but also their investments in R&D and CSR.

Firm Performance

In Table 7, we examine whether companies that maintained their investments in R&D and CSR during the Great Recession exhibit stronger performance once the economy recovered—to the extent that these strategies help sustain their competiveness, companies that held on to them during the meltdown may have benefited in the post-crisis period.

------Insert Table 7 about here------

To examine whether this is the case, we regress post-crisis performance—i.e., the average return on assets (ROA) in 2010-2011—on a dummy variable that indicates whether the company did not reduce the resource of interest (i.e., the workforce, CAPEX, R&D, and CSR, respectively) during the Great Recession, industry fixed effects, and controls.[24] To mitigate the impact of outliers, we winsorize ROA at the 5th and 95th percentiles of its empirical distribution.

[23] Product development cycle refers to the time it takes to develop and bring a new product to the market; product life cycle refers to the market life of a product. A cycle is "long" if it is at least four years. See Bushman et al. (1996) for details.

[24] More precisely, we estimate the following regression: $ROA_i = \alpha_j + \beta \times dummy_i + \boldsymbol{\gamma}'\mathbf{X}_i + \varepsilon_i$, where *ROA* is the average return on assets of company *i* in the years 2010-2011; *dummy* is an indicator variable that is equal to one if the company did not reduce the resource of interest (i.e., the workforce, CAPEX, R&D, and CSR, respectively) from 2007-2009; α_j are industry fixed effects; the control variables in **X** are the same as in regression (1).

The results are presented in Table 7. As can be seen, companies that reduced neither their workforce (column (1)) nor their CAPEX (column (2)) did not perform better in the post-crisis years. In contrast, and importantly, companies that did not reduce their R&D (column (3)) nor their CSR (column (4)) achieved significantly higher performance in the post-crisis years. These results are economically significant as well: the reported coefficient of 0.025 for R&D (0.013 for CSR) corresponds to a 19% (10%) higher ROA for companies that did not reduce their investments in R&D (CSR) compared to those companies that did. Furthermore, in column (5), we find that the post-crisis performance is even higher for companies that followed the two-pronged approach of reducing their workforce and CAPEX ("saving their way out of the crisis") while maintaining their R&D and CSR ("investing their way out of the crisis") during the Great Recession. Overall, the evidence suggests that R&D and CSR are important for sustaining a positive economic profit during (and beyond) an economic meltdown.[25]

DISCUSSION AND CONCLUSION

How did companies adjust their resource base during the Great Recession of 2007-2009? Did they try to "save their way" or "invest their way" out of the crisis? In which direction and to what extent did they adjust their strategic investments to survive or even enhance their competitiveness? In this exploratory study, we shed light on these questions by exploiting the "panic" of August 2007 as a source of (quasi-)random variation in the severity of the crisis to provide causal evidence on firms' strategic investment decisions in response to the crisis.

Our findings indicate that, on average, companies responded to the crisis by following a two-pronged approach: they significantly reduced their workforce and CAPEX, but sustained their

[25] We caution that the performance results presented in this section do not necessarily warrant a causal interpretation. Indeed, while our empirical setting allows us to study the causal impact of the crisis on firms' investment decisions, it does not allow us to establish a causal link between firms' investment decisions and performance. Doing so would require a separate instrument for firms' investment decisions.

investments in R&D and CSR. This suggests that investments in innovation capability and stakeholder relations contribute towards the firms' ability to maintain their competitiveness during an economic meltdown.

We also find that—although on average firms did not decrease their investments in R&D and CSR—firms operating in industries with low R&D intensity and low CSR sensitivity, respectively, were more likely to do so. This finding indicates that companies reduce their R&D and CSR only if they operate in industries where innovation and stakeholder relations are less essential to the firm's competitiveness. In addition, we document that companies that are i) more financially constrained, ii) have less organizational slack, and iii) operate in short-cycle industries were more likely to reduce all of their investments, including those in R&D and CSR. Arguably, such companies were less able to pursue the two-pronged approach, as they had no choice but to reduce investments across the board.

Finally, we find that companies that sustained their investments in R&D and CSR exhibit higher performance in the post-crisis years, suggesting that such investments contribute to companies' competitiveness in the long run. In contrast, companies that only sustained their workforce and CAPEX did not perform better in the post-crisis years. What is more, we find that companies that pursued the two-pronged approach of simultaneously "saving their way out" (by reducing their workforce and CAPEX) and "investing their way out" (by maintaining their investments in R&D and CSR) achieved even higher performance in the post-crisis years.

Our study relates to the large body of work on organizational decline and corporate turnaround (see the review of Trahms et al., 2013). While the adaptation to external changes has long been studied in this literature, the focus has been on more "traditional" disruptions in the firm's external environment such as industry decline, environmental jolts, technology shocks, and

disruptions due to the regular business cycle (e.g., Aghion et al., 2012; Anand and Singh, 1997; Barlevy, 2007; Fabrizio and Tsolmon, 2014; Ouyang, 2011). In contrast, little is known of firm strategy during an economic meltdown such as the Great Depression of 1929 or the Great Recession of 2007-2009—the two economic meltdowns of the past century.[26]

In this vein, our paper contributes to the literature by empirically "documenting the phenomenon" of how companies adjusted their resource base—specifically their workforce, CAPEX, R&D, and CSR—during the Great Recession. This echoes the recent call for research that examines firms' strategic actions during the Great Recession (e.g., Agarwal et al., 2009; Garcia-Sanchez et al., 2014). More generally, the Great Recession provides an opportunity to empirically (and causally) study corporate strategy during an economic meltdown. As discussed above, economic meltdowns are rare—the past century has witnessed two economic meltdowns: the Great Depression of 1929 and the Great Recession of 2007-2009. While it is difficult to obtain historical data to study firm strategy during the Great Depression, the Great Recession provides a unique opportunity to do so.

While our paper's contribution is predominantly empirical—in keeping with the scope of this special issue on phenomenon-based empirical strategy research—it has important theoretical implications as well. The extant theoretical literature on organizational decline aims to explain how companies respond to traditional sources of organizational decline (e.g., technology shocks,

[26] Notable exceptions include Bresnahan and Raff (1992) who study the transformation of the motor vehicle industry during the Great Depression; Garcia-Sanchez, Mesquita, and Vassolo (2014) who use structural modeling to examine the evolution of competition and entry-order advantages during a hypothetical meltdown; and Bamiatzi, Bozos, Cavusgil, and Hult (2016) who use a three-level random coefficient model to examine the relevance of firm, industry, and country effects on profitability during the Great Recession. Also related are Lee and Makhija (2009) who study how foreign direct investments made by Korean firms increased their flexibility during the Korean crisis of 1998; Grewal and Tansuhaj (2001) who study how strategic flexibility and market orientation (which are measured qualitatively through surveys) affected the performance of Thai companies during the Asian crisis; Wan and Yiu (2009) who study the performance of corporate acquisitions made by Hong Kong and Singapore companies during the Asian crisis; and Chakrabarti et al. (2011) who study the performance implications of external and internal growth of companies in eight Southeast Asian countries during the Asian crisis.

environmental jolts, regular booms and recessions). Trahms et al. (2013) note that most, if not all, firms experience such organizational decline.[27] This is in sharp contrast to economic meltdowns that are rare events. Such economic meltdowns are fundamentally different from disruptions (even if radical) in the firm's industry or operating context. Indeed, an economic meltdown such as the Great Recession, leaves virtually no aspect of the firms' operations unaffected, disrupts all of the firms' stakeholder relations (such as those with customers, employees, suppliers, and local communities), and results in a major shift in the competitive landscape. Accordingly, companies are likely to fundamentally rethink and reshape their strategic investments to ensure survival and sustain their competitiveness.

One of the major challenges of an economic meltdown for strategic management is that it exacerbates resource constraints. As a result, companies might need to divest from at least some of their resources to maintain the necessary liquidity and ensure survival in the short run. Doing so is a balancing act though, as divesting from too many resources (or not the "right" ones) could jeopardize a firm's ability to thrive in the long run. A second critical challenge is that an economic meltdown disrupts all of the company's stakeholder relations by fundamentally changing their needs and expectations. For example, during the crisis, customers experienced a significant drop in their purchasing power (Mian, Rao, and Sufi, 2013), which altered customer demand not only quantitatively but also qualitatively. This, in turn, challenges firms to find innovative ways to swiftly adjust their product offerings and pricing policies.[28] Similarly, an economic meltdown disrupts the companies' suppliers (e.g., due to their own liquidity constraints). To mitigate such

[27] Organizational decline can occur in fast-growth industries as well. For example, Ndofor, Vanevenhoven, and Barker (2013) found that more than 15% of firms in the software industry during the boom period of 1990 to 1996 experienced organizational decline.

[28] This shift in consumer needs and demands triggered a wide spectrum of companies—including, e.g., Applied Materials, General Motors, and Kraft Foods—to shift their focus away from product development during the crisis towards more effective delivery of products and solutions to their customers. Kraft Foods, for example, launched price-sensitive products to deal with the drop in consumers' purchasing power (Booz & Company, 2009).

disruptions, companies may intensify their collaboration with them to more effectively address their needs and, in so doing, secure supply.[29] Moreover, the collapse of customer demand can result in excess capacity. To reduce excess capacity, companies may decrease their workforce, divest from physical assets (e.g., by closing loss-making facilities), and postpone investments in new buildings and equipment. Accordingly, during an economic meltdown, we might expect companies to decrease their workforce and CAPEX to reduce excess capacity and release financial resources that can be redeployed towards other purposes. The same however need not apply to other strategic resources such as R&D and CSR. While divesting from these resources might help reduce costs, doing so is less effective in reducing excess capacity.

In fact—and in line with the evidence presented in this paper—when adjusting their resource base during an economic meltdown, companies may decide to *maintain* their investments in R&D and CSR, as these resources may enable them to address other challenges that arise during the meltdown. From a theoretical perspective, we conjecture that there are at least three main reasons for why this might be the case. First, by maintaining their investments in R&D during the meltdown, companies may find innovative ways to become more efficient—i.e., to do more with less—thereby enhancing their ability to maneuver through the meltdown.[30] Moreover, existing research finds that through experimentation companies are better positioned to rapidly adapt to changes in the business environment and improve their technological capability (e.g., Eisenhardt

[29] For example, during the crisis, Starbucks increased its commitment to subsistence coffee farmers in developing countries, offering them training and fair prices for sustainable coffee production, thereby ensuring quality and supply of coffee for Starbucks (Starbucks, 2009).

[30] A survey conducted by Booz & Company (2009) supports this argument—during the Great Recession, virtually all surveyed companies enhanced their innovation processes to align product development with the changing economic reality and increase the return on their R&D investments. Specifically, several companies—including, e.g., Pitney Bowes and Harman International—intensified communication and collaboration between research labs and development shops to save costs and more effectively deliver products and solutions to customers. Similarly, many innovative products ranging from Apple's iPod to General Electric (GE)'s fuel-efficient aircraft engines resulted from investments made during the Great Recession (*Wall Street Journal*, 2009).

and Martin, 2000).

Second, communication and collaboration with the firm's stakeholders are important factors in the firm's processes—e.g., in the innovation process (Eisenhardt, 1989; Flammer and Kacperczyk, 2016) and the supply chain process (Homburg, Stierl, and Bornemann, 2013). In this regard, firms that continue investing in stakeholder relations are likely better positioned to understand the changing conditions inherent to an economic meltdown, identify concerns and opportunities, and adapt to the shifting needs, demands, and expectations of suppliers, consumers, and other stakeholders, compared to firms that curtail such investments.[31]

Third, CSR can benefit companies through a series of mechanisms. These may in turn help companies navigate through an economic meltdown. In particular, CSR can help firms differentiate themselves from their competitors (Bettinazzi et al., 2015; Flammer, 2015a), enhance firms' ability to recover from unfavorable situations (Bansal, Jiang, and Jung, 2015; Barnett, Darmall, and Hustedet, 2015; Choi and Wang, 2009; DesJardine, Bansal, and Yang, 2015), strengthen connections with the local communities (Tilcsik and Marquis, 2013), improve labor productivity (Flammer, 2015b; Flammer and Luo, 2017), enhance consumer loyalty (Du, Bhattacharya, and Sen, 2007; Kotler, Hessekiel, and Lee, 2012), improve access to government procurement contracts (Flammer, 2018), and lower capital constraints (Cheng, Ioannou, and Serafeim, 2014). These mechanisms are likely to be especially important during an economic

[31] Anecdotal evidence is supportive of this argument. For example, Pitney Bowes adopted a new idea-generating process (called IdeaNet) during the Great Recession. This process provides an electronic meeting platform for its 35,000 employees to collaborate and provide comments and inputs on any idea that they think helps create new sources of revenue, improve profitability, or add value for customers. Within two years of including the entire workforce in innovative thinking, the company was able to realize $8 million in revenues from employee-driven innovations (Dahl, 2011). Pitney Bowes is not the only company that views stakeholder engagement as an important determinant of the firm's ability to innovate. In fact, many companies—e.g., Audi, General Electric, IBM, Nike—include consumers, employees, suppliers, governments, and other stakeholders in their innovation process (*Computer Weekly News,* 2013; *New York Times,* 2012; see also Bogers, Afuah, and Bastian, 2010; Chatterji and Fabrizio, 2014; Fueller, Matzler, and Hoppe, 2008).

meltdown, as they can improve companies' resilience and, as a result, help companies maintain or even enhance their competitiveness.

Taken together, the above arguments are consistent with the empirical evidence presented in this study, suggesting that firms that adjust their resource base by simultaneously reducing their workforce and CAPEX ("saving their way out of the crisis") while sustaining their investments in R&D and CSR ("investing their way out of the crisis") are better able to adapt to the new and unique challenges brought about by an economic meltdown.

Lastly, our study documenting the impact of the Great Recession on strategic management generates several avenues for future research. In particular—while we briefly outlined potential implications for theory—future work could build on our results to develop an integrated theory of how (and why) companies adjust their resource base during an economic meltdown. Such theory would need to consider the unique features of an economic meltdown such as the collapse of the financial system and the breakdown of the global economy. In addition, more empirical evidence is needed. In particular, a finer-grained empirical analysis of the four strategic resources could shed light on the underlying theoretical mechanisms. For example, while our results show that companies laid off employees, an important question is *which* employees were laid off and why. Based on our results, one may expect companies to have laid off employees whose role is inessential for competitiveness and long-term survival. Relatedly, our study focuses on exploring *how* firms adjusted their investment strategies and offers plausible rationales—firms might maintain their investments in R&D and CSR because doing so enables them to i) become more efficient and innovative, ii) adapt more easily to the shifting needs and demands of various stakeholders, and iii) enhance organizational resilience. Future research could build on these arguments and seek to empirically distinguish between these mechanisms; doing so would address

the question of *why* firms maintained their investments in R&D and stakeholder relations. Examining these questions is a challenging task that requires detailed micro data on the companies' operations and processes. Making ground on them is a promising avenue for future research.

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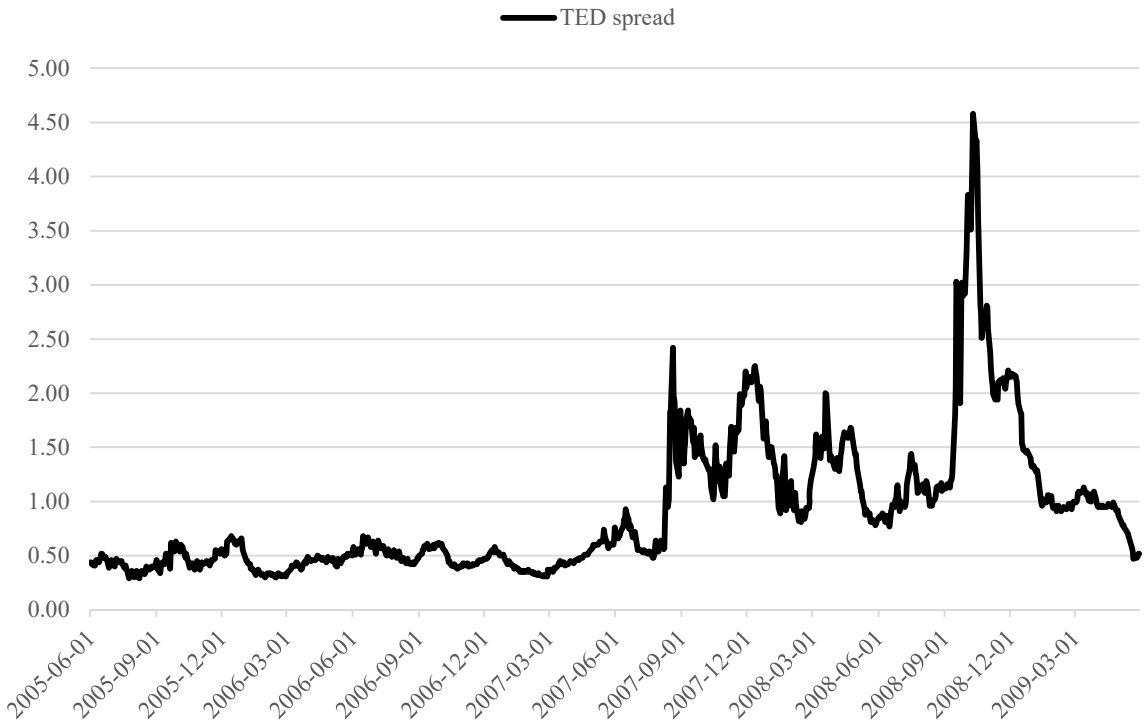
Figure 1. Evolution of financing costs



Notes. This figure plots the daily TED spread from June 2005 until June 2009. The TED spread is the difference between the 3-month LIBOR rate and the 3-month Treasury bill rate. The data are obtained from the St. Louis Fed.

Table 1. Summary statistics

		Obs.	Mean	Median	Std. Dev.	*p*-value (diff. in means)	*p*-value (diff. in medians)
Panel A. Pre-crisis characteristics							
Log(assets)	Treated	382	7.612	7.488	1.953	0.298	0.155
	Control	288	7.313	7.308	1.825		
ROA	Treated	382	0.132	0.121	0.086	0.764	0.192
	Control	288	0.130	0.126	0.115		
Tobin's Q	Treated	382	1.644	1.344	0.869	0.280	0.319
	Control	288	1.836	1.538	1.014		
Leverage	Treated	382	0.290	0.275	0.202	0.344	0.380
	Control	288	0.279	0.247	0.203		
Cash/Assets	Treated	382	0.088	0.046	0.110	0.356	0.207
	Control	288	0.104	0.055	0.128		
Log(employees)	Treated	382	1.507	1.508	1.728	0.303	0.168
	Control	288	1.392	1.303	1.834		
CAPEX/PPE	Treated	382	0.231	0.203	0.143	0.617	0.344
	Control	288	0.237	0.206	0.147		
R&D/Assets	Treated	161	0.030	0.008	0.068	0.220	0.174
	Control	134	0.042	0.017	0.068		
KLD-index	Treated	286	1.549	1.000	2.222	0.458	0.998
	Control	217	1.719	1.000	2.760		
Panel B. Amount of debt financing maturing around August 2007							
Amount ($M)	Treated	382	573.9	200.0	1,452.7	0.546	0.253
	Control	288	512.2	150.0	1,725.9		

Table 2. The effect of the financial crisis on firms' investment strategies

	Δ Log(Employees)	Δ CAPEX/PPE	Δ R&D/Assets	Δ KLD-index
	(1)	(2)	(3)	(4)
Treatment	-0.023	-0.021	0.001	-0.013
	(0.009)	(0.010)	(0.001)	(0.063)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	670	670	295	503
R-squared	0.06	0.08	0.15	0.03

Notes. Control variables include *size, ROA, Tobin's Q, leverage, cash holdings*, all measured in 2006. Standard errors (reported in parentheses) are clustered at the industry level.

Table 3. Alternative cutoffs around the August 2007 discontinuity

	Δ Log(Employees)	Δ CAPEX/PPE	Δ R&D/Assets	Δ KLD-index
Panel A. Three-month cutoff				
Treatment	-0.027	-0.023	0.001	-0.015
	(0.010)	(0.012)	(0.003)	(0.094)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	398	398	175	310
R-squared	0.06	0.07	0.13	0.06
Panel B. Nine-month cutoff				
Treatment	-0.021	-0.022	-0.001	-0.012
	(0.009)	(0.010)	(0.001)	(0.059)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	883	883	396	650
R-squared	0.06	0.04	0.10	0.01
Panel C. Twelve-month cutoff				
Treatment	-0.016	-0.020	0.000	-0.013
	(0.007)	(0.009)	(0.001)	(0.052)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	1,076	1,076	487	783
R-squared	0.05	0.04	0.08	0.02

Notes. Control variables include *size, ROA, Tobin's Q, leverage, cash holdings*, all measured in 2006. Standard errors (reported in parentheses) are clustered at the industry level.

Table 4. Robustness

	Δ Log(Employees)	Δ CAPEX/PPE	Δ R&D/Assets	Δ KLD-index
Panel A. Common sample				
Treatment	-0.027	-0.023	0.001	-0.018
	(0.012)	(0.011)	(0.002)	(0.073)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	221	221	221	221
R-squared	0.10	0.09	0.09	0.04
Panel B. Controlling for pre-crisis levels and pre-trends (i.e., y_{2006} and $\Delta y_{2002\text{-}2006}$)				
Treatment	-0.030	-0.019	-0.000	0.009
	(0.010)	(0.010)	(0.002)	(0.082)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	599	599	247	219
R-squared	0.07	0.09	0.29	0.02
Panel C. Heckman's correction for survivorship				
Treatment	-0.028	-0.020	0.000	0.002
	(0.010)	(0.010)	(0.002)	(0.080)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Inverse Mills ratio	Yes	Yes	Yes	Yes
Observations	599	599	247	219
R-squared	0.07	0.09	0.29	0.02

Table 4. Robustness
(continued)

	Δ Log(Employees)	Δ CAPEX/PPE	Δ R&D/Assets	Δ KLD-index
Panel D. Seemingly unrelated regressions (SUR) estimation				
Treatment	-0.023	-0.021	0.001	-0.013
	(0.010)	(0.010)	(0.002)	(0.055)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	670	670	295	503
R-squared	0.06	0.08	0.15	0.03
	Δ Log(1 + CAPEX)	Δ Log(1 + R&D)	Δ Log(1 + KLD-index)	Δ KLD-index (net)
Panel E. Alternative dependent variables				
Treatment	-0.061	0.004	-0.007	-0.010
	(0.028)	(0.023)	(0.016)	(0.047)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	670	295	503	503
R-squared	0.07	0.06	0.02	0.05
	Δ Log(1 + # patents)	Δ Log(1 + # citations)	Δ KLD-index(input)	Δ KLD-index(output)
Panel F. Patenting and inputs versus ouput KLD-index				
Treatment	-0.004	-0.002	-0.004	-0.010
	(0.014)	(0.016)	(0.051)	(0.082)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	670	670	503	503
R-squared	0.11	0.12	0.01	0.03

Notes. Control variables include *size, ROA, Tobin's Q, leverage, cash holdings*, all measured in 2006. Standard errors (reported in parentheses) are clustered at the industry level.

Table 5. Industry-specific investment strategies

	Δ R&D/Assets	Δ KLD-index
	(1)	(2)
Treatment	0.003	0.043
	(0.003)	(0.068)
Treatment × Low R&D intensity	-0.012	
	(0.005)	
Treatment × B2B sector		-0.164
		(0.077)
Controls	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	295	503
R-squared	0.15	0.03

Notes. *Low R&D intensity* is a dummy variable indicating whether the company operates in a 2-digit SIC industry whose R&D intensity is in the bottom quartile across all industries; *B2B sector* is a dummy variable indicating whether the company operates in a B2B industry based on the classification of Lev, Petrovits, and Radhakrishnan (2010). Control variables include *size, ROA, Tobin's Q, leverage, cash holdings*, all measured in 2006, along with the interaction variable as stand alone. Standard errors (reported in parentheses) are clustered at the industry level.

Table 6. Financing constraints, organizational slack, and industry time horizons

	Δ Log(Employees)	Δ CAPEX/PPE	Δ R&D/Assets	Δ KLD-index
Panel A. Financing constraints				
Treatment	-0.016	-0.015	0.002	0.072
	(0.009)	(0.009)	(0.002)	(0.089)
Treatment × High FC	-0.026	-0.023	-0.004	-0.343**
	(0.011)	(0.011)	(0.002)	(0.153)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	670	670	295	503
R-squared	0.06	0.08	0.15	0.03
Panel B. Organizational slack				
Treatment	-0.015	-0.016	0.003	0.090
	(0.009)	(0.010)	(0.002)	(0.069)
Treatment × Low slack	-0.028	-0.020	-0.005	-0.411
	(0.013)	(0.012)	(0.002)	(0.196)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	670	670	295	503
R-squared	0.06	0.08	0.15	0.03
Panel C. Industry time horizon				
Treatment	-0.016	-0.017	0.003	0.061
	(0.009)	(0.010)	(0.002)	(0.062)
Treatment × Short cycle	-0.024	-0.018	-0.004	-0.312
	(0.012)	(0.010)	(0.002)	(0.130)
Controls	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	670	670	295	503
R-squared	0.06	0.08	0.15	0.03

Notes. *High FC (financing constraints)* is a dummy variable indicating whether the index of financing constraints of Kaplan and Zingales (1997) is in the top quartile across all firms; *Low slack* is a dummy variable indicating whether the measure of organizational slack of Wan and Yiu (2009) is in the bottom quartile across all firms. *Short cycle* is a dummy variable indicating whether the company operates in an industry that has either a short product development cycle or a short product life cycle based on the classification of Bushman, Indjejikian, and Smith (1996). Control variables include *size, ROA, Tobin's Q, leverage, cash holdings*, all measured in 2006, along with the interaction variable as stand alone. Standard errors (reported in parentheses) are clustered at the industry level.

Table 7. Firm performance after the financial crisis

	ROA (2010-2011)				
	(1)	(2)	(3)	(4)	(5)
No reduction in workforce	0.003				
	(0.006)				
No reduction in CAPEX		0.002			
		(0.006)			
No reduction in R&D			0.025		
			(0.011)		
No reduction in KLD-index				0.013	
				(0.007)	
No reduction in R&D and KLD-index, reduction in workforce and CAPEX					0.032
					(0.013)
Controls	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	592	592	257	465	204
R-squared	0.46	0.46	0.44	0.44	0.38

Notes. Control variables include *size, ROA, Tobin's Q, leverage, cash holdings*, all measured in 2006. Standard errors (reported in parentheses) are clustered at the industry level.