# Do Stakeholders Connect Corporate Social Responsibility to Firm Performance? Testing Stakeholder Influence Capacity Theory

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Finishing this dissertation and my PhD program would not have been possible without the love and support of family, friends, and colleagues, perseverance, compromise, and sacrifice. I'm the first person in my extended family to earn a PhD.

Thank you to Rodney and Shirley, my parents, who provided my siblings and me advantages from the moment we were born. When I started the program, my dad was just showing signs of what became an Alzheimer's disease diagnosis. My mom took on full-time caregiving. Mom, you are amazing. The disease is devastating, a kudzu-like funeral that creeps over everything until the sun is gone. It has been strange trying to join a professional world that claims to revolve around ideas and the mind as I watch my dad lose both. We academics take ourselves and our ideas so seriously sometimes, and forget we live in a tiny, protected, privileged world where ideas and understanding have some intrinsic value, rather than always serving something else. But watching my dad disappear into the disease made me realize that minds, like bodies, are fleeting, temporary things, and I wonder even more about the academic practice of equating names—bodies—with ideas. My dad got into woodworking when he was around the age I am now. He made a wooden sign that lived in our garage. As a kid I always wondered what it meant, and it took growing up to finally understand. It read, "Golf—the most fun you can have with your pants on" (R. Poggioli, ~1980). I've now completed a PhD and haven't found a more solid social scientific law.

Thank you also to my mom, Shirley, for her steadfast love and support and for working every day to make others' lives better and easier. Thanks to her, I had a childhood combination of safety and exploration that seems increasingly rare today but also seems like a great start for a scientist. She led the Scout troop that introduced me to the natural world. She led the church

groups that taught me people try to explain their world and what happens before and after it, one of the best introductions to social science I can imagine. (She might not see it that way…). When my dad, sister, and brother went to amusement parks for roller coasters, she took me to museums, fostering my interests. She probably bought or at least tolerated the home chemistry set that my brother and I used as kids, and she didn't ban science from our lives when we hypothesized that mixing all chemicals in a test tube and putting a fire under it would cause fun. Hypothesis confirmed. One of my favorite moments was starting to talk about some research papers I was reading in my first years of the PhD program. She immediately started pointing out questions and flaws in the research design that I and other PhD students struggled to grasp. She has accomplished so much in her own life and with her family, and I wonder what other things she would have accomplished had she applied her intelligence and energy to something else. But I am grateful she applied it to her family, including me, and those around her. I have so much of her in me, and I intend to use the advantages she gave me to somehow harness my work to helping others.

Thank you to my sister Whitney for helping me through difficult times. I'm glad we're growing closer. It's wonderful seeing you build your family. Please be patient with me as I figure out how to be an uncle. Thank you to Andy M. for getting me interested in grilling, though you might regret it given your competitive approach to the sport. Thank you to my brother Andy S. for conversations about life, death, middle age, and haircuts, all more related than I realized. It's great to see you building your family. My extended family has been a source of support, comfort, and blistering perspective. We've lost irreplaceable folks and gained new ones through what I understand is "acquiring children" in which other humans are internalized into the family to take advantage of the efficiency advantage authority has over contracting.

That is a theory of the firm joke. I acknowledge it is bad. I can think of one person who might laugh at it. Worth it.

Thank you to my friends Adam, Christina, Devin, Molly, Pat, Nate, Seth (alphabetical order…you can't make me sort). I apologize to all of you for disappearing for years at a time. I will be a better friend. Thank you for talking, playing games, going to southern New Mexico on short notice, visiting me in Minnesota. Nate, thank you for doing the work to plan events that keep the group together. Seth, thank you for the conversations and helping me through difficult times.

Completing a PhD is difficult under the best circumstances of a functioning department, personal health, financial stability, no crises for friends or family, and no need or desire to emotionally or financially support others. These conditions are of course rare, but some organizations assume them. Completing a PhD in the absence of several or many of these things is extraordinarily difficult. I am perhaps most proud of this dissertation as a symbol of persistence and survival.

These comments do not reflect on my adviser Alfie Marcus. Thank you, Alfie, for supporting me as I found a way to finish the program. Our conversations about research and the profession of academia were often the highlight of my week. The first substantive conversation we had was when we shared a train from the Newark airport to Philadelphia for my first Academy of Management Meeting. I look forward to many more conversations. When he was a PhD student, he met with his advisor, and his advisor took his manuscript and threw it in the garbage, saying Alfie now had to go talk to people. I hope Alfie doesn’t mind me sharing that story. That kind of abusive supervision is of course ridiculous and should not be tolerated, but the story reveals Alfie's abilities to persist through such treatment and build a

career researching, teaching, and advising in ways that advance our understanding while building up the people around him. That's a rare combination in academia, and I feel extremely fortunate to learn from him, especially given my background is far removed from the culture of academia.

I have more Midwestern working-class populism in me than I realized, and that viewpoint often puts the process of work first over outputs or accolades. This caused trouble for me because few things are more threatening to strategy research right now than focusing on process rather than results. The field is grappling with a credibility crisis and a fight over how to do its research. But science is process. Yet my focus on process, on method, often clashed with field-wide pressure to produce "results." I often felt isolated, sidelined, and undermined by colleagues. Unfortunately, my association with academia and science meant I sometimes got similar rejection from the world I came from. Halfway through my PhD, a cousin from back home asked me what I do. I told him I do research. He said I must get a lot of blisters on my fingers doing that. Sometimes life is a hackneyed country music song. So it goes.

Thank you to my professional family, especially my adviser Alfie Marcus and my committee members Paul Vaaler, Russ Funk, and Dave Knoke. Thank you for supporting me through finishing the program. Thanks also to Stephanie Bertels for your advice at the Atlanta Academy of Management Conference. Many more deserve thanks, including Minnesota faculty and PhD students.

Thank you to anyone committed to using scientific methods to understand the world. You never know who you inspire, even if they never say a word to you. We're part of an extraordinary project. We should be proud of what we've accomplished so far, and we should

be vigilant against those who use the appearance of science for self-enrichment. Finishing a PhD should be a celebration of a tremendous, collective achievement and of joining a community of scholars. I hope to eventually work with doctoral students, and I will strive to make their training worth celebrating.

References

Poggioli, Rodney. ~1980. "Golf—the most fun you can have with your pants on." Carving in wood. Leaf River, IL, USA.

**DEDICATION**

To understanding, myth, and ceremony.

To understanding myth and ceremony.

**ABSTRACT**

This dissertation tests stakeholder influence capacity theory. Stakeholder influence capacity theory predicts that corporate social responsibility affects firm performance by influencing the behavior of stakeholders. In a series of chapters, this dissertation reviews research at the intersection of corporate social responsibility and stakeholder management, uses causal inference research designs to test for a direct effect of responsibility on performance, tests whether stakeholder influence capacity mediates the responsibility-performance relationship, and tests whether stakeholder influence capacity is stakeholder-specific rather than a single firm capability applicable to all stakeholders.

The findings are the following. First, they support the responsibility literature's lack of consensus about a main effect of responsibility on performance. Second, there is mixed evidence for whether stakeholder influence capacity mediates the effect of responsibility on performance, with some models showing partial mediation, some full mediation, and others no mediation. Third, stakeholder-specific mediation tests provide some evidence that stakeholder influence capacity varies by stakeholder group, with no evidence for customer stakeholders, some evidence for employee stakeholders, and strong evidence for environment stakeholders.

These findings suggest the responsibility performance literature's lack of consensus around an effect of responsibility on performance could be due to lack of attention to the specific mechanism that connects corporate responsibility actions to performance. Lack of attention to mechanisms was identified at least two decades ago, but only now are scholars beginning to specify and test mechanisms. Stakeholder influence capacity theory advances responsibility research by proposing a stakeholder influence capacity mechanism connecting responsibility to performance.

This dissertation is one of the first empirical tests of stakeholder influence capacity theory's mediation hypothesis. Prior work tested stakeholder influence capacity as a moderation hypothesis; the authors of that study explicitly note that the theory is a mediation theory while their empirical test is moderation. This dissertation using mediation analysis more directly tests the theory and finds suggestive evidence that the theory needs further development to account for stakeholder heterogeneity.

The primary contributions of this dissertation are advancing the ongoing integration of corporate social responsibility and stakeholder management research, empirically testing stakeholder influence capacity, and advancing stakeholder influence capacity theory by showing the need for further theoretical development accounting for stakeholder-specific influence capacity. The final chapter charts future research directions needed to further develop the theory and understand whether and how firms' corporate social responsibility actions influence stakeholders and, ultimately, the firm's economic performance.

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Companies are increasingly expected to address social issues through corporate social responsibility actions. Corporate social responsibility (CSR) is a corporate investment of resources that seeks to address a social welfare issue for some stakeholder group (Barnett, 2007). CSR research examines the motivations, processes and performance of CSR investments (Aguinis & Glavas, 2012; Bansal & Song, 2017). CSR research originated in the 1970s (Margolis & Walsh, 2003) with studies of the performance impact of pollution and the social responsibility of stock investments (Moskowitz, 1972). Since then, CSR research has grown into a mature research field, including competing theories and robust debate about methodological challenges in testing those theories.

Despite decades of research, the CSR literature has yet to produce a consensus or consistent empirical findings on whether and how CSR actions influence firm performance. CSR scholars now point to both theoretical and methodological reasons for the lack of consistent findings. Theoretically, CSR research is turning toward theorizing exactly how specific CSR actions affect the welfare of specific groups (Barnett, 2007; see also Wood & Jones, 1995). This work seeks to uncover the *mechanisms* by which CSR could affect firm performance. CSR research has tended to ignore underlying mechanisms, instead assuming CSR can affect performance and examining correlations between CSR measures and performance measures without theorizing how, or even whether, the CSR being studied could affect the performance being studied (Wood & Jones, 1995). Recent work calls for CSR scholars to specify and test theoretical mechanisms by which CSR actions affect performance (Aguinis & Glavas, 2012; Mattingly, 2017).

Methodologically, CSR research has used research designs that struggle to isolate causal effects and address the problem of reverse causality. Reverse causality has even been a central theoretical claim, with one influential study arguing there is a "virtuous circle" in which CSR increases performance and performance increases CSR (Waddock & Graves, 1997). Methodological studies identified problems in data commonly used in CSR research, suggesting past studies suffer from measurement error and construct validity problems that call into question insights gained from past CSR research (Chatterji, Durand, Levine, & Touboul, 2016; Mattingly & Berman, 2006).

This dissertation advances CSR research by empirically testing a specific theoretical mechanisms connecting CSR and performance recently developed in what I call stakeholder influence capacity theory (Barnett, 2007). Stakeholder influence capacity (SIC) theory advances CSR research by specifying an exact theoretical mechanism by which CSR affects firm performance. The theory pushes CSR beyond the question of whether "it pays to be good" toward questions of whether it pays to be good, why, when, and for whom. SIC theory proposes that CSR affects performance by first influencing the behavior of stakeholders whose actions drive changes in firm performance. I test stakeholder influence capacity with two counterfactual and one associational research designs and a new data source that improves on some of the methodological problems identified in past work.

I make my primary theoretical contributions to the literature on CSR performance. The most recent review of CSR performance examined 104 articles and found a small, positive relationship between firm-level responsibility and financial outcomes (Aguinis & Glavas, 2012). A meta-analysis of 52 studies found an overall positive association between social responsibility strategies and financial performance (Orlitzky, Schmidt, & Rynes, 2003).

Another review of 109 studies found almost half report a performance increase associated with increased responsibility, 7 found responsibility predicts a performance decrease, 28 found no association, and 20 reported mixed results (Margolis & Walsh, 2003). A 2009 review of 128 studies found more than 50% reported a positive responsibility performance relationship, about 25% reported a mixed or neutral relationship, and about 15% reported a negative relationship (Peloza, 2009).

These findings remain contentious. The tendency for published studies to report positive associations might be due to publication bias rather than a positive responsibility performance relationship (Rost & Ehrmann, 2017). Six responsibility data sets commonly used in responsibility performance studies do not agree on their ratings for the same firms (Chatterji et al., 2016). Ratings of firms' environmental responsibility do not use all publicly available information, suggesting ratings might contain measurement error that reduces the validity of empirical studies (Chatterji, Levine, & Toffel, 2009). Positive and negative responsibility actions and outcomes are different, but CSR studies often combine positive and negative actions into a single measure (Mattingly, 2017; Mattingly & Berman, 2006). A replication of Waddock and Graves (1997) supported the positive association between financial performance and future responsibility but not the relationship between responsibility and future financial performance (Zhao & Murrell, 2016).

The diversity of measures is a pressing problem. Peloza's (2009) found 36 measures of responsibility and 39 measures of financial performance used in CSR research. The choice of firm performance measure affects whether CSR affects performance. There might not be a universal effect of CSR on performance. Richard, Devinney, Yip, and Johnson (2009) reviewed firm performance measures used in management studies and found high diversity in

the type and measures used to capture firm performance (Table 1). If responsibility affects each performance outcome differently, the responsibility performance literature's general inattention to exactly which firm performance outcome is affected by what type of CSR remains a large research gap in the CSR literature, despite identification of CSR mismatching more than twenty years ago (Wood & Jones, 1995).

Table 1: Performance measures by type, reproduced from Richard, Devinney, and Yip (2009)

| **Accounting** | **Financial market** | **Mixed accounting/financial market** |
|---|---|---|
| Cash flow from operations | Beta coefficient | Balanced scorecard |
| Earnings before interest and taxes (EBIT) | Earnings-per-share (EPS) | Cash flow per share |
| Earnings before interest, taxes, depreciation, and amortization (EBITDA) | Jensen's alpha | Cash flow return on investment (CFROI) |
| Market share | Market value (or market capitalization) | Cash value added (CVA) |
| Net operating profits (earnings) | Price-to-earnings ratio (P/E ratio) | Discounted cash flows (DCF) |
| Net operating profit less adjusted taxes (NOPLAT) (or net operating profit after taxes NOPAT) | Return on market-valued assets | Economic value added (EVA) (aka economic profit) |
| Profit margin | Stock price | Free cash flows |
| Return on assets (ROA) | Total shareholder return (TSR) | Internal rate of return (IRR) |
| Return on book-valued assets | Tracking stocks | Market-to-book value (MBV) |
| Return on capital employed (ROCE) (or return on capital ROC) | | Market value added (MVA) |
| Return on equity (ROE) | | Net present value (NPV) |
| Return on investment (ROI) | | Shareholder value analysis (SVA) |
| Return on invested capital (ROIC) | | Tobin's q |
| Return on net assets (RONA) | | Total business return (TBR) |
| Return on sales (ROS) | | Warranted equity value (WEV) |
| Return on total assets | | Weighted average cost of capital (WACC) |
| Risk-adjusted return on capital (RAROC) (or return on risk-adjusted capital RORAC) | | Z-score |
| Sales (revenue) | | |
| Sales growth (revenue growth) | | |
| Variance in accounting profitability | | |

The measurement of CSR has also been criticized. One common CSR measure is the net KLD score from the MSCI KLD dataset. However, net KLD is constructed by subtracting negative CSR performance from positive CSR performance. The resulting net measure fails to distinguish between negative and positive CSR performance. If negative and positive CSR have different performance effects, conflating them in a single measure would not enable research to capture those separate effects A recent review recommended positive and negative responsibility actions be measured separately (Mattingly, 2017). Generally, responsibility performance studies need to explore specific responsibility measures regardless of the dataset being used (Aguinis & Glavas, 2012; H. Wang, Tong, Takeuchi, & George, 2016).

The research gaps filled by this dissertation address the theoretical and methodological problems reviewed so far and are described in Table 2. The gaps include theory about the exact mechanism(s) connecting responsibility to performance, whether responsibility causes performance or instead spuriously correlates with performance, how specific responsibility actions affect specific financial performance outcomes, which financial performance outcomes are affected by responsibility, how responsibility measures can be improved, and how researchers can avoid problems in commonly used data sets.

Table 2: Research Gaps

| **Gap** | **Filled in** |
|---|---|
| Cause or correlation | Chapter 2 |
| Mechanism connecting responsibility to performance | Chapters 2 and 3 |
| Relevant performance outcome | Chapters 2, 3, and 4 |
| Improved responsibility measure and data quality | Chapters 2, 3, and 4 |
| Variation across stakeholder groups | Chapter 4 |

This dissertation contributes to identifying whether the relationship between responsibility and performance is causal. Past studies use associational research designs, usually regression of

observational data. I use two counterfactual research designs, propensity score matching and difference-in-differences estimation (Angrist & Pischke, 2009; Morgan & Winship, 2007).

Second, this dissertation addresses the theoretical mechanism gap by examining the mechanisms of stakeholder influence capacity (Barnett, 2007). Stakeholder influence capacity is the capacity of a firm to use social responsibility to influence stakeholder behavior in ways that increase firm performance. The theory claims a firm's influence capacity mediates the effect of CSR on performance. To test the theory, I use mediation analysis to examine whether stakeholder influence capacity fully or partially mediates the effect of CSR on performance. This analysis contributes to emerging empirical work on specific pathways through which responsibility affects specific stakeholder groups that, in turn, can influence specific performance outcomes. Responsibility studies are beginning to examine how responsibility works through specific stakeholder groups, such as employees (Flammer, 2015; Flammer & Luo, 2017; Shea & Hawn, 2019). I extend this work by testing mediation for the stakeholder groups of employees, customers, and environmental stakeholders.

Third, I address the stakeholder mismatching problem by using a firm performance outcome that stakeholder groups can influence: revenue. Lev et al (2010) use revenue in their study of corporate philanthropy because they can theoretically motivate how philanthropy might affect revenue. Revenue can be influenced by stakeholders including customers through purchasing behavior, employees through effort, and environmental stakeholders through organizing boycotts that influence sales. Stakeholder influence on revenue can also happen quickly, while other performance outcomes' response to responsibility might require more time to manifest (Flammer, 2015; Lev et al., 2010).

Revenue is also an appealing performance measure because it is not a ratio. Ratio variables cause parameter estimates to fluctuate across estimations and inflate standard errors, causing inference errors. Yet ratio variables remain common in management and strategy research. Wiseman (2009) found 74% of empirical papers published in 2007 in *Strategic Management Journal* included ratio variables. Certo et al. (2018) found 79% of empirical articles published in *Strategic Management Journal* in 2015 included ratios, and more than two-thirds of empirical articles published in *Academy of Management Journal* in 2015 used at least one ratio variable. Using revenue as a level rather than a ratio facilitates more reliable estimation.

I also address gaps four and five related to data and measures. To avoid problems identified with the commonly used KLD dataset (Mattingly, 2017), I measure CSR with a dataset that aggregates multiple CSR measures into a single CSR measure. Aggregating across multiple measures uses information from many different CSR ratings rather than relying on a single rating. Single ratings do not converge on similar values (Chatterji et al., 2016). Combining multiple ratings uses information from each rating but avoids equating a single rating with overall CSR performance. Similar to how political scientists construct more accurate polls by aggregating across many different individual polls (Pasek, 2015), aggregating multiple responsibility datasets together can produce a more accurate CSR measure using information from all individual ratings.

**Research Questions**

Across three related chapters, I answer the following research questions:

1. **Chapter 2 (main relationship)**: What is the effect of corporate social responsibility on firm financial performance?

2. **Chapter 3 (stakeholder influence capacity):** Does stakeholder influence capacity mediate the effect of responsibility on performance?
3. **Chapter 4 (stakeholder heterogeneity)**: Is stakeholder influence capacity stakeholder-specific?

**Dissertation Structure**

Chapter 1 describes the research questions, justification for the studies, and reviews the relevant literature. Chapters 2, 3, and 4 each report the results of a study answering one of the research questions. Chapter 5 concludes with combined inferences across the three studies.

Chapter 2 answers the research question, *What is the effect of corporate social responsibility on firm financial performance?* Prior research, replications, and reviews find a weakly positive association between responsibility and firm performance (Aguinis & Glavas, 2012; Orlitzky et al., 2003; Zhao & Murrell, 2016). Recent empirical studies using counterfactual research designs capable of causal inferences also report a positive relationship (Flammer, 2015). Theoretical and empirical problems related to data and measurement remain a problem in this literature (Chatterji et al., 2016, 2009; Mattingly, 2017; Mattingly & Berman, 2006). I incorporate solutions to these problems into my empirical strategy to test hypotheses about the responsibility performance relationship.

I hypothesize a positive relationship between corporate social responsibility and firm financial performance. To test the hypothesis, I use a dataset created and maintained by CSRHub Inc., which I refer to as CSRHub. CSRHub aggregates multiple social responsibility measures into twelve measures of responsibility performance. I match firms in CSRHub data with firms in Compustat data to link responsibility to firm performance. To assess causality, I

use the counterfactual research designs of propensity score matching and difference-in-differences estimation of the effect of responsibility on performance. I supplement the counterfactual designs with fixed effects panel regressions.

Chapter 2 makes three contributions to the social responsibility performance literature. First, I build on the trend toward causal identification by using counterfactual research designs to capture the causal impact of responsibility on performance. Second, I contribute an empirical examination of the relationship using an alternative data source to the standard MSCI KLD STATS data, enabling a test of whether relationships found using KLD data hold using an alternative corporate social responsibility measure. Third, I test social responsibility's relationship with revenue as a measure of firm performance. Revenue is theoretically justified by instrumental stakeholder theory's linkage of firm performance to changes in stakeholder behavior toward the firm's products and services.

Chapter 3 answers the question, *Does stakeholder influence capacity mediate the effect of responsibility on performance?* Examining the mediating effect of stakeholder influence capacity is a form of testing whether stakeholder influence capacity is a mechanism connecting responsibility to performance. Past studies of a direct relationship between responsibility and performance assume responsibility has an effect on performance independent of other factors. Mixed results from such studies might arise from the assumption of a direct, independent effect being wrong. If responsibility affects performance through one or multiple mechanisms, studying only the direct effect conflates those mechanisms. If some mechanisms positively link responsibility to performance but others link it negatively, studies conflating mechanisms could produce conflicting results over time.

To address this problem, responsibility scholars are calling for more direct examination of specific mechanisms. At the organizational level, only 7% of studies reviewed by Aguinis and Glavas (2012) examine a mechanism. Those studies identified two mechanisms: intangible resources (e.g., Surroca, Tribó, & Waddock, 2010) and whether managers interpret responsibility as an economic opportunity. Barnett and Salomon (2012) attempt to study the stakeholder influence capacity mechanism, but they acknowledge data limitations and hope their study motivates future research on how stakeholder influence capacity mediates the responsibility performance relationship.

To examine how stakeholder influence capacity mediates the responsibility performance relationship, I use mediation analysis (Aguinis, Edwards, & Bradley, 2017; Baron & Kenny, 1986; Shaver, 2005). I use the same responsibility and performance data as in Chapter 2. Measuring stakeholder influence capacity is complicated by my inability to directly observe firm-level capability to influence stakeholder behavior with responsibility. Instead, I use a measure of how stakeholders perceive firms' responsibility on various dimensions as a proxy for firms' stakeholder influence capacity. The critical assumption with this measurement approach is that a positive change in perception indicates the firm has the ability to influence its stakeholders to behave in ways that increase performance. Conversely, a negative change in responsibility perception correlates with a firm's lack of stakeholder influence capacity.

I use mediation analysis developed in psychology (Baron & Kenny, 1986) and modify it following the recommendations of Shaver (2005) and Aguinis et al. (2017) for using mediation analysis in strategy research. Shaver recommends addressing possible correlation of errors across the estimating equations in the classic Baron and Kenny test. Aguinis et al. identify both the popularity of mediation analysis in management research and a variety of

problems that reduce the knowledge gained from mediation studies. They recommend solutions to these problems that I implement in the mediation analysis.

Chapter 4 answers the question, *Is stakeholder influence capacity stakeholder-specific?* Understanding whether stakeholder influence capacity differs across stakeholder groups is important given recent instrumental stakeholder theory development recognizing that stakeholder groups have different preferences and motivations that influence their attitudes toward and responses to their treatment by firms (Bosse, Phillips, & Harrison, 2009; Bridoux & Stoelhorst, 2014; Bundy, Vogel, & Zachary, 2018; Harrison, Bosse, & Phillips, 2010). If stakeholder groups vary on preferences, firms need to tailor their relationship maintenance to the preferences of each stakeholder group. The same responsibility action will be evaluated differently by stakeholder groups, suggesting the effect of that action on stakeholder behavior will vary across those groups. Initial development of stakeholder influence capacity assumed all stakeholders have similar preferences. Relaxing that assumption in the context of instrumental stakeholder theory development implies the responsibility performance relationship varies across stakeholder groups.

To answer the research question, I derive and test hypotheses predicting the responsibility performance relationship for the stakeholder groups customers, employees, environmental stakeholders, and investors. As in previous chapters, I use CSRHub data to measure responsibility and Compustat data to measure performance. I test hypotheses predicting different responsibility performance relationships across stakeholder groups.

Chapter 5 integrates findings across Chapters 2, 3, and 4, discusses limitations, and charts future research directions for understanding whether and how firms transform CSR into performance through influencing stakeholders.

## CHAPTER 2: WHAT IS THE EFFECT OF RESPONSIBILITY ON PERFORMANCE?

This chapter tests for a direct effect of CSR on firm performance. The CSR literature generally claims a weak, positive association between CSR and performance (Aguinis & Glavas, 2012; Orlitzky et al., 2003; Peloza, 2009; Wood, 2010). To test the relationship, I use two counterfactual research designs, difference-in-differences estimation and propensity score matching. I supplement the analysis with one associational design, fixed effects regression. I next describe the theory and hypothesis tested. I then describe the research designs, data, and empirical strategies.

### Theory and Hypotheses

The CSR performance literature examines CSR's contribution, if any, to firms' overall financial performance. Margolis and Walsh (2003) trace the origins of CSR performance research to the 1970s (Bragdon & Marlin, 1972; Moskowitz, 1972). The most recent reviews and meta-analyses of the literature cover studies published up to about 2010 and report a weak, positive association between CSR and performance. A meta-analysis by Orlitzky, Schmidt, and Rynes (2003) analyzed 52 studies and found responsibility "is likely to pay off," but the relationship is inconsistent across performance and responsibility measures. Peloza (2009) reviewed 159 publications (128 academic, 31 practitioner). Of academic articles, 59% reported a positive CSR performance relationship, 27% a mixed or no relationship, and 14% a negative relationship. Of practitioner articles, 77% reported a positive association, 10% a mixed or no relationship, and 13% a negative relationship. Aguinis and Glavas (2012) reviewed 588 articles and 102 books on responsibility performance at the institutional, organizational, and individual levels of analysis published from 1970 to 2011. The 50 empirical and 54 conceptual studies

that examined responsibility performance at the organizational level reported a small, positive relationship between CSR and financial outcomes.

Despite these reviews and meta-analyses claiming a positive performance effect of CSR, subsequent findings remain inconsistent. Waddock and Graves (1997) found a "virtuous circle" in which responsibility and future performance are positively associated and performance and future responsibility are positively associated. Later work questioned the virtuous circle finding. A meta-analysis of 42 responsibility studies published from 2003-2012 found CSR and future performance positively related but performance and future CSR unrelated (Q. Wang, Dou, & Jia, 2016). A replication of Waddock and Graves (1997) found performance positively associated with future CSR but CSR not associated with future performance (Zhao & Murrell, 2016), contradicting both the original finding and the meta-analysis.

Inconsistent findings could be due to several factors. First, studies use different performance measures, and the effect of responsibility might differ across types of firm performance (Peloza, 2009). Second, studies continue to use associational designs vulnerable to misspecification and biased estimation results. Third, though Wood and Jones (1995) identified the problem of "stakeholder mismatching" two decades ago, studies still tend not to address the specific type of CSR and how it might affect the specific type of performance measured in the study. These and other problems contribute to the ongoing " notorious 'inconsistencies' of this research stream" (Orlitzky et al., 2003, p. 422). .

Trends in 87 CSR studies published in *AMJ* from 1958-2015 suggest CSR research is beginning to focus on CSR processes to address the problems in the literature (H. Wang et al., 2016), including how stakeholders interpret and respond to CSR actions. Research is also

moving toward understanding underlying theoretical mechanisms connecting specific CS types to specific performance outcomes.

Table 38 in the Chapter 2 Appendix describes responsibility performance research published since the last round of reviews and meta-analyses. Lev et al. (2010) found corporate philanthropy positively associated with future financial performance but performance not associated with future philanthropy, again rejecting the virtuous circle and contradicting the replication findings.

Drawing on neo-institutional theory, Hawn and Ioannou (2016) separated responsibility actions into internal and external actions, relative to the firm. Internal responsibility actions aim to change the firm's structure into conformity with institutional expectations. External responsibility actions aim to gain the endorsement of powerful external constituents. The distinction resembles that between internal and external audiences in the stakeholder literature (Freeman, 1984). Internal responsibility aims to influence the behavior of internal stakeholders like employees, managers, and owners, while external responsibility aims to change the behavior of external stakeholders like regulators, customers, suppliers, shareholders, activists, and communities. Using data from 2002-2008, Hawn and Ioannou found prior internal and current external responsibility actions positively related to market performance.

Flammer (2013) studied market reaction to firms' announcements of eco-friendly and eco-harmful news over the three decade period from 1980-2009. Through the entire period, eco-friendly news announcements were associated with increased share prices on markets, and eco-harmful announcements were associated with decreased share prices. However, the relationship changed over time. From 1980-1989, the positive market reaction to eco-friendly

announcements was positive, from 1990-1999, it was positive but weaker, and from 2000-2009 the relationship disappeared. The negative market reaction to eco-harmful events also changes over time. From 1980-1989, there was no relationship. From 1990-1999, the relationship became negative, and from 2000-2009 the relationship became negative and twice as strong as the previous decade. From these results, Flammer inferred stakeholders' normative expectations on firm eco-behavior shifted over time. Early on, stakeholders expected firms to harm the environment, and markets rewarded firms that instead adopted eco-friendly initiatives or actions. However, the expectation changed toward expecting firms to act in eco-friendly ways. As expectations shifted, eco-friendly actions received less reward, but eco-harmful actions were increasingly punished by investors. These patterns suggest the preferences of shareholder stakeholders change over time.

Flammer (2015) studied how the passage of responsibility-related shareholder proposals relates to market performance and other outcomes. From 1997-2012, markets responded more positively to proposals that barely passed compared to those that barely failed, suggesting markets believed firms adopting responsibility-related proposals would perform better than they would have without adopting the proposal. Flammer investigated several mechanisms through which better performance might occur: employees, customers, and infrastructure investment. Proposal passage was positively associated with labor productivity and sales, but not with capital expenditures. Flammer infers this to mean responsibility affected performance by altering the behavior of stakeholders like employees and customers, consistent with stakeholder influence capacity, rather than an infrastructure investment mechanism.

As part of the turn toward replication in strategy research (Ethiraj, Gambardella, & Helfat, 2016), Zhao and Murrell (2016) conducted a replication study of Waddock and Graves

(1997). Waddock and Graves found a virtuous circle in which responsibility is positively associated with future financial performance and financial performance is positively associated with future responsibility. The replication used data from additional years and multiple measures of performance. It found accounting performance positively associated with future responsibility, though the effect size is half that reported in the original study. Responsibility is not associated with future market performance. Zhao and Murrell concluded that the virtuous circle findings of the original study might not generalize to other samples. Though Zhao and Murrell do not make this claim, their findings could also be driven by the types of changes in the CSR performance relationship over time found by Flammer (2013).

Given the continued presence of mixed findings, even with counterfactual research designs, what is the expected effect of responsibility on firm performance? At this point in the history of the responsibility performance literature, we have not found enough consistent evidence at the firm level to conclude that responsibility causes either increased or decreased firm performance. Even though more studies report a positive relationship than a null or negative relationship, evidence suggests that disparity might be attributable to publication bias making it easier to publish papers finding a positive relationship than papers finding no or a negative relationship (Rost & Ehrmann, 2017). The possibility of publication bias suggests the weight of evidence in the published literature should be adjusted away from a positive association. Published studies tend to report more positive associations, but after adjusting this evidence away from a positive relationship to account for publication bias, there is likely no causal effect of responsibility on firm performance at the firm level.

However, this conclusion changes if we consider a specific type of firm performance outcome. Using all published responsibility performance studies to determine if there is a

responsibility performance relationship assumes that all the different firm performance outcomes in those studies are conceptually and empirically equivalent. But the responsibility performance relationship empirically varies according to the firm performance measure used (Orlitzky et al., 2003; Zhao & Murrell, 2016), suggesting all firm performance outcomes are not interchangeable in their relationship with responsibility.

I study a firm performance outcome that is theoretically relevant to a variety of stakeholders: revenue. By theoretically relevant, I mean it can be argued that the outcome (1) matters to the stakeholder and (2) can be affected by the stakeholder. Wood and Jones (1995) argue we should only expect a positive relationship between responsibility and performance when there is a theoretical mechanism linking them. Lev et al (2010) use revenue in their study of corporate philanthropy because they can theoretically motivate how philanthropy might affect revenue. I adopt a similar approach and use revenue as the financial performance outcome for responsibility.

Using revenue in the context of the stakeholder influence capacity mechanism links the financial performance outcome to the theoretical mechanism. If stakeholder behavior toward the firm connects responsibility actions to performance, the performance construct should be something that matters to and can be affected by a variety of stakeholders. Revenue can be influenced by a variety of stakeholders, including customers most directly but also employees through effort and environmental stakeholders through organizing boycotts that influence sales. Employees can affect revenue through their effort selling the firm's products and services. Customer stakeholders can influence revenue by increasing or decreasing their purchases of the firm's offerings. Community stakeholders can affect revenue by choosing to become customers or by organizing community actions supporting or resisting the firm's

operations (Henisz, Dorobantu, & Nartey, 2014). Environmental stakeholders can influence revenue by organizing social movement activities like boycotts against the firm. Stakeholder influence on revenue can also happen quickly, while other performance outcomes' response to responsibility might require more time to manifest (Flammer, 2015; Lev et al., 2010).

Based on these arguments, I predict that CSR has a causal, positive effect on revenue.

*Hypothesis 1: Increased corporate social responsibility causes increased firm revenue.*

**Data and Sample**

Testing the direct effect of CSR on performance requires data on both CSR and firm performance. Data on CSR come from CSRHub. I purchased access to the data with a grant from the University of Minnesota Institute on the Environment (Project #MS-003-17, Principal Investigator Prof. Alfred A. Marcus).

Data on firm performance are from Compustat, accessed through the University of Minnesota institutional subscription to the Wharton Research Data Service.

***CSRHub***

The CSRHub data contain 965,877 firm-month observations on 17,458 unique firm names (14,362 unique CUSIP identifiers) from December 2008 to September 2017. I obtained CSRHub data through a 1-year subscription to the CSRHub data service. The subscription provided access to data from the beginning of the CSRHub service in December 2008 through September 2017, the last month available at the time the annual subscription expired.

The CSRHub data are created and maintained by CSRHub, LLC, a private company founded in 2008. CSRHub's mission is to increase access to Environment, Society, and

Governance (ESG) ratings. Rather than create its own CSR measure, CSRHub contracts with other ESG measure providers to obtain access to their measures. CSRHub aggregates those providers' measures into a single ESG measure for each firm. As of April 1, 2019, CSRHub reports using 613 providers as data sources for its rating calculations (CSRHub LLC, 2019a). However, not all firms are rated by every provider, so the number of ratings that are used to calculate a CSRHub rating varies across firms and time. CSRHub's main providers are ASSET4 (Thomson Reuters), Carbon Disclosure Project (CDP), IdealRatings, ISS (IW Financial), MSCI (ESG Intangible Value Assessment and ESG Impact Monitor), Trucost, and VigeoIRIS (CSRHub LLC, 2019c).

The unbalanced panel of CSRHub data has 965,877 monthly observations on 17,458 firms over 106 months, and 2,712 firms appear in all months. The median months per firm is 54. Table 3 shows the number of firms rated in each year.

Table 3: Number of firms rated by CSRHub, by year.

| *Year* | *Firms with at Least One Rating* | *Firms with an Overall Rating* | *Percent with Overall Rating* |
|---|---|---|---|
| 2008 | 3,027 | 1,128 | 37.3 % |
| 2009 | 4,646 | 2,575 | 55.4 % |
| 2010 | 6,552 | 3,930 | 60.0 % |
| 2011 | 8,655 | 4,748 | 54.9 % |
| 2012 | 9,649 | 5,617 | 58.2 % |
| 2013 | 10,771 | 6,256 | 58.1 % |
| 2014 | 10,686 | 6,733 | 63.0 % |
| 2015 | 11,716 | 7,281 | 62.1 % |
| 2016 | 13,931 | 8,255 | 59.3 % |
| 2017 | 17,419 | 8,813 | 50.6 % |

Table 4 shows ratings by year and month. The number of ratings per month generally increases over time as more firms are added. The number of ratings occasionally declines (e.g., May 2010, June 2014).

Table 4: CSRHub observations by month and year. Each observation is a firm-month.

| Month | 1 (Jan) | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 (Dec) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2008 | - | - | - | - | - | - | - | - | - | - | - | 3,027 | 3,027 |
| 2009 | 3,031 | 3,031 | 3,130 | 3,382 | 4,321 | 4,332 | 4,388 | 4,391 | 4,413 | 4,550 | 4,594 | 4,631 | 48,194 |
| 2010 | 4,875 | 5,276 | 6,075 | 6,162 | 6,159 | 6,175 | 6,176 | 6,176 | 6,175 | 6,452 | 6,380 | 6,428 | 72,509 |
| 2011 | 6,700 | 6,725 | 6,850 | 6,946 | 7,203 | 7,820 | 8,034 | 8,169 | 8,242 | 8,293 | 8,198 | 8,141 | 91,321 |
| 2012 | 8,199 | 8,322 | 8,396 | 8,627 | 8,676 | 8,607 | 8,708 | 8,880 | 8,986 | 9,099 | 9,390 | 9,440 | 105,330 |
| 2013 | 9,567 | 9,645 | 9,621 | 9,715 | 9,091 | 9,035 | 9,100 | 9,099 | 9,368 | 9,508 | 9,531 | 9,522 | 112,802 |
| 2014 | 9,441 | 9,559 | 9,434 | 9,561 | 9,662 | 9,645 | 9,652 | 9,753 | 9,778 | 9,663 | 9,774 | 9,901 | 115,823 |
| 2015 | 10,068 | 10,059 | 10,063 | 10,073 | 10,044 | 10,525 | 10,637 | 10,559 | 10,818 | 10,914 | 10,677 | 11,010 | 125,447 |
| 2016 | 11,219 | 11,288 | 11,289 | 11,359 | 10,999 | 11,005 | 12,626 | 12,654 | 12,754 | 12,846 | 12,791 | 13,286 | 144,116 |
| 2017 | 13,387 | 13,255 | 17,240 | 17,240 | 17,240 | 17,229 | 17,239 | 17,239 | 17,239 | - | - | - | 147,308 |
| Total | 76,487 | 77,160 | 82,098 | 83,065 | 83,395 | 84,373 | 86,560 | 86,920 | 87,773 | 71,325 | 71,335 | 75,386 | 965,877 |

CSRHub uses a bottom-up process to create sub-category, category, and an overall rating. To create a category rating, two or more subcategory ratings must exist for the firm. Not all firm-months contain a measure on all dimensions. Table 5 shows the number and percentage of firm-month observations on each dimension in the data.

Table 5: Firm-month CSRHub observations by responsibility dimension.

| *Type* | *Rating* | *Rated* | *Not Rated* | *%Rated* |
|---|---|---|---|---|
| **Overall** | | **561,501** | **404,376** | **58%** |
| **Category** | **Community** | **785,009** | **180,868** | **81%** |
| Subcategory | Community development | 755,656 | 210,221 | 78% |
| Subcategory | Product | 614,193 | 351,684 | 64% |
| Subcategory | Human rights and supply chain | 818,916 | 146,961 | 85% |
| **Category** | **Employees** | **833,241** | **132,636** | **86%** |
| Subcategory | Compensation and benefits | 697,011 | 268,866 | 72% |
| Subcategory | Diversity and labor rights | 788,659 | 177,218 | 82% |
| Subcategory | Training, health, and safety | 686,667 | 279,210 | 71% |
| **Category** | **Environment** | **591,179** | **374,698** | **61%** |
| Subcategory | Energy and climate change | 731,515 | 234,362 | 76% |
| Subcategory | Environmental policy and reporting | 567,318 | 398,559 | 59% |
| Subcategory | Resource management | 583,020 | 382,857 | 60% |
| **Category** | **Governance** | **888,167** | **77,710** | **92%** |
| Subcategory | Board | 712,286 | 253,591 | 74% |
| Subcategory | Leadership ethics | 884,364 | 81,513 | 92% |
| Subcategory | Transparency and reporting | 822,771 | 143,106 | 85% |

Note: Two or more subcategories must be rated to calculate a category rating. Data from December 2008 to September 2017. Table created March 12, 2018.

Table 6 shows descriptive statistics for each responsibility dimension.

Table 6: Firm-month CSRHub descriptive statistics.

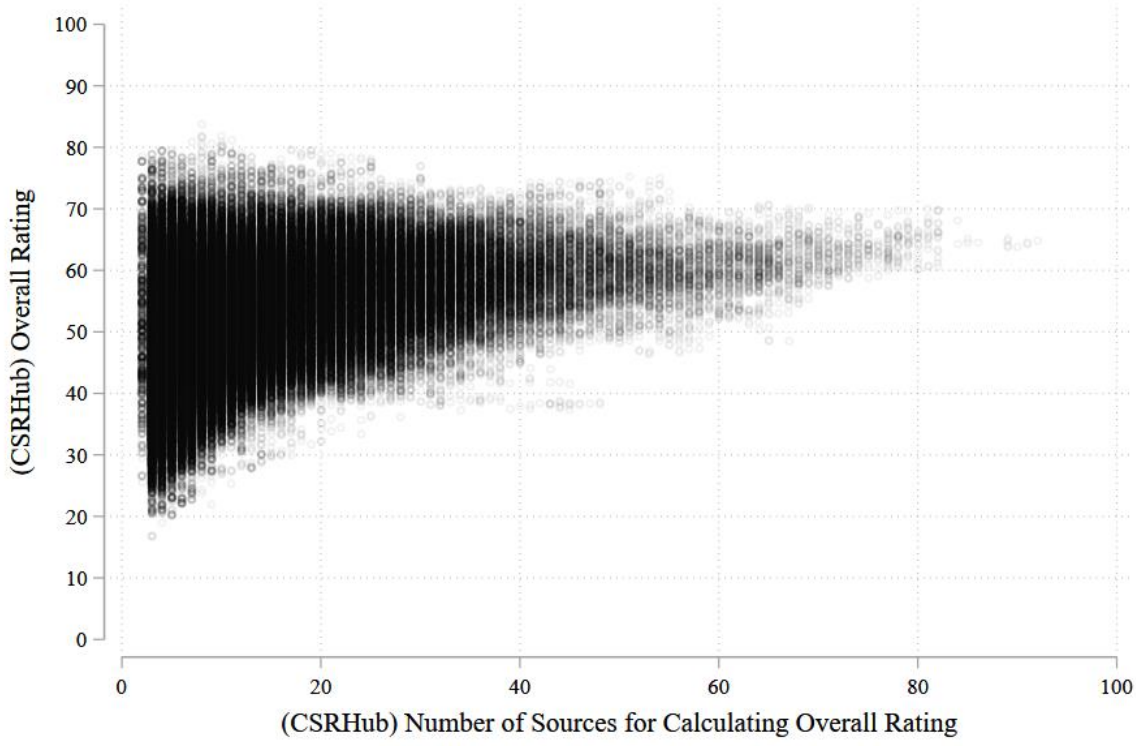
| *Rating* | *Observations* | *Mean* | *Standard Deviation* | *Min* | *Max* |
|---|---|---|---|---|---|
| **Overall** | **561,501** | **52.258600** | **7.6925610** | **16.84620** | **83.82450** |
| **Community** | **785,009** | **53.835540** | **12.0379000** | **5.00000** | **94.00000** |
| Community development | 755,656 | 51.294490 | 12.8621800 | 5.01000 | 94.94000 |
| Product | 614,193 | 51.726500 | 13.3769200 | 5.16000 | 94.90000 |
| Human rights and supply chain | 818,916 | 55.020870 | 12.4933900 | 5.11000 | 94.94000 |
| **Employees** | **833,241** | **54.817720** | **12.5191300** | **5.00000** | **95.00000** |
| Compensation and benefits | 697,011 | 53.859460 | 13.5531800 | 5.18000 | 94.90000 |
| Diversity and labor rights | 788,659 | 54.742900 | 13.1170200 | 5.05000 | 94.71000 |
| Training, health, and safety | 686,667 | 53.543150 | 13.3188900 | 5.04000 | 94.91000 |
| **Environment** | **591,179** | **52.955830** | **10.8330000** | **6.00000** | **94.00000** |
| Energy and climate change | 731,515 | 52.040430 | 12.8599700 | 5.04000 | 94.95000 |
| Environmental policy and reporting | 567,318 | 53.692120 | 12.3928000 | 5.08000 | 94.98000 |
| Resource management | 583,020 | 53.065360 | 11.2105200 | 5.72000 | 94.27000 |
| **Governance** | **888,167** | **51.873580** | **12.0472800** | **5.00000** | **95.00000** |
| Board | 712,286 | 50.187860 | 13.8914700 | 5.04000 | 94.53000 |
| Leadership ethics | 884,364 | 54.384700 | 13.2615300 | 5.07000 | 94.94000 |
| Transparency and reporting | 822,771 | 49.299580 | 13.1306100 | 5.27000 | 94.78000 |

Note: Category ratings are bold. Subcategory ratings are nested beneath the categories for which they are used to generate the category rating.

Using individual responsibility measures has been criticized due to questions about the validity of any single measuring system (Chatterji et al., 2016). By aggregating together information from multiple ESG sources, CSRHub's aggregation approach has the potential to produce a more valid CSR measure than any single measure used in the aggregation.

For the overall responsibility rating, Figure 1 shows the relationship between overall rating and the number of sources used to calculate the rating.

Figure 1: CSRHub overall rating against number of sources used in rating.




Note: CSRHub overall rating and number of sources used to calculate the overall rating. Point transparency set to 20%. Darker areas indicate more observations.

CSRHub uses the following process to calculate its ratings from source ratings (CSRHub LLC, 2019e). First, it creates a single framework of twelve sub-categories, four categories, and one overall rating of firms' ESG activities. CSRHub uses source ratings to generate sub-category ratings. Category and overall ratings are generated from sub-category ratings.

Second, CSRHub converts each source rating to a rating from 0 to 100, where 0 is worst and 100 best. This standardizes the rating across rating sources. CSRHub refused to discuss how it converts source scores to the 0-100 scale.

Third, CSRHub normalizes input ratings by comparing across ratings and adjusting them to eliminate bias for disagreement between input rating systems. CSRHub refused to

discuss its adjustment process for fear such information could be used to reverse engineer their ratings methodology and enable firms to game their ratings. However, similar to how political scientists can adjust individual polls using knowledge of the polls' biases, it is possible CSRHub can identify biases in input systems and create a less biased aggregate measure.

Fourth, CSRHub aggregates the input systems together by weighting each input system for its credibility and value. These aggregate ratings produce the sub-category ratings.

Fifth, CSRHub applies rules determining if an aggregate rating is backed by sufficient information to retain (CSRHub LLC, 2019b). As of January, 2019, CSRHub dropped ratings on about 140,000 firms for which they felt they had insufficient information (CSRHub LLC, 2019e). Finally, CSRHub assesses each rated firm and assigns it an industry of operation. Its industry classification system is based loosely on the NAICS code system, and CSRHub provides a crosswalk for translating its industry codes into NAICS codes (CSRHub LLC, 2019d).

By combining many different ratings systems into a pooled rating, CSRHub's methodology has the potential to produce a more reliable rating than any individual rating system. Political science research on how to aggregate multiple polls into a single poll more accurate than any individual poll suggests aggregate responsibility ratings might address the weaknesses identified in using single ratings (Chatterji et al., 2009). Work on polling aggregation in political science. Any individual poll will reflect biases in the polling procedures used, similar to how any individual ESG rating might reflect bias in the ratings procedure. Political scientists have shown how aggregating across multiple polls can produce a more reliable poll than any single poll used in the aggregation (Pasek, 2015). This is an

important strength of the data given recent criticism of ESG ratings that they do not converge toward agreement on individual firm ratings (Chatterji et al., 2016).

***Compustat***

Data on corporate financial performance and other firm characteristics are from Standard & Poor's Compustat Capital IQ database. I use both Compustat North America and Compustat Global. Compustat North America – Daily contains data on firms headquartered in North America. Compustat Global – Daily contains data on firms headquartered outside North America.

***Final Sample***

I match CSRHub with Compustat data to create my analysis sample. Month-level CSRHub data complicate matching with year-level Compustat data. I aggregate CSRHub data up from the firm-month to the firm-year level.

I explore three aggregation methods. First, I calculate the CSRHub rating in the last month of data for each year. While this is typically December, it is sometimes another month if the firm drops out of the CSRHub ratings data before December in any year. Second, I calculate the average of the rating for each year as the yearly measure. Third, I calculate the median of the rating for each year as the measure for the year. Table 7 shows descriptive statistics for the *overall rating* measure for each aggregation method. Means and standard deviations for all three aggregations are within 0.3 and 0.2, respectively, and all three aggregation methods have identical minimum and maximum values.

Table 7: Descriptive statistics for year-level aggregated CSRHub overall rating measures.

| *Variable* | *Mean* | *Standard Deviation* | *Minimum* | *Maximum* |
|---|---|---|---|---|
| Last month of year | 52.09012 | 7.764424 | 16.8462 | 83.8245 |
| Year median | 51.92573 | 7.770861 | 16.8462 | 83.8245 |
| Year mean | 51.89341 | 7.629368 | 16.8462 | 83.8245 |

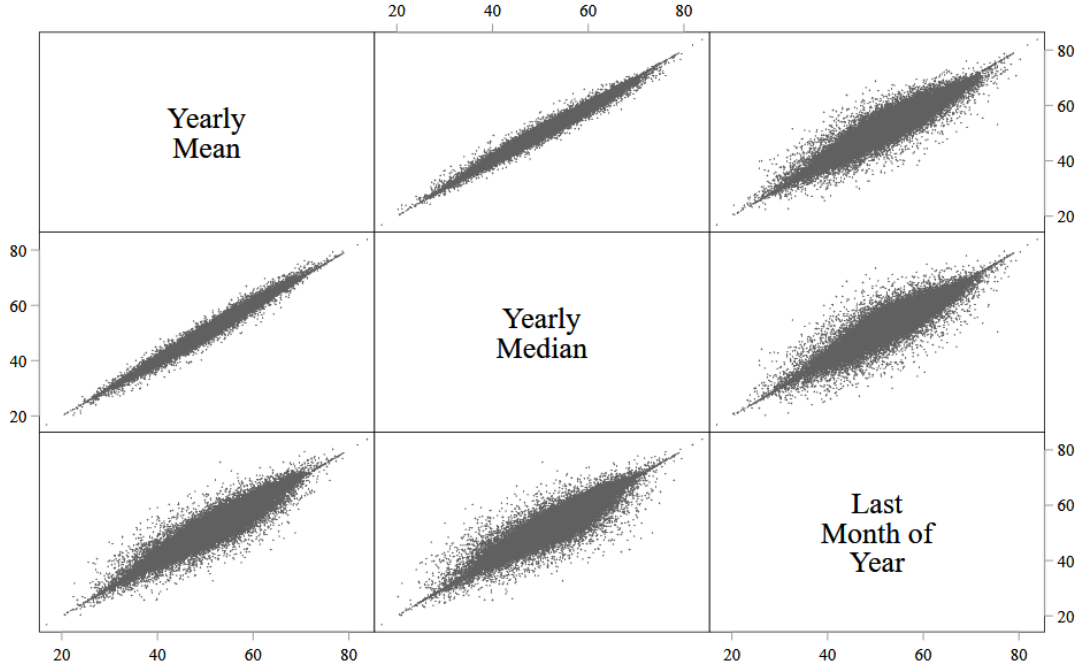
Correlations for the three aggregation methods exceed 0.93 (Table 8), supported by scatterplots (Figure 2).

Table 8: Correlations of CSRHub aggregated overall rating measures.

| | Variable | (1) | (2) | (3) |
|---|---|---|---|---|
| (1) | Last month of year | 1 | | |
| (2) | Yearly median | 0.9328 | 1 | |
| (3) | Yearly mean | 0.9424 | 0.9931 | 1 |

These correlations suggest all three aggregation techniques capture similar variation in CSRHub scores. While aggregating from month- to year-level discards variation, all three aggregation methods produce year-level measures capturing similar information.

Figure 2: Scatterplots showing relationships between three methods of aggregating CSRHub *overall rating* from month- to year-level.




In my empirical analyses, I use the last month of the year aggregation method. Using the last month of the year is similar to the method used by Compustat. Compustat annual data are calculated at the end of each firm's fiscal year, representing an end-of-year metric.

Matching North American Firms on CUSIP-year

To match firms with a CUSIP in CSRHub to Compustat – North America data, I use the Wharton Research Data Service's search function. The search takes CUSIPs and a date range as input and returns all firms with those CUSIPs in that date range.

I first convert CSRHub's 9-digit CUSIP to an 8-digit CUSIP compatible with Compustat – North America Fundamentals Annual. I use the Compustat – Capital IQ CUSIP converter tool in WRDS to convert CSRHub's 9-digit CUSIP to an 8-digit CUSIP compatible with Compustat's search engine. I create a list of all unique CUSIPs in CSRHub, resulting in 14,362 unique CUSIPs. I convert these 9-digit CUSIPs to 8-digit CUSIPs, producing a list of

13,195 unique 8-digit CUSIPs. The conversion results in a loss of 1,167 (8.1%) CUSIPs compared to the original list of 9-digit unique CUSIPs in CSRHub. The loss occurs because

Using the converted CUSIPs, I search Compustat – North America Fundamentals Annual for all CUSIPs between 1990 and 2018. I then match these data to CSRHub on CUSIP and year.

Descriptive Statistics

Table 9 shows descriptive statistics for the final sample. Table 10 shows the correlation matrix.

Table 9: Descriptive statistics.

| Variable | Obs | Mean | Std.Dev. | Min | Max |
|---|---|---|---|---|---|
| Revenue | 55612 | 6148.777 | 18170.81 | -45500 | 484000 |
| Revenue HIS | 55612 | 7.827 | 2.101 | -11.419 | 13.782 |
| CSRHub Overall | 39112 | 52.264 | 7.846 | 16.846 | 80.252 |
| Treat 3 Positive | 38143 | .002 | .047 | 0 | 1 |
| Treat 3 Negative | 38143 | .002 | .047 | 0 | 1 |
| Treat 2 Positive | 38143 | .033 | .179 | 0 | 1 |
| Treat 2 Negative | 38143 | .029 | .167 | 0 | 1 |
| Treat 1 Positive | 38143 | .161 | .368 | 0 | 1 |
| Treat 1 Negative | 38143 | .14 | .347 | 0 | 1 |
| Debt | 54870 | 4022.952 | 44292.47 | -.407 | 3230000 |
| Assets | 55617 | 23663.03 | 137000 | 0 | 3460000 |
| Age | 37035 | 25.785 | 18.06 | 1 | 71 |
| Size | 46367 | 17.863 | 51.92 | 0 | 2300 |
| Advertising | 9333 | 141.426 | 516.677 | 0 | 9729 |
| R&D | 25455 | 16567.41 | 265000 | -73900 | 16800000 |
| Year | 55673 | 2013.121 | 2.611 | 2008 | 2017 |

Table 10: Correlation matrix.

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Revenue | 1.00 | | | | | | | | | | | | | | | |
| (2) Revenue HIS | 0.48* | 1.00 | | | | | | | | | | | | | | |
| (3) CSRHub Overall | 0.12* | 0.12* | 1.00 | | | | | | | | | | | | | |
| (4) Treat 3 Positive | 0.01* | 0.03* | 0.06* | 1.00 | | | | | | | | | | | | |
| (5) Treat 3 Negative | -0.00 | 0.02* | -0.03* | -0.00 | 1.00 | | | | | | | | | | | |
| (6) Treat 2 Positive | -0.00 | 0.00 | 0.12* | 0.26* | -0.01 | 1.00 | | | | | | | | | | |
| (7) Treat 2 Negative | 0.01* | 0.02* | -0.07* | -0.01 | 0.28* | -0.03* | 1.00 | | | | | | | | | |
| (8) Treat 1 Positive | 0.00 | 0.02* | 0.15* | 0.11* | -0.02* | 0.42* | -0.08* | 1.00 | | | | | | | | |
| (9) Treat 1 Negative | -0.01 | -0.04* | -0.09* | -0.02* | 0.12* | -0.07* | 0.43* | -0.18* | 1.00 | | | | | | | |
| (10) Debt | 0.23* | 0.13* | 0.03* | 0.00 | -0.00 | 0.00 | 0.00 | -0.00 | -0.01 | 1.00 | | | | | | |
| (11) Assets | 0.39* | 0.24* | 0.08* | 0.01 | -0.00 | -0.01 | 0.01 | -0.01 | -0.00 | 0.61* | 1.00 | | | | | |
| (12) Age | 0.17* | 0.34* | 0.00 | 0.01* | 0.01 | -0.00 | 0.00 | -0.00 | -0.03* | 0.03* | 0.02* | 1.00 | | | | |
| (13) Size | 0.64* | 0.40* | 0.11* | 0.01* | -0.00 | 0.00 | 0.01 | -0.00 | -0.00 | 0.10* | 0.26* | 0.14* | 1.00 | | | |
| (14) Advertising | 0.59* | 0.47* | 0.17* | 0.04* | 0.00 | -0.00 | 0.03* | 0.00 | -0.02 | 0.41* | 0.31* | 0.28* | 0.39* | 1.00 | | |
| (15) R&D | 0.18* | 0.09* | 0.04* | -0.00 | -0.00 | 0.00 | -0.01 | -0.00 | -0.02* | 0.04* | 0.16* | 0.08* | 0.22* | 0.58* | 1.00 | |
| (16) Year | -0.07* | -0.15* | 0.21* | -0.06* | -0.05* | -0.10* | -0.03* | -0.11* | 0.11* | -0.02* | -0.03* | -0.00 | -0.05* | -0.04* | 0.02* | 1.00 |

*p<0.05

## Empirical Approach

I use three empirical approaches to test the hypothesis that responsibility causes increased revenue. Propensity score matching and difference-in-differences analysis are counterfactual research designs. Fixed effects regression is an associational design. Each empirical approach requires different assumptions. Comparing results across approaches can generate greater insights than using a single approach.

Prior to 2010, CSR performance research tended to use associational designs to analyze observational data. Like all research designs, associational designs require unverifiable assumptions to make causal inferences. One assumption required by associational designs using regression analysis is complete specification, which means the regression model accurately captures the relationship between performance and CSR. Misspecification occurs when a regression model does not accurately describe the relationship. McWilliams and Siegel (2000) tackled the misspecification problem by arguing past regression models omitted research and development, an important cause of both performance and CSR. After including research and development in regression models, McWilliams and Siegel found no relationship between CSR and performance, demonstrating how changes to specification can have large impacts on analysis results.

Recently CSR researchers adopted counterfactual rather than associational research designs, hoping make inferences more robust to specification and other assumptions. Counterfactual designs mitigate the specification problem by using an understanding of the data generating process as the inference engine, rather than claiming to accurately model the relationship being studied.

Flammer (2015) used a regression discontinuity counterfactual design to study the performance effect of adopting a CSR-related shareholder proposal. The data generating process is shareholders voting on proposals. Proposal passage requires exceeding a threshold of votes in favor of the proposal. Proposals' positions relative to the threshold are observable, and the counterfactual research design regression discontinuity uses the observability of the threshold to eliminate confounds of the effect of proposal passage on other outcomes. Flammer compares the performance effects of proposals that barely pass to those that barely fail. Because such proposals are both close to the passage threshold, regression discontinuity assumes potential confounds are equally distributed in the group of firms that barely pass proposals and the group that barely fails to pass them. The only systematic difference between groups is proposal passage. Because the only difference between the groups is proposal passage, comparing performance outcomes of the two groups provides an estimate of the causal effect of barely-passed proposals on firm performance. If resolution passage does measure responsibility (a construct validity issue separate from the causal inference issue), the performance effect of resolution passage can be inferred to estimate the performance effect of taking a responsibility action. The analysis found CSR-proposal adoption caused increased stock market price, responsibility ratings, return on assets, net profit margin, Tobin's Q, sales growth, and labor productivity. Adoption had no effect on return on equity or capital expenditures.

***Counterfactual research designs***

Counterfactual research designs estimate causal relationships by approximating experimental designs in which the researcher controls treatment assignment and creates a treatment group and a control group (Angrist & Pischke, 2009; Morgan & Winship, 2007; Rubin, 1974).

Approximate experiments are known as quasi-experiments. Because I cannot control treatment assignment, a quasi-experimental framework is the next best option for testing the causal effect predicted by Hypothesis 1. In the framework, responsibility is the treatment, and revenue is the outcome. Business firms are the research subjects.

The counterfactual design estimates the causal impact of responsibility on revenue. The treatment effect of responsibility is calculated as the difference in average revenue between the treatment firms and the control firms that are similar to the treated firms but do not experience treatment. The validity of the treatment effect estimate is driven by the degree of similarity between treatment and control groups. If the two groups differ on non-treatment characteristics, and if those characteristics affect both treatment and outcome, the treatment effect estimate is biased and has low validity. Propensity score matching and difference-in-differences estimation use the data generating process to eliminate such bias.

Propensity score matching predicts each firm's probability of receiving treatment. Treated and control firms are matched on probability of receiving treatment. If the model of treatment likelihood is correct, treated and control firms should only systematically differ on receiving treatment. The treatment effect is estimated as the difference in outcomes between the treatment and control groups.

Difference-in-differences estimation uses characteristics of the treatment event to create treatment and control groups. The most important characteristic is whether the treatment is exogenous to firms, in other words unexpected and outside firms' control. If yes, the treatment event quasi-randomly distributes treatment across firms. However, whether treatment is exogenous is typically unverifiable. Difference-in-differences estimation uses a proxy for whether treatment is exogenous: pre-treatment trends in the outcome for firms that

eventually experience treatment and control firms that do not. If pre-treatment outcome trends are the same prior to treatment, this is used as evidence that treatment is exogenous to the firms. Pre-treatment trend analysis is becoming more common in studies using difference-in-difference designs (for an example, see Frake, 2017).

***Defining a treatment event***

Propensity score matching and difference-in-differences estimation both require discrete treatment events separating firms into treatment and control groups. I define a responsibility treatment event as a firm experiencing a large change in responsibility score from one year to the next. I define "large" in three ways, based on how far the change deviates from the firm's overall average responsibility score in the data. I create separate treatment event thresholds using how many standard deviations from the mean a firm's overall change in responsibility is from one year to the next. The three treatment events are experiencing a one-, two-, or three-standard deviation change in social responsibility rating, relative to the firm's overall average rating in the panel.

I use the following process to identify treatment events for each firm in my data:

1. For each firm, calculate the standard deviation of the firm's responsibility rating for all years with a rating. This value is constant within firms but varies across firms.
2. For each firm-year, calculate the change in responsibility rating from the previous year. This value varies within firms, except for firms whose responsibility scores don't change in the panel and varies across firms.
3. For each firm-year, divide the year-on-year change in responsibility by the within-firm standard deviation of responsibility. The quotient is a z-score, a measure of how many

standard deviations away from the firm's average responsibility score the year-on-year change in responsibility is for that year.[1] This value varies within and across firms.

4. For each firm-year, create a dummy variable for whether the quotient from step 3 is greater than 1, greater than 2, and greater than 3. When the indicator equals 1, I consider the firm to have experienced a treatment event of either high or low unexpected change in responsibility.
5. I create separate treatment variables for positive and negative responsibility changes.

The standard deviation-based treatment definition captures how unexpected the change in responsibility is for a firm from one year to the next. The greater the z-score for a year-on-year change, the less likely that change is, compared to the firm's overall responsibility performance in the panel. The within-firm standard deviation captures how variable a firm's responsibility tends to be. This captures expectations about firms. Firms with high standard deviations tend to change on responsibility performance frequently with large magnitude, compared to firms with low standard deviations.

I assume the more unlikely the change in a firm's responsibility rating, the less the change reflects actions taken by the firm. This is important because it relates to the likelihood that the responsibility change is exogenous or endogenous to firm choices (Shaver, 1998). Exogenous change refers to whether the firm chooses to change its responsibility. Exogenous change refers to whether factors outside the firm's control alter its social responsibility. When researchers control the assignment of responsibility to firms, change in responsibility is

[1] Z-scores are technically only possible when the population standard deviation is known. When the population standard deviation is unknown, as is the case most often, the T-score rather than the Z-score is used. However, in large samples, the normal distribution and t-distribution converge as sample size increases. Unless the sample is small (fewer than 40 units of observation), the difference between the z-score and t-score are negligible.

completely exogenous to the firm's other choices and characteristics. When the firm chooses to alter its responsibility, responsibility is endogenous to the firm's other choices and characteristics. Exogenous change simplifies treatment effect estimation: the difference between firms experiencing the change and those not experiencing the change is an estimate of the treatment effect. But endogenous change complicates treatment effect estimation and requires counterfactual research designs and assumptions.

I assume the more unlikely a year-on-year change in responsibility is, the less likely the change is endogenous to the firm. This assumption relies on inertia in responsibility. I assume a firm's responsibility rating is somewhat difficult to change from year to year due to the difficulty of quickly reorganizing firm assets, the stickiness of firm routines, and the stability of social perceptions of firms' reputations. Thus, if a firm experiences a large responsibility change, either positive or negative, I argue it must in part be due to factors outside the firm's control, i.e., factors exogenous to the firm.

I also assume within-firm responsibility is normally distributed, such that the number of standard deviations from the within-firm mean can be used as a measure of the probability of that change. Under assumptions that the within-firm average change in responsibility is 0 and the change each year is normally distributed, responsibility changes with a z-score greater than 1 have a probability of about 34% of occurring by chance. A z-score of 2 has a probability of about 4% of occurring by chance. A z-score of 3 has a probability of about 2.6% of happening by chance. Thus year-on-year changes in responsibility that deviate more than 2 standard deviations from the firm's average deviation are unlikely to occur and can be considered quasi-random responsibility shocks to the firm.

Now that I have defined treatment events, I describe the three empirical approaches used to test the hypothesis: propensity score matching, difference-in-differences estimation, and fixed effects regression.

***Propensity score matching***

I use propensity score matching to create treatment and control groups for each of the three different treatment events at the 1, 2, and 3 standard deviation thresholds.

Propensity score matching is a counterfactual research design in which the researcher manually creates a control group by estimating how likely each firm is to experience a treatment event. By estimating the likelihood of treatment for each firm regardless of whether the firm experienced a treatment event or not, the researcher can match treated firms with untreated firms based on identical treatment likelihoods. The untreated firms are the counterfactual for what would have happened to the treated firms if treatment had not occurred.

Prior studies have used propensity score matching to study the effect of responsibility on performance. Eccles, Ioannou, and Serafeim (2014) use propensity score matching to estimate the effect of adopting sustainability policies on long-run financial performance. Shen, Wu, Chen, and Fang (2016) use the design to study the effect of engaging in responsibility on banks' profit and rate of non-performing loans. Byun and Oh (2018) estimate the propensity score for firms to experience high media coverage of their responsibility actions. They combine the propensity scores with nearest-neighbor matching on covariates to match equal-propensity treated and untreated firms. After matching, they find firms experiencing high media coverage of responsibility actions have higher Tobin's q than firms not receiving high media coverage.

Propensity Score Model

The ability of propensity score matching to produce unbiased treatment effect estimates depends on several factors, critically the validity of the model used to estimate treatment probability. I build a model predicting the probability of experiencing responsibility treatment events at each z-score threshold. To build the model, I reviewed responsibility literature reviews (Aguinis & Glavas, 2012; Bansal & Song, 2017; Orlitzky et al., 2003) and individual studies (Byun & Oh, 2018; Shen et al., 2016). From these, I collected predictors from models with responsibility as the outcome. Treatment propensity can be estimated using a logistic of probit regression model, and estimates should be roughly similar from both approaches (Imbens, 2015).

I estimate the propensity of experiencing a responsibility treatment event as a function of the firm's assets, age, debt, employees, and market value (Equation 1).

$$\Pr(CSR = 1) = f(Assets, Age, Debt, Employees, Market\ Value) \quad 1$$

I specify this model as a logistic regression (Equation 2)

$$Treat_{it} = \alpha + \beta_1 Assets_{it} + \beta_2 Age_{it} + \beta_3 Debt_{it} + \beta_4 Employees_{it} + \beta_5 Market_{it} + \varepsilon_{it} \quad 2$$

Subscript *i* is firm and *t* is year. All right-hand variables are measured using Compustat. *Assets* is total assets, *Age* is years since the firm was first covered in Compustat data, *Debt* is total long term debt, *Employees* is the number of employees in the firm, and *Market* is Tobin's Q, a measure of how much financial markets value the firm compared to the firm's book value of assets.

I use estimates of the betas from Equation 2 to generate propensity scores—predicted values of $Treat_{it}$—for each firm $i$ in each year *t*. Firms that experience treatment events are then matched on propensity scores with firms that did not experience treatment. Observations

with equal propensity scores are predicted to have the same probability of being treated, even if one or both are not treated in the data. Untreated firms are used as counterfactuals of what would have happened to treated firms if treated firms had not received treatment. The treatment effect is then calculated as the difference in mean outcomes between treated and untreated firms in the matched sample.

***Difference-in-differences Estimation***

Difference-in-differences estimation compares outcomes for a treatment group and a counterfactual control group before and after treatment occurs. Difference-in-differences estimation assumes the treatment event is exogenous to the firm and that trends in the outcome being studied only change for the treatment group as a result of the treatment occurring (Angrist & Pischke, 2009). If both assumptions are true, the treatment effect is the difference in outcomes between the two groups prior to treatment minus the difference between the two groups after treatment.

One challenge in using difference-in-differences in my context is that treatment does not occur simultaneously for all treated firms. In the classic difference-in-differences design, all firms that experience treatment experience it simultaneously. The difference in average outcome between treated and control groups before that treatment event is compared to the difference after that treatment event. Under various identification assumptions, the classic difference-in-differences design allows straightforward estimation of the causal effect of treatment, at the treatment-group level.

However, the design becomes more complicated when treatment occurs at different times for each treated firm, as in my context. One solution to this problem is to treat all treated firms as receiving treatment at the same time, setting treatment time to $t_0$ for all events and

estimating the treatment effect as if the timing of treatment does not matter. I adopt that approach in this study.

Another important element of the difference-in-differences design is construction of the counterfactual control group. The counterfactual control group represents what treated firms' outcomes would have been had they not been treated. In my context, the counterfactual control group represents what the revenue of firms experiencing responsibility treatment events would have been if they had not experienced the treatment event.

Counterfactuals are imaginary and their quality cannot be empirically assessed. Instead, the quality of a counterfactual control group depends on rhetorical arguments about whether we should believe treated firms would have behaved exactly like counterfactual firms had they not been treated.

One approach to making this argument for difference-in-differences is to visually examine the trends in outcomes between treatment and counterfactual groups prior to treatment using a plot. The assumption is that if the outcome trend for the treatment group is parallel to the outcome trend for the counterfactual group up until the treatment date, then this provides support for the argument that the counterfactual group is a valid counterfactual for the treated group. In short, the argument is that if the outcome trends were parallel prior to treatment, they would have continued to be parallel after the treatment on the treatment group, if the treatment had not happened. When this assumption is true, the outcomes for the counterfactual group after the treatment date can inform what the outcomes for the treatment group would have been absent treatment.

Difference-in-differences Model

I estimate the following difference-in-differences regression model:

$$Y_{it} = \alpha_i + \beta Treated_i + \gamma Post_t + \delta(Treated_i \cdot Post_t) + \varepsilon_{it}$$

In this model, the dependent variable $Y_{it}$ is firm *i*'s revenue in year *t*. $\alpha_i$ is an unobserved fixed effect for each firm *i*. $Treated_i$ is a dummy variable equal to 1 when firm *i* is a treated firm and 0 when a firm is an untreated control firm. The variable $Post_t$ is a dummy variable equal to 1 if the observation occurs in a post-treatment year *t*, else 0. The regression includes an error term $\varepsilon_{it}$ for each firm *i* in each year *t*.

The parameters to be estimated are $\beta$, $\gamma$, and $\delta$. The parameter of interest is $\delta$, the estimate of the causal effect of experiencing a responsibility treatment event on revenue. The estimate $\beta$ is the average revenue of treated firms in the pre-treatment period. The estimate of $\alpha_i$ is the average revenue of untreated firms in the pre-treatment period. The estimate of $\gamma$ is the average revenue for treated firms in the post-treatment period.

***Fixed effects estimation***

I estimate the following fixed effects regression model:

$$Y_{it} - \bar{Y}_i = \beta(X_{it} - \bar{X}_i) + \boldsymbol{\gamma}(\mathbf{C_{it}} - \bar{\mathbf{C}}_\mathbf{i}) + (\varepsilon_{it} - \bar{\varepsilon}_i) \quad 3$$

Subscript *i* refers to firms and subscript *t* refers to years. Within each parenthetical, the firm-level mean of each variable is subtracted from year *t*'s value, creating within-firm estimates. $\beta$ is the coefficient of interest estimating the within-firm change in *Y* associated with a one-unit within-firm change in *X*. $\mathbf{C}$ is a vector of control variables, and $\boldsymbol{\gamma}$ is the vector of coefficient estimates corresponding to each control variable. $\varepsilon$ is an error term assumed random after clustering by firm.

***Dependent Variable***

The dependent variable is firm performance, measured as revenue (or next-year's revenue in models exploring time-lagged treatment effects). Many firm performance measures

have been used in the responsibility performance and broader management literatures (Richard et al., 2009). Similar measurement diversity exists in the responsibility performance literature, where one review found 39 different performance measures (Peloza, 2009).

Inattention to performance measures also complicates knowledge accumulation. Building on prior work requires the outcome being studied matches across studies. If the responsibility performance relationship differs according to the measures used, the hundreds of published studies on the relationship might reflect a small amount of knowledge accumulation—specific to each performance measure—rather than the large amount of knowledge implied by the number of published responsibility performance studies.

Justifying the choice of performance measure is important because the choice of measure moderates the responsibility performance relationship. Orlitzky et al. (2003, p. 419) find "the association between [responsibility] and [performance] depends on the firm's or researcher's operational definition of each construct, or both." Accounting measures are more highly correlated with responsibility than market-based measures, particularly with reputation-based responsibility measures. Disclosure-based responsibility measures show lowest correlation with performance. Orlitzky et al. claim their findings support the idea that study artifacts, stakeholder mismatching, and lack of theoretical specification drive the differences in the responsibility performance relationship across studies.

Zhao and Murrell (2016) find responsibility positively correlates with one accounting-based measure—return on assets—but not two other accounting-based measures of return on equity and return on sales. They find no association between responsibility and market-based measures. These findings somewhat support Orlitzky et al.'s (2003) findings that responsibility is associated with accounting-based measures but not market-based measures.

Differences could be driven by stakeholders viewing performance outcomes differently depending on their interests. Market-based performance might matter to shareholders, but not to community stakeholders more concerned about the local community impacts of firm operations (Wood & Jones, 1995). Another source of difference could be due to statistical artifacts driven by small sample sizes or measurement error. (Orlitzky et al., 2003; Zhao & Murrell, 2016). This pattern could result if some financial outcomes matter more and less than others to specific stakeholders. Variation across financial performance measures captures differences in which stakeholders firms target with social strategy and which firm outcomes matter to those stakeholders.

Scholars debate whether financial performance is a single construct or a meta-construct. Meta-constructs can, and should, be measured in a variety of ways. Different measures reflect "differences in organizational strategies, structures, and environments" (Orlitzky et al., 2003, p. 425). The important thing for any one responsibility performance study is that its choice of financial performance measure is justified by theoretically connecting the performance measure to the responsibility being studied. We should only expect relationships between performance and responsibility measures connected together by some theoretical mechanism (Wood & Jones, 1995).

I focus on a stakeholder mechanism connecting responsibility to performance. Market-based performance measures prioritize the interests and actions of shareholder stakeholders. Accounting-based measures capture firms' internal efficiency, such as return on assets that measures the profit per unit of assets a firm controls. Subjective performance measures like ratings capture how stakeholders perceive performance. Measurement choice should reflect

differences in which stakeholders are theoretically expected to connect the performance and responsibility measures used in the study.

To address these issues, I theoretically justify my choice of firm performance measure as revenue. I examine how stakeholders connect responsibility to performance, so I use a measure that matters to firms and a variety of stakeholders. Revenue can be affected by customers through purchasing behavior. Employees can affect revenue through commitment and effort. Environmental activists affect revenue through organizing boycotts. Investors can affect revenue by pressuring the firm to change strategies, such as divesting or acquiring businesses.

Evidence suggests responsibility can affect revenue. In the early 2000s, Sears Roebuck projected the promotion of its responsibility initiatives on a nationally-syndicated television talk show would increase sales by $13-40 million (Rochlin & Christoffer, 2000). Lev et al. (2010) examines the relationship between performance and corporate philanthropy, using revenue to measure performance. Increased philanthropy predicts future increased revenue, but increased revenue is not associated with increased future philanthropy. These results are strongest for firms most sensitive to consumer perception, suggesting philanthropy influences revenue through customer stakeholders. Philanthropy is also positively associated with customer satisfaction, further supporting the customer stakeholder mechanism.

***Independent Variable***

In propensity score matching and difference-in-differences models, the independent variable is an indicator variable equal to one in any year a firm experiences a responsibility treatment event. I use three indicator variables, each equal to a different treatment threshold. The thresholds are 1, 2, and 3 standard deviation changes in year-on-year responsibility for a firm.

I separate each treatment into positive and negative changes in responsibility. Mattingly and Berman (2006) critique prior responsibility performance studies for conflating positive and negative responsibility into a single measure. I follow their recommendation to keep positive and negative responsibility events separate.

In fixed effects models, the independent variable is the level of CSRHub overall rating on corporate social responsibility. Rather than examining the cause of large deviations in CSR on performance, this approach examines whether changes in the actual rating of firms is associated with changes in firm performance.

***Control Variables***

In the fixed effects regression model, I use several control variables to eliminate potential sources of omitted variable bias. I control for research and development spending, following McWilliams and Siegel's recommendation that previous CSR performance studies were misspecified by omitting R&D spending (2000). Table 11 describes several other controls for potential causes of both CSR and firm performance.

Table 11: Control variables, measures, and data sources.

| Variable | Measure | Data source (variable name) |
|---|---|---|
| Performance | Revenue | Compustat (revt) |
| CSR treatment | Deviation from mean | CSRHub (over_rtg) |
| CSR | CSRHub rating | CSRHub (over_rtg) |
| Debt | Long-term debt | Compustat (dltt) |
| Assets | Total assets | Compustat (at) |
| Age | Years in the data | Compustat (ipodate; if ipodate missing, time since firm appears in Compustat) |
| Size | Number of employees | Compustat (emp) |
| Research and development capability | R&D expenditure | Compustat (xrd) |
| Advertising capability | Advertising expenditure | Compustat (xad) |

**Results**

Hypothesis 1 stated that increased CSR increases revenue. Taken together, the hypothesis tests reported below do not provide clear support or rejection of the hypothesis. In some estimation strategies, the hypothesis appears to have predictive power. In others, it does not. Some estimations even reject the hypothesis by showing that increased CSR causes decreased revenue. This pattern of mixed evidence persists in models using leading revenue rather than same-year revenue. Unfortunately, the results of these tests using CSRHub data do not provide unequivocal conclusions about the relationship between CSR and performance measured as revenue. However, they do inform our understanding of the relationship in ways that future work can explore to build toward a more consistent understanding of the relationship, if any, between social responsibility and firm performance.

Propensity score matching and difference-in-differences models use treatment thresholds as the independent variable. Concerns about the endogeneity of treatment persist

regardless of the type of estimation method used. In this case, endogeneity could arise if there is a common cause of large changes in CSR and also firm performance that is not controlled for in the estimation strategies. However, as the size of CSR deviation increases, concern about endogeneity decreases, assuming the size (number of standard deviations from the mean) of the deviation indicates the unexpectedness of the event occurring. Firms likely have less control over large changes in CSR rating than small changes. Because of this, as the magnitude of the CSR change increases, there are fewer ways firms can influence the degree of CSR rating change. This also means there are fewer possible common causes of changes in CSR and performance, making larger CSR deviations more exogenous to performance than smaller deviations.

But there is a tradeoff between the exogeneity of treatment events and the availability of data to estimate treatment effects using those treatment events. If treatment thresholds with higher deviations from the mean are more likely to be exogenous, we should expect estimates from higher thresholds to be less biased than those from lower thresholds. Ideally, there would be enough data to estimate all thresholds. But 3-standard deviation events are rare, and some years do not have enough of them to calculate estimates of treatment effects in those years. Treatments at 2-standard deviation are less rare and have enough data for estimation of all models, but these events are less likely to be exogenous than 3-standard deviation events. Consequently, estimates at the 2-standard deviation threshold are more susceptible to bias than those at the 3-standard deviation threshold. Treatment at 1-standard deviation is the most common. However, these events are expected to be the most vulnerable to bias due to endogeneity.

***Propensity Score Matching***

I use two approaches to propensity score matching estimation. The first pooled years approach pools all years of data into a single dataset to estimate the propensity scores. In this approach, firms treated in year *t* can be matched with observations on firms in years other than *t*. One strength of this approach is that it utilizes all available data to calculate propensity scores, which improves the quality of counterfactual matches for treated firms. One weakness of this approach is that it assumes the observation year is independent of treatment probability: otherwise it would need to be included in the propensity score model. Another weakness is that this approach assumes every observation in the dataset is independent of all other observations. This is a strong assumption in panel data with repeated observations on the same firm because those observations are likely not independent over time.

The second single-year approach addresses weaknesses in the first approach but has other drawbacks. The single-year approach mitigates concerns about interdependence across years by using single years of data to calculate propensity scores, match firms, and estimate the treatment effect. However, the single-year approach uses less data to calculate propensity scores, potentially reducing the quality of counterfactual matches.

I report results from the pooled approach, then the single-year approach.

Pooled years

Table 12 reports the results of propensity score matching estimation using all years of data and revenue and treatment events in the same year for both positive and negative CSR treatment events.

Table 12: Propensity score matching estimation results.

| **DV: Same year revenue** | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **3 Standard Deviations** | | **2 Standard Deviations** | | **1 Standard Deviation** | |
| **Neighbors** | *Positive* | *Negative* | *Positive* | *Negative* | *Positive* | *Negative* |
| 1 | 7,288* | -233 | -271.6 | 550.3 | 928.5** | 744.8 |
| | (3,147) | (2,233) | (698.0) | (530.3) | (351.1) | (475.6) |
| | 0.0206 | 0.917 | 0.697 | 0.299 | 0.00817 | 0.117 |
| 2 | 7,392* | 455.6 | -976.2 | 503.7 | 874.3** | 807.4 |
| | (3,426) | (2,268) | (553.6) | (500.5) | (314.7) | (420.5) |
| | 0.0310 | 0.841 | 0.0779 | 0.314 | 0.00546 | 0.0549 |
| 3 | 8,161* | 1,554 | -820.2 | 566.2 | 749.9* | 734.1 |
| | (3,190) | (2,677) | (545.2) | (505.3) | (296.3) | (399.9) |
| | 0.0105 | 0.562 | 0.132 | 0.262 | 0.0114 | 0.0664 |
| 4 | 7,878** | 1,726 | -981.9 | 586.9 | 741.2* | 666.1 |
| | (3,049) | (2,696) | (522.2) | (548.1) | (294.2) | (396.9) |
| | 0.00978 | 0.522 | 0.0601 | 0.284 | 0.0118 | 0.0933 |
| 5 | 7,009* | 1,317 | -1,088* | 594.0 | 756.1** | 526.3 |
| | (2,802) | (2,512) | (491.3) | (566.5) | (286.9) | (385.1) |
| | 0.0124 | 0.600 | 0.0267 | 0.294 | 0.00841 | 0.172 |
| 6 | 6,331* | 1,572 | -1,248** | 524.2 | 721.5* | 357.6 |
| | (2,529) | (2,284) | (478.1) | (561.7) | (282.3) | (377.8) |
| | 0.0123 | 0.491 | 0.00906 | 0.351 | 0.0106 | 0.344 |
| 7 | 5,812* | 2,044 | -1,235** | 412.0 | 723.1* | 295.5 |
| | (2,354) | (2,109) | (474.0) | (560.6) | (285.2) | (368.9) |
| | 0.0135 | 0.332 | 0.00919 | 0.462 | 0.0112 | 0.423 |
| 8 | 5,482* | 2,262 | -1,320** | 442.9 | 742.1** | 225.2 |
| | (2,338) | (2,021) | (476.6) | (569.1) | (286.0) | (376.5) |
| | 0.0191 | 0.263 | 0.00562 | 0.436 | 0.00947 | 0.550 |
| 9 | 5,421* | 1,887 | -1,313** | 425.0 | 730.5* | 236.1 |
| | (2,361) | (1,950) | (467.7) | (571.2) | (283.8) | (379.0) |
| | 0.0217 | 0.333 | 0.00501 | 0.457 | 0.0100 | 0.533 |
| 10 | 5,553* | 1,794 | -1,315** | 382.6 | 704.0* | 220.5 |
| | (2,381) | (1,898) | (462.9) | (563.9) | (279.3) | (395.6) |
| | 0.0197 | 0.344 | 0.00451 | 0.497 | 0.0117 | 0.577 |
| Observations for propensity scores | 25,048 | 25,048 | 25,048 | 25,048 | 25,048 | 25,048 |
| Treatment events | 51 | 53 | 891 | 724 | 4,092 | 3,599 |

*** p < 0.001, ** p < 0.01, * p < 0.05

Note: For revenue (in $millions USD) and treatment in same year for years 2009-2016. Each cell contains coefficient, standard error (in parentheses), and p-value. Propensity scores estimated by logistic regression of treatment indicator on debt, assets, age, and employees, using 25,048 observations. *Treatment events* is the number of treated firms in each model.

The first column of Table 12 shows the number of neighbors used in each estimation. Neighbors is the number of untreated firms matched with each treated firm. The row with

neighbors equal to 1 shows estimate in which each treated firm is matched with 1 untreated firm. The row with neighbors of 2 matches 2 untreated firms with each treated firm.

The number of neighbors involves a tradeoff between the bias and precision of estimates. Using fewer neighbors produces less biased but more imprecise estimates. Increasing the number of neighbors increases precision but also bias. When using 1 neighbor, each treated firm is matched with an untreated firm having the most similar propensity score as the treated firm. Comparing the outcome for the treated firm against the outcome for the untreated firm provides an unbiased estimate of the average treatment effect. However, the estimate might have low precision because it uses only two data points. As the number of neighbors increases, the estimate becomes more precise due to the use of more data points. However, bias might increase as the difference between the treated firm's propensity score and the scores of neighbors increases. This concern is not applicable if all neighbors have the same propensity score as the treated firm, but that is not guaranteed. As the difference between propensity scores increase, so too do bias concerns.

Table 13 shows the results of the propensity score models. These are logistic regression models regressing treatment indicators on variables that model the treatment process. Estimated coefficients from these models are used to calculate the predicted value of treatment for each firm-year. The predicted value of treatment is the propensity score for each firm-year. Firms that experience treatment are then matched on propensity score with firms that do not experience treatment.

Table 13: Propensity score matching estimation "first stage" logistic regression results used to calculate propensity scores.

| DV: Treatment indicator | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **3 Standard Deviations** | | **2 Standard Deviations** | | **1 Standard Deviation** | |
| | *Positive* | *Negative* | *Positive* | *Negative* | *Positive* | *Negative* |
| Debt | -0.000 | -0.000 | 0.000 | -0.000 | -0.000 | -0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| | 0.751 | 0.908 | 0.127 | 0.575 | 0.949 | 0.220 |
| Assets | 0.000 | 0.000 | -0.000 | 0.000 | -0.000 | 0.000 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| | 0.108 | 0.972 | 0.184 | 0.243 | 0.358 | 0.548 |
| Age | 0.014* | 0.011 | -0.001 | -0.000 | -0.000 | -0.005*** |
| | (0.007) | (0.007) | (0.002) | (0.002) | (0.001) | (0.001) |
| | 0.041 | 0.103 | 0.536 | 0.962 | 0.650 | 0.000 |
| Employees | 0.001 | -0.002 | 0.000 | 0.001 | 0.000 | -0.000 |
| | (0.001) | (0.004) | (0.001) | (0.000) | (0.000) | (0.000) |
| | 0.195 | 0.574 | 0.596 | 0.100 | 0.985 | 0.937 |
| Constant | -6.705*** | -6.452*** | -3.267*** | -3.536*** | -1.618*** | -1.656*** |
| | (0.275) | (0.262) | (0.061) | (0.068) | (0.031) | (0.032) |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Observations | 25,048 | 25,048 | 25,048 | 25,048 | 25,048 | 25,048 |

*** p < 0.001, ** p < 0.01, * p < 0.05

Note: Estimates are from a logistic regression of treatment indicators on debt, assets, age, and employees.

One implication of the bias variance tradeoff is that standard errors in each model in Table 12 should decrease as the number of neighbors increases. This pattern generally appears in Table 12 where standard errors with 10 neighbors are smaller than with 1 neighbor in all models, except Model 4. Increasing the number of neighbors increases the risk for biased coefficient estimation, and this risk manifests in changes to the estimated coefficient as the number of neighbors increases. Because estimates and standard errors change with the number of neighbors, p-values calculated using estimates and standard errors also change.

The results in Table 12 provide partial support for Hypothesis 1, which predicts higher CSR causes higher revenue. Models 1 and 3 show consistent positive estimates across all neighbors, but Model 2 shows no treatment effect from 1-4 neighbors and a negative treatment

effect from 5-10 neighbors. Estimates with 1-4 neighbors have less bias and less precision than estimates with neighbors 5-10. Estimates from neighbors 1-4 support Hypothesis 1 more strongly than those from neighbors 5-10.

Table 12 also reports estimates of the effect of CSR *declines* on revenue (Models 2, 4, and 6). Estimates for all negative treatment events are not statistically different from zero, suggesting that decreased social responsibility has no effect on revenue in the same year as the change in CSR.

Substantively, the estimates suggest a 3-standard deviation positive change in CSR rating increases revenue from $5.5 to $8.1 billion USD in the same year as the CSR change. A 2-standard deviation negative CSR change affects revenue from $-1.4 billion to $0 USD. A 1-standard deviation positive change in CSR affects revenue from $700 to $900 million USD. Average revenue in the data is about $6 billion USD, with a median of about $1.4 billion.

The estimates in Table 12 are for models in which the outcome revenue and the treatment of CSR occur in the same year. This specification assumes the effect of CSR changs on revenue occurs within the same year. But changes in CSR might take more time to impact revenue. To explore this possibility, I also estimate propensity score matching models using the next year's revenue as the dependent variable. Table 14 shows the results.

Table 14: Propensity score matching estimation results for 1-year leading revenue (in $millions USD) and treatment for data from 2009-2015.

| **DV: Next year's revenue** | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **3 Standard Deviations** | | **2 Standard Deviations** | | **1 Standard Deviation** | |
| **Neighbors** | *Positive* | *Negative* | *Positive* | *Negative* | *Positive* | *Negative* |
| 1 | 7,708* | 2,028 | -261.1 | 2,028 | 332.0 | 431.7 |
| | (3,133) | (3,140) | (777.6) | (3,140) | (330.3) | (535.9) |
| | 0.0139 | 0.518 | 0.737 | 0.518 | 0.315 | 0.420 |
| 2 | 7,787* | 2,129 | -209.0 | 2,129 | 172.6 | 243.3 |
| | (3,306) | (3,521) | (762.9) | (3,521) | (304.6) | (462.7) |
| | 0.0185 | 0.545 | 0.784 | 0.545 | 0.571 | 0.599 |
| 3 | 8,809** | 3,327 | -213.1 | 3,327 | 106.3 | 203.6 |
| | (3,151) | (3,474) | (725.5) | (3,474) | (293.7) | (440.4) |
| | 0.00518 | 0.338 | 0.769 | 0.338 | 0.718 | 0.644 |
| 4 | 8,136* | 3,391 | -515.8 | 3,391 | 177.0 | 188.7 |
| | (3,162) | (3,260) | (697.6) | (3,260) | (292.7) | (435.2) |
| | 0.0101 | 0.298 | 0.460 | 0.298 | 0.545 | 0.664 |
| 5 | 7,663** | 3,466 | -578.9 | 3,466 | 262.8 | 219.0 |
| | (2,934) | (3,262) | (683.7) | (3,262) | (290.6) | (452.4) |
| | 0.00902 | 0.288 | 0.397 | 0.288 | 0.366 | 0.628 |
| 6 | 7,264** | 3,613 | -655.2 | 3,613 | 289.7 | 195.5 |
| | (2,747) | (3,389) | (673.5) | (3,389) | (291.4) | (453.3) |
| | 0.00819 | 0.286 | 0.331 | 0.286 | 0.320 | 0.666 |
| 7 | 6,908* | 3,230 | -797.7 | 3,230 | 280.1 | 227.8 |
| | (2,710) | (3,417) | (669.1) | (3,417) | (292.2) | (462.0) |
| | 0.0108 | 0.344 | 0.233 | 0.344 | 0.338 | 0.622 |
| 8 | 6,568* | 2,820 | -929.9 | 2,820 | 290.7 | 238.2 |
| | (2,571) | (3,203) | (650.7) | (3,203) | (293.7) | (464.2) |
| | 0.0106 | 0.379 | 0.153 | 0.379 | 0.322 | 0.608 |
| 9 | 6,536* | 2,688 | -934.1 | 2,688 | 291.8 | 256.8 |
| | (2,639) | (3,110) | (640.1) | (3,110) | (293.2) | (468.9) |
| | 0.0133 | 0.387 | 0.144 | 0.387 | 0.320 | 0.584 |
| 10 | 6,584** | 3,223 | -982.2 | 3,223 | 319.0 | 290.4 |
| | (2,511) | (3,244) | (619.7) | (3,244) | (291.4) | (475.2) |
| | 0.00873 | 0.320 | 0.113 | 0.320 | 0.274 | 0.541 |
| Observations for propensity scores | 20,267 | 20,037 | 20,267 | 20,267 | 20,267 | 20,267 |
| Treatment events | 50 | 49 | 858 | 631 | 3,652 | 2,688 |

*** p < 0.001, ** p < 0.01, * p < 0.05

Note: Each cell contains coefficient, standard error (in parentheses), and p-value. Propensity scores estimated by logistic regression of treatment indicator on debt, assets, age, and employees, using 20,267 observations. *Treatment events* is the number of treated firms at each threshold.

The results for next-year revenue effects provide mixed support for Hypothesis 1 and are more consistent than the Table 12 results using same-year revenue. At the 3-standard deviation

threshold (Model 1), all estimates are positive and significantly different from zero, supporting the prediction that increased CSR leads to increased revenue. All estimates from the 2- and 1-standard deviation threshold estimations are not statistically different from zero (Models 3 and 5). Similar to the estimates with same-year revenue, all models estimating the revenue effects of negative CSR changes are not statistically different from zero. These results suggest increased CSR does increase revenue after one year, but only for the largest changes in CSR (greater than 3 standard deviations from the firm's mean CSR performance). No other changes in CSR affect next year's revenue.

Estimates from next-year models are more consistent than estimates from same-year models. All next-year estimates have the same sign regardless of the number of neighbors. The number of neighbors does not change whether estimates are statistically significant at $p<0.05$, though estimates sometimes become significant at $p<0.01$.

Substantively, the estimated effect of a 3-standard deviation change in CSR on the following year's revenues is between $6-8 billion USD. Average revenue in the data is about $6 billion USD, with a median of about $1.4 billion.

The results above are from the pooled years approach to the data. I now describe the results from the single-year approach.

Single years

Table 15 shows the results of propensity score estimation using single years of data and same-year revenue as the outcome. All models use 1 neighbor matching, producing the least biased and least precise estimates. Some years have too few treatment events at the 3-standard deviation threshold to estimate a treatment effect. A "." character indicates those years in the table.

Table 15: Propensity score matching model estimation results of revenue (in $millions USD) and treatment in same year, estimated separately by year.

| DV: Same year revenue | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Neighbors: 1 | **3 Standard Deviations** | | **2 Standard Deviations** | | **1 Standard Deviation** | |
| **Year** | *Positive* | *Negative* | *Positive* | *Negative* | *Positive* | *Negative* |
| 2009 | . | 3,144 | 1,243 | 4,251 | 2,635 | 3,949 |
| | . | (8,257) | (1,812) | (3,013) | (3,684) | (2,384) |
| | . | 0.7034 | 0.493 | 0.158 | 0.475 | 0.098 |
| 2010 | 3,809 | -2,397 | 6,062*** | -1,368 | 4,573* | -2,023 |
| | (2,137) | (1,428) | (1,499) | (3,196) | (1,804) | (1,252) |
| | 0.0747 | 0.0933 | 0.000 | 0.669 | 0.011 | 0.106 |
| 2011 | . | . | -4,116** | 3,200 | -1,366 | 2,384 |
| | . | . | (1,384) | (1,653) | (1,098) | (1,281) |
| | . | . | 0.003 | 0.053 | 0.214 | 0.063 |
| 2012 | . | -1,742*** | -4,415*** | -1,617 | -1,228 | -260 |
| | . | (466) | (1,186) | (2,005) | (1,437) | (935) |
| | . | 0.0002 | 0.000 | 0.420 | 0.393 | 0.781 |
| 2013 | . | . | -2,317 | -2,032*** | -628 | -519 |
| | . | . | (1,453) | (415) | (616) | (5,324) |
| | . | . | 0.111 | 0.000 | 0.308 | 0.922 |
| 2014 | . | . | -1,863** | 423 | -2,696*** | 4,303** |
| | . | . | (585) | (1,283) | (402) | (1,594) |
| | . | . | 0.001 | 0.742 | 0.000 | 0.007 |
| 2015 | . | . | -3,921*** | -3,106*** | 4,365 | -1,351*** |
| | . | . | (325) | (822) | (2,971) | (320) |
| | . | . | 0.000 | 0.000 | 0.142 | 0.000 |
| 2016 | . | . | 534 | -3,402*** | 4,015*** | -2,238*** |
| | . | . | (1,511) | (428) | (1,036) | (295) |
| | . | . | 0.724 | 0.000 | 0.000 | 0.000 |

*** p < 0.001, ** p < 0.01, * p < 0.05

Note: The outcome variable is revenue. The treatment variable is a change in CSR rating. Each cell contains the coefficient, standard error in parentheses, and p-value. Cells with "." have too few treatment events for estimation.

The results in Table 15 suggest Hypothesis 1 does not predict the relationship in these data. The results do not show a consistent relationship between changes in CSR and revenue. Models 1 and 2 have too few data points to produce estimates for most years. Models 3 and 4 are at the 2-standard deviation level and have enough data to estimate treatment effects. Model 3 shows positive CSR changes sometimes have a negative, positive, or no effect on same-year revenue. Model 4 shows negative CSR changes have either a negative or no effect on same-

year revenue. Models 5 and 6 at the 1-standard deviation threshold show CSR changes sometimes negatively, positively, or do not affect same-year revenue.

Table 16 shows the results of single-year estimation using next-year revenue as the outcome, allowing for a delay in the effect of CSR ratings changes on revenue. Similar to the results using same-year revenue, the results using next-year revenue suggest Hypothesis 1 does not accurately predict the relationship between CSR and revenue in these data. All models show a mix of negative, positive, and null estimates, and there are no clear time trends in the estimates, such as an increasing effect from early to later in time.

Table 16: Propensity score matching model estimation results of 1-year leading revenue (in $millions USD) and treatment, estimated separately by year.

| **DV: Next year's revenue** | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **3 Standard Deviations** | | **2 Standard Deviations** | | **1 Standard Deviation** | |
| **Year** | *Positive* | *Negative* | *Positive* | *Negative* | *Positive* | *Negative* |
| 2009 | . | -1,759 | 1,419 | 2,352 | 3,687 | 6,602 |
| | . | (6,679) | (2,345) | (2,573) | (1,905) | (4,768) |
| | . | 0.792 | 0.545 | 0.3606 | 0.0530 | 0.1662 |
| 2010 | 3,010 | -5,552*** | 6,838*** | -1,549 | 5,373*** | -3,788** |
| | (2,498) | (1,368) | (1,756) | (3,457) | (1,470) | (1,329) |
| | 0.228 | 0.000 | 0.000 | 0.6541 | 0.0003 | 0.0044 |
| 2011 | . | . | -4,334** | 1,273 | -3,159*** | 5,144*** |
| | . | . | (1,444) | (1,342) | (887) | (1,258) |
| | . | . | 0.003 | 0.3430 | 0.0004 | 0.0000 |
| 2012 | . | -5,975*** | -4,869*** | -773 | -1,037 | 432 |
| | . | (727) | (644) | (2,088) | (1,430) | (1,203) |
| | . | 0.000 | 0.000 | 0.7113 | 0.4684 | 0.7195 |
| 2013 | . | . | -1,568 | -2,014*** | -72 | -1,966 |
| | . | . | (1,418) | (345) | (654) | (1,752) |
| | . | . | 0.269 | 0.0000 | 0.9119 | 0.2618 |
| 2014 | . | . | -1,482*** | 311 | -2,711*** | 1,616 |
| | . | . | (252) | (1,019) | (503) | (1,155) |
| | . | . | 0.000 | 0.7605 | 0.0000 | 0.1619 |
| 2015 | . | . | -3,828*** | -3,166*** | 3,359 | -2,332*** |
| | . | . | (334) | (889) | (2,425) | (584) |
| | . | . | 0.000 | 0.0004 | 0.1661 | 0.0001 |

*** p < 0.001, ** p < 0.01, * p < 0.05

Note: The outcome variable is revenue. The treatment variable is a change in CSR rating. Each cell contains the coefficient, standard error in parentheses, and p-value. Cells with "." have too few treatment events for estimation.

Overall, the results of propensity score matching offer very weak support for Hypothesis 1. Table 14, the results from pooled year estimation of the effect of CSR changes on next-year revenue, especially show support for Hypothesis 1 that increased CSR increases revenue. Those results only apply for the rarest 3-standard deviation increases in CSR. Results of other propensity score estimation strategies show a mixed and inconsistent relationship between CSR and revenue in these data.

To further explore the CSR-performance relationship, I next report the results of difference-in-differences estimation approaches.

***Difference-in-differences***

Difference-in-differences estimation assumes treatment is quasi-random and the trend in outcome variables is only affected by treatment. I report the estimation of treatment effects for various treatment thresholds of changes in CSR rating using both same-year and next-year revenue as the outcome. I also estimate models using a transformed dependent variable to examine whether outliers on revenue exert large influence on estimates using the untransformed level of revenue.

Same-year revenue

Table 17 shows difference-in-difference estimates of same-year revenue on treatment events in each year. For each year in the first column of the table, treatment events in that year are used as treated firms, and all other firms are used as untreated firms for the counterfactual. Years in which estimates appear as "." have too few treated firms to calculate an estimate. Because difference-in-differences requires observations in periods both before and after treatment, estimates from the first year of data (2009) and last year of data (2017) cannot be calculated.

Table 17: Average treatment effect estimation from difference-in-differences models for each year from 2010 to 2016.

| DV: Same year revenue | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **3 Standard Deviations** | | **2 Standard Deviations** | | **1 Standard Deviation** | |
| **Year** | *Positive* | *Negative* | *Positive* | *Negative* | *Positive* | *Negative* |
| 2010 | 6,198* | 5,802*** | 7,109*** | 6,126*** | 7,227*** | 6,426*** |
| | (2,819) | (1,123) | (1,285) | (1,532) | (1,072) | (1,057) |
| | 0.0279 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2011 | 1,783 | 19,826 | 2,902** | 3,783 | 4,163*** | 4,029** |
| | (2,916) | (10,913) | (1,110) | (2,208) | (667.6) | (1,549) |
| | 0.541 | 0.0693 | 0.00893 | 0.0867 | 0.000 | 0.00931 |
| 2012 | . | 2,332*** | 2,577*** | 2,282** | 3,542*** | 1,445* |
| | . | (439.6) | (516.3) | (804.3) | (503.4) | (711.4) |
| | . | 0.000 | 0.000 | 0.00455 | 0.000 | 0.0422 |
| 2013 | . | . | 1,748*** | 2,194*** | 2,072*** | 1,527* |
| | . | . | (462.2) | (405.8) | (445.1) | (692.7) |
| | . | . | 0.000156 | 0.000 | 0.000 | 0.0275 |
| 2014 | 2,519** | 1,991* | 2,004*** | 1,357 | 2,315*** | 1,550* |
| | (928.4) | (774.9) | (282.1) | (1,071) | (303.7) | (673.0) |
| | 0.00667 | 0.0102 | 0.000 | 0.205 | 0.000 | 0.0213 |
| 2015 | . | 8,661*** | 1,649*** | 2,109*** | -1,598 | 1,922*** |
| | . | (1,530) | (353.5) | (301.3) | (1,310) | (314.1) |
| | . | 0.000 | 0.000 | 0.000 | 0.222 | 0.000 |
| 2016 | 264.2 | . | -223.3 | 850.9 | -2,432** | 1,303*** |
| | (556.6) | . | (983.8) | (586.0) | (831.1) | (268.2) |
| | 0.635 | . | 0.820 | 0.147 | 0.00343 | 0.0000 |
| Observations | 38,111 | 38,111 | 38,111 | 38,111 | 38,111 | 38,111 |
| Year FEs | Y | Y | Y | Y | Y | Y |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05
Note: Reported coefficients, standard errors, and p-values are for the interaction term of treatment and post-treatment period in a regression of revenue on treatment, treatment period, and year fixed effects.

Results in Table 17 support Hypothesis 1 that increased CSR causes increased revenue. Models 1 and 2 show results for 3-standard deviation changes, both negative and positive. Several years do not have enough data to estimate a coefficient. Years that are estimated show a mix of positive and null coefficient estimates. However, the sparseness of treatment events at this threshold suggests caution about these estimates.

Model 3 and 4 show results at the 2-standard deviation of treatment. Positive treatment in Model 3 shows a positive effect on same-year revenue in all years except 2016.

Substantively, the estimates range from a $0 to $7 billion increase in same-year revenue. These estimates strongly support Hypothesis 1. However, Model 4 of negative treatment events also show a positive effect on revenue, though not as consistently as for positive treatment events. In half of the years, negative changes in CSR cause between $2 and $6 billion more in same-year revenue. In the other years, there is no relationship between negative treatment and revenue. The estimates show no discernible time trend, alternating between positive and null relationships. These results undermine the support for Hypothesis 1 provided by Model 3.

Models 5 and 6 show results at the 1-standard deviation threshold. These results are similar to the results for Models 3 and 4. The 2016 estimate for positive events in Model 5 is negatively different from 0, but this result uses only 1 year of post-treatment data and should be considered a weaker estimate than years closer to the middle of the data window.

The estimate tables only show estimates of the interaction term capturing the treatment effect. Difference-in-differences models estimate three other coefficients: average outcome for treated firms prior to treatment, average outcome for untreated firms prior to treatment, and average outcome for untreated firms after treatment. Figure 3 graphically reports these coefficients and confidence intervals for each treatment threshold.

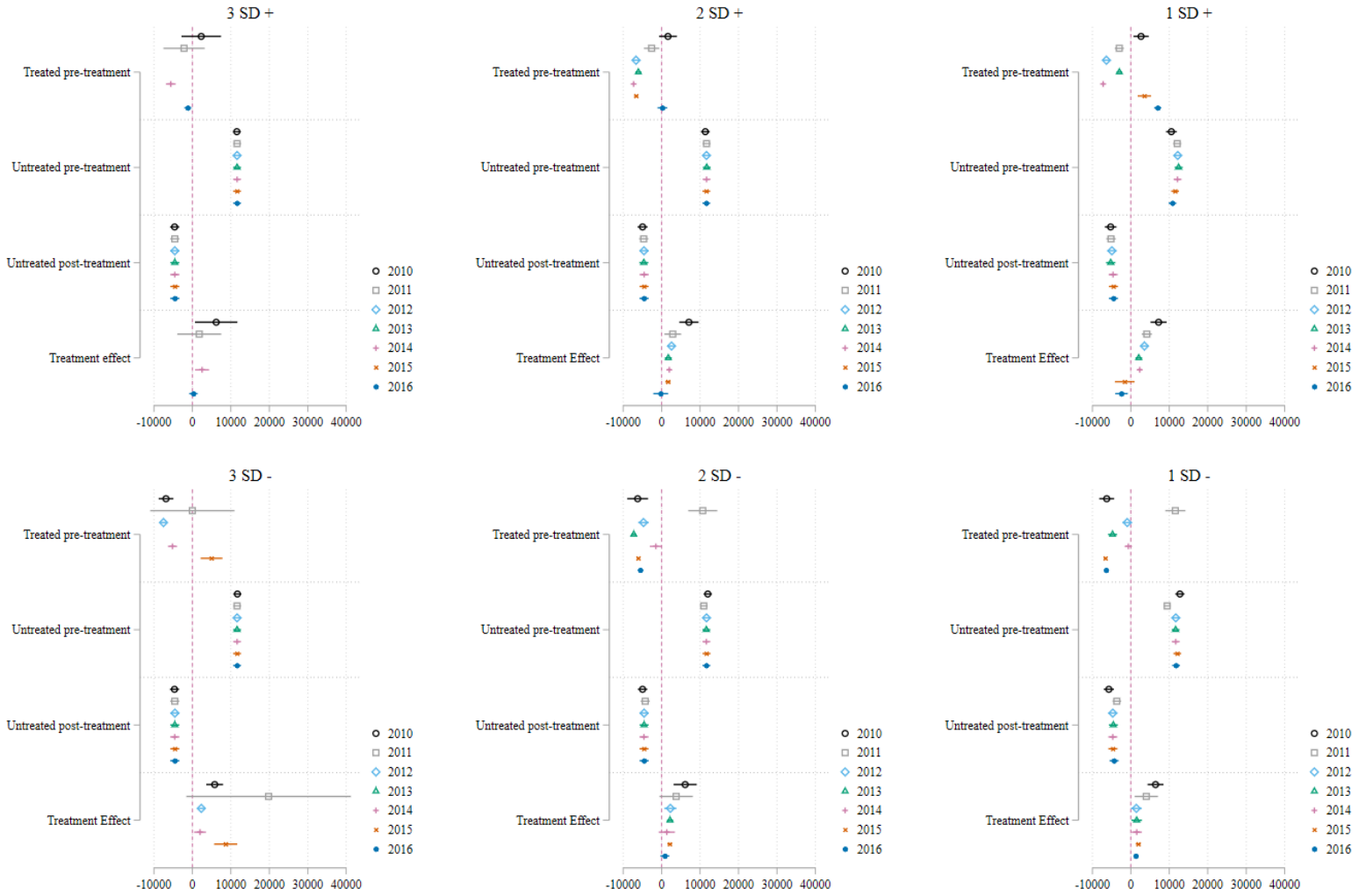



Figure 3: Coefficient plots of difference-in-differences estimates of treatment effects on same-year revenue from Table 17. The x-axis is revenue in $millions USD.

Two patterns emerge from the coefficient plots in Figure 3. First, in the pre-treatment period, untreated firms tend to have higher revenues than treated firms. Second, in the post-treatment period, untreated firms tend to have lower revenues than treated firms.

One concern about difference-in-difference estimates using the level of revenue is that outlier firms—firms like Walmart with large revenues compared to other firms in the sample—might exert large influence on estimates and obscure more generalizable estimates. Approaches to dealing with outliers include dropping them from the sample or transforming the data in some way to reduce the influence of outliers. I choose the latter and transform the revenue dependent variable. A common transformation is the logarithmic transformation, but that transformation excludes values of 0 or negative values from the data. The inverse hyperbolic sine transformation has similar properties as the logarithmic transformation but has the additional advantage of retaining values of 0 and below (see Burbidge, Magee, & Robb, 1988 for a discussion of outcome variable transformations).

I estimate difference-in-differences models using inverse hyperbolic sine-transformed revenue and report the results in the next section. Interpretation of coefficients estimated on inverse hyperbolic sine-transformed dependent variables is approximately equal to interpretation of coefficients estimated with log-transformed variables (Burbidge et al., 1988).

Inverse hyperbolic sine-transformed same year revenue

Figure 4 compares the distribution of untransformed revenue data to inverse hyperbolic sine-transformed revenue data. The left panel shows how untransformed revenue data is highly skewed, with a small number of firms having very large revenue compared to the overall sample. The right panel shows how transformed revenue is much less skewed, reducing the influence of outlier firms on estimation.

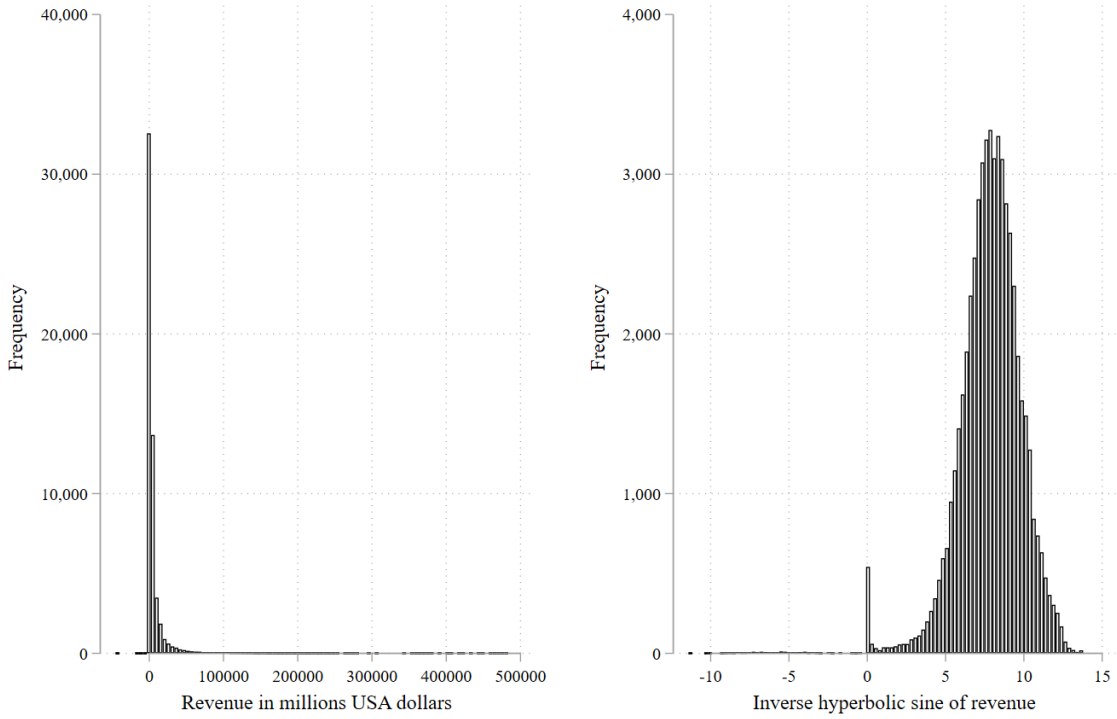



Figure 4: Comparison of the distribution of revenue and transformed revenue.

Table 18 shows the results of difference-in-differences estimation using inverse hyperbolic sine-transformed revenue as the dependent variable. I compare the results to estimates using the untransformed variable, reported in Table 17.

Coefficient interpretation for inverse hyperbolic sine-transformed dependent variables is similar to interpretation for log-transformed variables. The coefficient is approximately the percent change in the dependent variable associated with a treatment event. For example, Model 3 estimates the effect of CSR on revenue in 2013 as 0.296. This can be interpreted as an average 29.6% increase in revenue for firms experiencing positive treatment at this threshold, compared to untreated firms. The estimate using untransformed data is a $1.748 billion average increase in revenue for treated firms.

The results using transformed data are generally in the same direction and significance level as the results using untransformed data, suggesting outliers have a limited impact on estimation in these data. Figure 4 graphically shows the other coefficients produced by the difference-in-differences models using transformed revenue data.

Table 18: Average treatment effect estimation from difference-in-differences models for each year from 2010 to 2016.

| DV: Inverse hyperbolic sine, same-year revenue | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **3 Standard Deviations** | | **2 Standard Deviations** | | **1 Standard Deviation** | |
| **Year** | *Positive* | *Negative* | *Positive* | *Negative* | *Positive* | *Negative* |
| 2010 | 0.788*** | 0.895*** | 0.891*** | 1.046*** | 1.006*** | 1.247*** |
| | (0.225) | (0.214) | (0.102) | (0.165) | (0.0874) | (0.119) |
| | 0.0005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2011 | 0.276 | 1.111 | 0.602*** | 0.656*** | 0.793*** | 0.710*** |
| | (0.328) | (0.948) | (0.116) | (0.113) | (0.0636) | (0.0735) |
| | 0.4004 | 0.2411 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 2012 | . | 0.526*** | 0.646** | 0.584*** | 0.759*** | 0.545*** |
| | . | (0.140) | (0.226) | (0.0976) | (0.0627) | (0.0583) |
| | . | 0.0002 | 0.0043 | 0.0000 | 0.0000 | 0.0000 |
| 2013 | . | . | 0.296*** | 0.599** | 0.469*** | 0.537*** |
| | . | . | (0.0800) | (0.202) | (0.0408) | (0.158) |
| | . | . | 0.0002 | 0.0031 | 0.0000 | 0.0007 |
| 2014 | 0.585* | 0.369 | 0.347*** | 0.296 | 0.381*** | 0.287*** |
| | (0.288) | (0.265) | (0.104) | (0.185) | (0.0449) | (0.0661) |
| | 0.0423 | 0.1625 | 0.0009 | 0.1094 | 0.0000 | 0.0000 |
| 2015 | . | 0.911*** | 0.217 | 0.341** | -0.00260 | 0.277*** |
| | . | (0.198) | (0.451) | (0.125) | (0.122) | (0.0465) |
| | . | 0.0000 | 0.6310 | 0.0064 | 0.9830 | 0.0000 |
| 2016 | 0.103 | . | 0.159 | 0.145 | 0.0109 | 0.174* |
| | (0.105) | . | (0.118) | (0.225) | (0.0620) | (0.0842) |
| | 0.3286 | . | 0.1776 | 0.5201 | 0.8606 | 0.0382 |
| Observations | 38,111 | 38,111 | 38,111 | 38,111 | 38,111 | 38,111 |
| Year FEs | Y | Y | Y | Y | Y | Y |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05
Note: Reported coefficients, standard errors, and p-values are for the interaction term of treatment and post-treatment period in a regression of same year inverse hyperbolic sine-transformed revenue on treatment, treatment period, and year fixed effects.

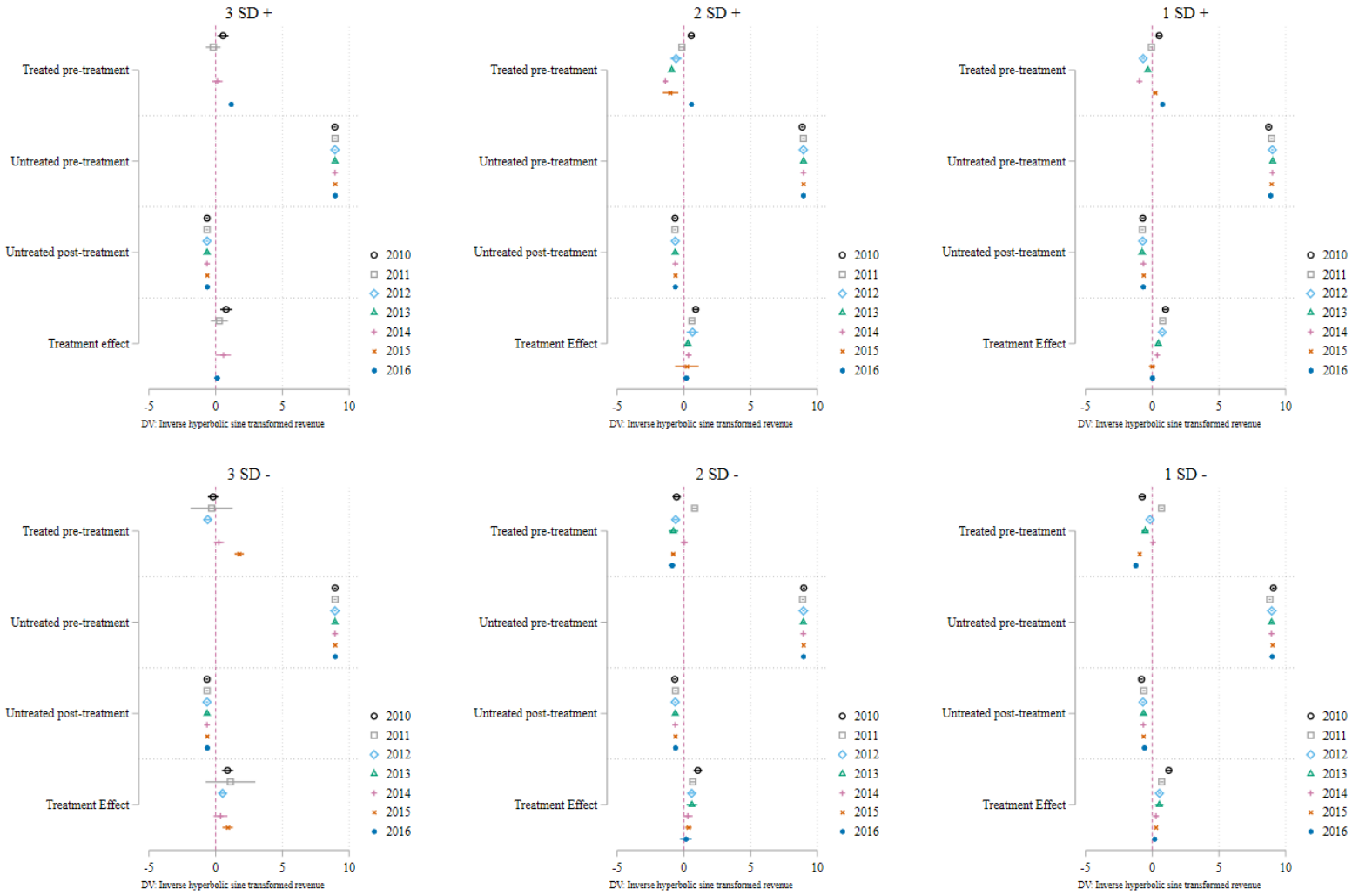



Figure 5: Coefficient plots of difference-in-differences estimates of treatment effects on next-year revenue. The "Treatment effect" plots are the coefficients from Table 18.

Next-year revenue

To explore whether the effect of CSR changes on revenue occurs over a longer time period than assumed by same-year models, I report the results of models using the next-year's revenue as the outcome variable. Table 19 reports the results of difference-in-differences model for each year using the next-year's revenue as the dependent variable. Results are similar to the results using same-year models and provide mixed support for Hypothesis 1.

Figure 6 graphically reports the results for all coefficients estimated in the models.

Table 19: Average treatment effect estimation from difference-in-differences models for each year from 2010 to 2016.

| DV: Next-year revenue | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | **3 Standard Deviations** | | **2 Standard Deviations** | | **1 Standard Deviation** | |
| **Year** | *Positive* | *Negative* | *Positive* | *Negative* | *Positive* | *Negative* |
| 2010 | 5,400 | 5,179*** | 6,044*** | 6,221*** | 6,529*** | 7,150*** |
| | (3,042) | (1,540) | (1,463) | (1,697) | (1,208) | (1,110) |
| | 0.076 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2011 | 1,703 | 18,354 | 3,281** | 2,791 | 4,316*** | 3,096 |
| | (3,147) | (13,312) | (1,153) | (2,390) | (744.0) | (1,726) |
| | 0.588 | 0.168 | 0.004 | 0.243 | 0.000 | 0.073 |
| 2012 | . | 2,503*** | 2,813*** | 2,356** | 3,717*** | 1,566* |
| | . | (480.9) | (555.6) | (869.6) | (562.7) | (764.9) |
| | . | 0.000 | 0.000 | 0.007 | 0.000 | 0.041 |
| 2013 | . | . | 1,934*** | 2,231*** | 2,155*** | 1,648* |
| | . | . | (504.3) | (452.8) | (487.4) | (738.6) |
| | . | . | 0.000 | 0.000 | 0.000 | 0.026 |
| 2014 | 2,647* | 2,154** | 2,001*** | 1,142 | 2,420*** | 1,142 |
| | (1,066) | (818.9) | (317.1) | (1,158) | (332.8) | (751.3) |
| | 0.013 | 0.009 | 0.000 | 0.324 | 0.000 | 0.129 |
| 2015 | . | 7,200*** | 1,039* | 1,753*** | -2,008 | 1,604*** |
| | . | (1,899) | (440.9) | (379.4) | (1,520) | (382.1) |
| | . | 0.000 | 0.018 | 0.000 | 0.187 | 0.000 |
| 2016 | -218.8 | . | -1,941 | -809.3 | -4,353*** | -25.82 |
| | (565.2) | . | (1,137) | (572.8) | (1,149) | (426.1) |
| | 0.699 | . | 0.088 | 0.158 | 0.000 | 0.952 |
| Observations | 30,833 | 30,833 | 30,833 | 30,833 | 30,833 | 30,833 |
| Year FEs | Y | Y | Y | Y | Y | Y |

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05

Note: Reported coefficients, standard errors, and p-values are for the interaction term of treatment and post-treatment period in a regression of next year's revenue on treatment, treatment period, and year fixed effects.

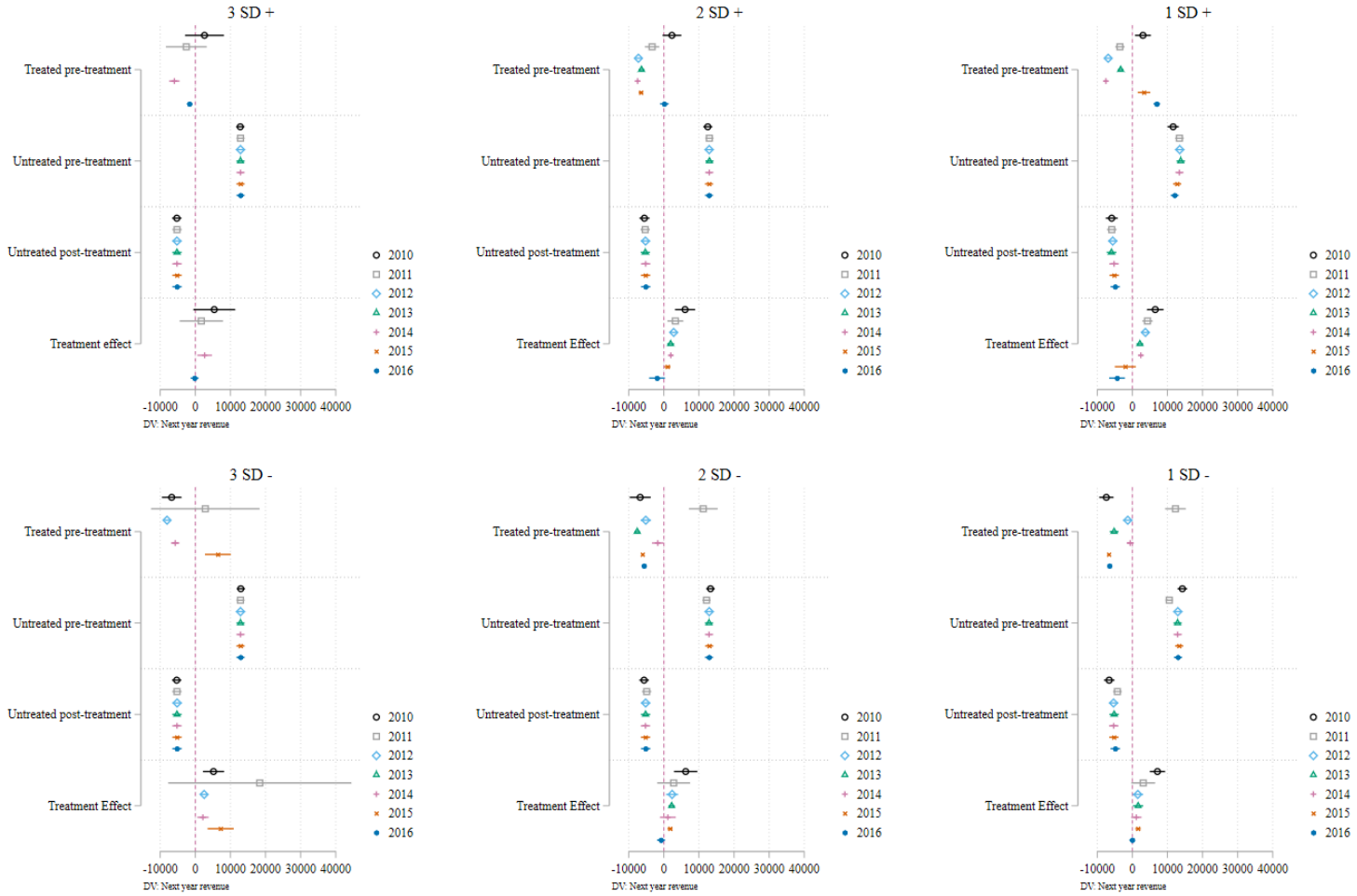



Figure 6: Coefficient plots of difference-in-differences estimates of treatment effects on next-year revenue. The "Treatment effect" plots are the coefficients from Table 19.

### *Fixed Effects Regression*

I estimate fixed effects regressions to estimate the within-firm relationship between revenue and overall social responsibility ratings. In contrast to previous propensity score matching and difference-in-differences estimations using thresholds of CSR rating mean deviation, the fixed effects estimations examine the relationship between revenue and the level of CSR rating.

Table 20 shows the results of fixed effects estimation of revenue on CSR rating in the same year. Model 1 estimates the bivariate relationship between revenue and CSR with firm fixed effects and firm-clustered robust standard errors. Model 1 does not include year fixed effects. The results indicate a $13.25 million USD change in the average within-firm revenue associated with a 1-point change in CSR rating. The estimate is significantly different from zero with a p-value of 0.033. However, Model 2 shows this result is not robust to the addition of year fixed effects and other control variables, and the relationship sometimes becomes negatively different from zero. In the full Model 8, the association between the average within-firm change in revenue and a 1-point change in CSR overall rating score is $-46.78 million USD, significantly different from zero with a p-value of 0.026. In the full Model 9 that assumes missing data on advertising and research and development is equal to 0 (this assumption is made in other studies of CSR performance, such as Barnett & Salomon, 2012), the estimate falls to $-15.25 million USD and has a p-value of 0.11.

The results in Table 20 largely reject Hypothesis 1 that increased CSR causes increased firm revenue. Within firms, increased CSR is more often negatively or not associated with revenue than it is positively associated with revenue. These findings suggest that firms that experience increased CSR scores also tend to experience decreased or no change in revenue. Table 21 results for the same models with the dependent variable transformed by inverse

hyperbolic sine to control for outliers show a similar pattern of results as Table 20, suggesting the results are not driven by revenue outliers.

Findings from Table 20 and Table 21 come from regressions of revenue on CSR in the same year. These estimations would not reveal an effect of CSR on revenue that occurs over a period longer than a year. To explore that possibility, I also estimate fixed effects regression models in which the dependent variable revenue is measured in the year following the other variables.

Table 20: Fixed effects regressions of same-year revenue.

| DV: Same-year revenue | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Overall rating | 13.25* | -9.582 | -13.96 | -18.20* | -18.81* | -19.48 | -23.41 | -46.78* | -15.25 |
| | (6.213) | (9.499) | (9.198) | (8.967) | (8.733) | (10.19) | (16.54) | (21.04) | (9.553) |
| | 0.0330 | 0.3131 | 0.1292 | 0.0424 | 0.0313 | 0.0559 | 0.1572 | 0.0264 | 0.1106 |
| Debt | | | 0.0503*** | -0.000696 | 0.00775 | 0.00643 | 0.210** | -0.474 | -0.00771 |
| | | | (0.0109) | (0.00859) | (0.00654) | (0.00689) | (0.0697) | (0.246) | (0.0146) |
| | | | 0.0000 | 0.9354 | 0.2359 | 0.3511 | 0.0026 | 0.0547 | 0.5976 |
| Assets | | | | 0.0473*** | 0.0348*** | 0.0356*** | 0.0232 | 0.542** | 0.0522** |
| | | | | (0.00738) | (0.00607) | (0.00679) | (0.0270) | (0.178) | (0.0163) |
| | | | | 0.0000 | 0.0000 | 0.0000 | 0.3910 | 0.0024 | 0.0014 |
| Employees | | | | | 174.9*** | 177.7*** | 152.8*** | 103.4* | 189.6*** |
| | | | | | (21.15) | (24.32) | (46.20) | (44.28) | (41.63) |
| | | | | | 0.0000 | 0.0000 | 0.0010 | 0.0197 | 0.0000 |
| Age | | | | | | -136.3*** | 212.5* | -70.44 | -44.99 |
| | | | | | | (28.66) | (83.02) | (93.92) | (94.13) |
| | | | | | | 0.0000 | 0.0106 | 0.4534 | 0.6328 |
| Advertising | | | | | | | 9.959*** | 3.149 | 2.441* |
| | | | | | | | (2.410) | (2.575) | (0.985) |
| | | | | | | | 0.0000 | 0.2217 | 0.0132 |
| R&D | | | | | | | | 0.707 | 4.494* |
| | | | | | | | | (1.052) | (1.806) |
| | | | | | | | | 0.5014 | 0.0129 |
| Observations | 39,080 | 39,080 | 38,677 | 38,677 | 33,719 | 25,731 | 6,914 | 4,042 | 16,887 |
| Firms | 7,301 | 7,301 | 7,239 | 7,239 | 6,552 | 4,925 | 1,530 | 915 | 3,543 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Note: Panel is firm-year. Coefficients are the average within-firm change in firm revenue associated with a 1-point change in the variable. Model 9 assumes missing xrd/xad = 0 for North American data. Firm-clustered robust standard errors in parentheses. P-values below standard errors. *** p<0.001, ** p<0.01, * p<0.05.

Table 21: Fixed effects regressions of same-year inverse hyperbolic sine-transformed revenue.

| DV: Same-year IHS-transformed revenue | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Overall rating | 0.0038*** | -0.0009 | -0.0012 | -0.0014 | -0.0016 | -0.0015 | -0.0023* | -0.0012 | -0.0011 |
| | (0.0009) | (0.0009) | (0.0009) | (0.0009) | (0.0009) | (0.0009) | (0.0011) | (0.0016) | (0.0011) |
| | 0.0000 | 0.3449 | 0.1730 | 0.1231 | 0.0706 | 0.0795 | 0.0362 | 0.4358 | 0.3262 |
| Debt | | | 0.0000* | -0.0000 | -0.0000 | -0.0000 | 0.0000 | -0.0000* | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0163 | 0.1484 | 0.2802 | 0.6204 | 0.2662 | 0.0378 | 0.7154 |
| Assets | | | | 0.0000*** | 0.0000*** | 0.0000*** | 0.0000 | 0.0000** | 0.0000* |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.0000 | 0.0008 | 0.0010 | 0.7815 | 0.0017 | 0.0323 |
| Employees | | | | | 0.0072*** | 0.0065*** | 0.0039*** | 0.0030** | 0.0062*** |
| | | | | | (0.0008) | (0.0008) | (0.0010) | (0.0010) | (0.0011) |
| | | | | | 0.0000 | 0.0000 | 0.0001 | 0.0026 | 0.0000 |
| Age | | | | | | -0.0048 | 0.0298*** | 0.0342*** | 0.0242*** |
| | | | | | | (0.0052) | (0.0030) | (0.0037) | (0.0056) |
| | | | | | | 0.3523 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0003*** | 0.0003** | 0.0001 |
| | | | | | | | (0.0001) | (0.0001) | (0.0000) |
| | | | | | | | 0.0000 | 0.0028 | 0.0637 |
| R&D | | | | | | | | -0.0000 | 0.0001 |
| | | | | | | | | (0.0000) | (0.0000) |
| | | | | | | | | 0.6529 | 0.0698 |
| Observations | 39,080 | 39,080 | 38,677 | 38,677 | 33,719 | 25,731 | 6,914 | 4,042 | 16,887 |
| Firms | 7,301 | 7,301 | 7,239 | 7,239 | 6,552 | 4,925 | 1,530 | 915 | 3,543 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Note: Panel is firm-year. Coefficients are the average within-firm change in firm revenue associated with a 1-point change in the variable. Model 9 assumes missing xrd/xad = 0 for North American data. Firm-clustered robust standard errors in parentheses. P-values below standard errors. *** p<0.001, ** p<0.01, * p<0.05.

Table 22 shows the results of fixed effects estimation using leading revenue as the dependent variable. These estimations capture the possibility of a 1-year delay in the effect of changes in CSR on revenue. The results of Models 1-9 suggest no association between changes in CSR and revenue in the next year. Table 20 suggests changes in a firm's CSR rating do not affect its revenue in the next year.

Table 22: Fixed effects regressions of next-year revenue.

| DV: Next-year revenue | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Overall rating | 3.716 | 8.268 | 7.396 | 4.776 | 7.626 | 11.91 | 8.284 | 7.547 | 14.96 |
| | (6.613) | (10.84) | (10.91) | (10.81) | (14.10) | (13.38) | (20.08) | (28.45) | (14.50) |
| | 0.5742 | 0.4458 | 0.4980 | 0.6586 | 0.5887 | 0.3735 | 0.6799 | 0.7909 | 0.3025 |
| Debt | | | 0.00510 | -0.0327*** | -0.0352*** | -0.0273*** | 0.207*** | -0.678** | -0.0376* |
| | | | (0.0113) | (0.00973) | (0.00947) | (0.00816) | (0.0423) | (0.255) | (0.0162) |
| | | | 0.6503 | 0.0008 | 0.0002 | 0.0008 | 0.0000 | 0.0079 | 0.0206 |
| Assets | | | | 0.0359*** | 0.0374*** | 0.0269*** | 0.00849 | 0.612*** | 0.0369* |
| | | | | (0.00499) | (0.00542) | (0.00427) | (0.0338) | (0.160) | (0.0167) |
| | | | | 0.0000 | 0.0000 | 0.0000 | 0.8016 | 0.0001 | 0.0273 |
| Employees | | | | | -335.9*** | -165.5*** | 349.5*** | 170.0 | 297.1*** |
| | | | | | (43.46) | (28.36) | (80.30) | (98.69) | (68.65) |
| | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0853 | 0.0000 |
| Age | | | | | | 178.2*** | 187.7*** | 140.4** | 226.2*** |
| | | | | | | (23.73) | (44.08) | (43.95) | (37.25) |
| | | | | | | 0.0000 | 0.0000 | 0.0015 | 0.0000 |
| Advertising | | | | | | | 9.285*** | 1.192 | 2.446** |
| | | | | | | | (2.532) | (2.347) | (0.833) |
| | | | | | | | 0.0003 | 0.6118 | 0.0034 |
| R&D | | | | | | | | 0.478 | 4.210** |
| | | | | | | | | (1.537) | (1.632) |
| | | | | | | | | 0.7560 | 0.0099 |
| Observations | 31,833 | 31,833 | 31,509 | 31,509 | 22,234 | 20,939 | 5,463 | 3,190 | 13,376 |
| Firms | 6,370 | 6,370 | 6,318 | 6,318 | 4,494 | 4,319 | 1,299 | 776 | 3,039 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Note: Panel is firm-year. Coefficients are the average within-firm change in firm revenue associated with a 1-point change in the variable. Model 9 assumes missing xrd/xad = 0 for North American data. Firm-clustered robust standard errors in parentheses. P-values below standard errors. *** p<0.001, ** p<0.01, * p<0.05.

## Discussion

Taken together, the results of hypothesis tests suggest increased CSR does not always increase firm revenues and sometimes causes decreased revenues. These results resemble the current disagreement in the CSR performance literature over whether and when it "pays to be good." The results also lend further weight to recent calls to move beyond looking for a single, consistent causal relationship between CSR performance and financial performance outcomes. These calls suggest CSR researchers should instead focus on the ethical dimensions of CSR, rather than only whether CSR increases financial performance. More research also needs to address the conditions under which CSR increases financial performance, when it has no effect on performance, and when it hurts performance.

## Limitations

The CSR performance literature suffers accusations of methodological overreach, specifically that studies in the literature claiming causal interpretations that are only justified by their estimation strategies if strong, unverifiable assumptions are true. The counterfactual designs used in this chapter—propensity score matching and difference-in-differences estimation—make causal claims that rely on fewer assumptions than some other methods. But counterfactual designs still require assumptions to justify causal inference, and these assumptions present limitations to the analyses in this chapter.

Propensity score matching assumes the model to generate propensity scores accurately predicts treatment probability. If the propensity score model—in this case a logistic linear regression model—suffers from omitted variable bias or other estimation problems, propensity scores could be biased. Matches made using biased propensity scores could then produce biased estimates of treatment effects.

Difference-in-differences estimation assumes that treatment events are outside the control of treated units and that trends in the outcome being studied would, had treatment not occurred, have continued in the same way after treatment as they did before treatment. Both assumptions are unverifiable. In this chapter, the most reasonable treatment events to be outside firms' control would be 3-standard deviation changes in CSR. Such changes are very rare and likely require events outside the firm's control to occur. However, in some cases such CSR changes occur in response to scandals at companies. Pfizer, Inc., a pharmaceutical company, experienced a 3-standard deviation increase in CSR rating from 2009 to 2010. In 2009, the company agreed to pay the largest settlement in the history of health care fraud prosecution in the United States. The decision to settle a legal prosecution is directly within the control of the firm, and settlement decisions are not controlled for in the difference-in-differences estimation. Such decisions could bias the treatment effect estimates.

Finally, fixed effects estimation relies on the assumptions criticized as too strong in the CSR performance literature. The approach is vulnerable to omitted variable bias in which common causes of CSR and performance are not controlled for in the regression model. While fixed effects estimation does eliminate some common causes with firm and year fixed effects, those common causes are only controlled for if they do not change over time.

## CHAPTER 3: DOES STAKEHOLDER INFLUENCE CAPACITY CONNECT RESPONSIBILITY TO PERFORMANCE?

Whether CSR affects performance remains contested. This chapter contributes to the development of stakeholder influence capacity theory that connects CSR to performance through CSR's impact on stakeholders (Barnett, 2007; Barnett & Salomon, 2012; Bridoux & Stoelhorst, 2014; Bundy et al., 2018). Stakeholder influence capacity (SIC) is defined as a firm-level ability "to notice and profitably exploit opportunities to improve stakeholder relations through corporate social responsibility" (Barnett, 2007, p. 803). I test the theory's prediction that CSR affects performance by first influencing stakeholder behavior. I find some support for the theory's predictions, with important limitations that suggest a need to focus on heterogeneity across stakeholder groups to further develop stakeholder influence capacity theory.

SIC is a mechanism by which CSR affects firm performance. The CSR literature more commonly tests a direct CSR performance effect rather than a mechanism: 168 of 181 reviewed CSR performance studies tested a direct relationship rather than a mechanism (Aguinis & Glavas, 2012). The studies that tested mechanisms identified two mechanisms at the organizational level of analysis: a firm's intangible resources (e.g., Surroca et al., 2010) and managerial interpretation of responsibility as a business opportunity (e.g., Sharma, 2000).

Surroca et al. (2010) found four intangible resources of innovation, human capital, reputation, and culture fully mediated the CSR performance relationship and argued prior findings of a direct relationship between CSR and performance were spurious because they did not account for these separate mechanisms. They recommended scholars focus on mediating mechanisms and contextual conditions linking responsibility to performance, such as

intangible firm resources. Stakeholder influence capacity is an intangible firm resource (Barnett, 2007), and Surroca et al.'s findings suggest stakeholder influence capacity might be one channel by which responsibility affects performance.

Mehrpouya and Chowdhury (2018) theorize two categories of mechanisms: relational mechanisms and capabilities mechanisms. Relational mechanisms change how stakeholders relate to and behave toward the firm as a result of the firm's CSR actions. Relational mechanisms include a market-based mechanism that applies to stakeholders with a market and exchange-oriented relationship with the firm and an institutional relational mechanism for stakeholders with institutional relationship with the firm. Institutional stakeholders set constraints on firms and include regulators and non-state organizations like supply chain monitors (Short, Toffel, & Hugill, 2016). Mehrpouya and Chowdhury do not claim markets and institutions are entirely separate. Instead, they view institutions as the structure or setting in which markets exist (Marquis, Toffel, & Zhou, 2016). Capabilities mechanisms apply to how CSR actions change stakeholders' capabilities and the capabilities of the firm itself.

The stakeholder influence capacity mechanism adds another possible theoretical mechanism by which CSR might affect performance. Research suggests CSR improves a firm's performance by increasing its reputation and goodwill with stakeholders (Orlitzky et al., 2003), such as customers (Lev et al., 2010; Luo & Bhattacharya, 2006). These findings hint at the connection between CSR's effects on stakeholders and the subsequent influence those stakeholders have on firm performance, the process theorized in stakeholder influence capacity. If responsibility affects performance through first affecting stakeholders,

understanding the SIC mechanism will meaningfully advance our understanding of how CSR relates to firm performance.[2]

## Theory

In this section, I develop a hypothesis from stakeholder influence capacity theory, which arises from resource-based theory and instrumental stakeholder theory (Barnett, 2007; Bridoux & Stoelhorst, 2014; Bundy et al., 2018). I first review resource-based theory and instrumental stakeholder theory. I then describe stakeholder influence capacity theory and derive the hypothesis tested in this chapter.

### *Resource-based Theory*

The stakeholder influence capacity mechanism is grounded in resource-based theory (Barnett, 2007). Resource-based theory's main proposition is that firm performance depends on the resources controlled, managed, developed, and acquired by the firm (Leiblein, 2011). Firm performance differs across firms because firms vary in their capabilities to control, manage, develop, and acquire resources. Three branches of resource-based theory have emerged around these concepts: resource endowments, strategic factor markets, and dynamic capabilities.

The resource endowment branch considers how founding conditions influence firms' resource endowments (Barney, 1991; Rumelt, 1984; Wernerfelt, 1984). Resource endowments containing rare, difficult to imitate resources provide firms competitive advantage against rivals. If such resources are bound to the firm rather than mobile or tradeable, firms are protected from entry by competitors who cannot acquire the same resource mix. Even if resources are not entirely bound to the firm, firms can protect resource endowments by using

[2] Responsibility could seek to achieve other ends than performance, such as fulfilling a moral obligation to the firm's stakeholders. Stakeholder influence capacity theory arises in part from instrumental stakeholder theory, which assumes stakeholder engagement seeks only to increase firm performance.

isolating mechanisms to increase competitors' costs of acquiring or imitating resources (Dierickx & Cool, 1989; S A Lippman & Rumelt, 1982; Rumelt, 1984).

The second and third branches of resource-based theory consider performance differences if resource endowments at founding are easily changed and managers can alter resource endowments. The strategic factor markets branch considers whether and how firms acquire and sell new resources or "factors" on strategic factor markets (S A Lippman & Rumelt, 1982; Rumelt, 1984). Managers adjust their firms' resource mix over time but struggle to accurately predict the total value factors will create. Factor markets are not efficient, and prices are not perfect, allowing managers to acquire factors at costs below their value creation potential.

The strategic factor markets literature has developed three mechanisms linking resource acquisition to superior performance. First, firms might be lucky and acquire resources that were undervalued (Barney, 1986; Denrell, Fang, & Winter, 2003; Makadok & Barney, 2001). Second, firms with superior information about the value-creating potential of resources can make more lucrative resource acquisition and divestment decisions, outperforming firms with inferior information. Third, variation in the resource mixes firms control can produce performance differences if some resources produce more value when paired in certain combinations than alone. Existing resource mixes can lead to different performance outcomes by presenting each firm with a different cost of acquiring complementary resources (Adegbesan, 2009; Steven A. Lippman & Rumelt, 2003).

The dynamic capabilities branch explores how firms alter their resource base in quickly-changing competitive environments (Eisenhardt & Martin, 2000; Helfat, 2007; Teece, Pisano, & Shuen, 1997). A dynamic capability is a firm's ability to stay apace with the

dynamism of its operating environment by creating, extending, and modifying new resources. The dynamic capabilities branch tends to focus on three processes: resource allocation policies, organization structure, and managerial decision making (Leiblein, 2011). Firms that allocate resources to understanding the nature of their operating environment are thought to have higher dynamic capability than firms that do not. Helfat (1994, 1997) examines this in the context of stable allocations to research and development. However, the idea that stable resource allocation policies enable a dynamic capability is disputed (Knott, Bryce, & Posen, 2003), and more research is needed on the specific types of investments that develop dynamic capabilities. Investment in stakeholder influence capacity is one promising direction for research that could contribute to both responsibility performance and the dynamic capabilities literature.

How do these resource-based theory branches relate to stakeholder influence capacity and corporate social responsibility? The resource endowment branch of resource-based theory suggests a firm's initial endowment of stakeholder relationships and its initial endowment of stakeholder influence capacity drive some variation in firm performance. The initial endowment of stakeholder relationships can both enable and restrict managers' choices about future relationships. For example, startups funded through venture capital must balance the need to establish new relationships with funders against existing investors' desire to avoid dilution of their initial investments. A firm's initial endowment of stakeholder influence capacity also could drive variation in firm performance outcomes. Whether firms' initial endowments of stakeholder relationships and stakeholder influence capacity provide sustained competitive advantage depends on how bound these resources are to firms and whether firms can develop isolating mechanisms around these resources to prevent rivals from imitating or acquiring the same stakeholder relationships and levels of stakeholder influence capacity.

A firm's stakeholder influence capacity also "depends on its prior stakeholder relationships" (Barnett, 2007, p. 803), linking stakeholder influence capacity to the strategic factor markets branch of resource-based theory. That branch notes that the most profitable mix of resources a firm might acquire from strategic factor markets depends on the mix of resources it controls. If each firm controls a unique mix of resources, no two firms will demand the same mix of resources from strategic factor markets. Complementarities between resources further create differences between the resource mix a firm currently controls and the resource mix it would be most profitable for the firm to acquire. Similarly, a firm's stakeholder influence capacity depends on its existing mix of stakeholder relationships, and the mix of stakeholder relationships it would be most profitable for the firm to develop in the future depends on the existing relationships it has with stakeholders. If no two firms have identical relationships with stakeholders, then no two firms will have the same mix of stakeholder relationships that would be most profitable to develop in the future. Further, complementarities between stakeholder groups and relationships suggest that firms might vary on the value creation and capture potential of current and potential relationships, introducing variation in firms' demand for stakeholder relationships and variation in firms' ability and interest in allocating time and effort to increasing stakeholder influence capacity.

Finally, stakeholder influence capacity is theorized as a firm-level ability "to notice and profitably exploit opportunities to improve stakeholder relations through corporate social responsibility" (Barnett, 2007, p. 803). This is similar to the dynamic capabilities approach that emphasizes the firm's ability to perceive and respond to changes in its competitive environment. Firms notice opportunities to improve stakeholder relationships by monitoring changing stakeholder demands on the firm and changes in the institutional environment in

which they operate. These changes can take the form of shifting expectations for what firms should and shouldn't do in their normal operations.

Over time the positive stock market reaction to firms announcing eco-friendly news has declined while the negative stock market reaction to eco-harmful news has increased (Flammer, 2013), suggesting shareholder stakeholders have shifted from rewarding firms for eco-friendly behavior to simply expecting it from firms while increasing negative reactions to eco-harmful behavior. Firms that accurately perceive these shifting stakeholder perceptions should be better able to adjust how they manage their responsibility actions.

Resource-based theorists call for integrating a stakeholder approach into resource-based theory's model of profit appropriation (Barney, 2018). The assumption that shareholder stakeholders are the only stakeholder group with a claim on profit created by a firm is incompatible with resource-based theory's profit creation model in which firms combine resources from many different stakeholders to generate profit. Firms that only distribute that profit to shareholders will struggle to attract resources from non-shareholder stakeholders. To attract more diverse resources and perform better, firms need to distribute profit to more diverse stakeholders than shareholders. A firm's ability to influence stakeholders plays an important role in both profit creation and appropriation.

### *Instrumental Stakeholder Theory*

Stakeholder theory views the firm as a collection of relationships with stakeholders, defined as individuals, organizations, or groups affected by the firm's operations or that the firm depends on for resources (Parmar et al., 2010). Instrumental stakeholder research studies how the management of stakeholder relationships affects firm performance. Instrumental stakeholder theory's core proposition is that firms that correctly assess stakeholder preferences and develop

and maintain stakeholder relationships in line with those preferences will perform better than firms that do not (Donaldson & Preston, 1995). Managing stakeholder relationships can increase firm performance by increasing stakeholder commitment to the firm, lowering transaction costs, and reducing certain types of business risks (Barnett, 2007; Donaldson & Preston, 1995; T. M. Jones, 1995; T. M. Jones, Harrison, & Felps, 2018). The primary strategic challenges are (1) understanding stakeholder preferences and (2) fostering relationships built around those preferences (Berman & Johnson-Cramer, 2016).

Wood and Jones (1995) identified the need to integrate stakeholder theory into the responsibility performance literature. CSR performance studies suffered from "stakeholder mismatching" in which no theoretical mechanism linked the CSR measure to the performance measure, suggesting inferences were theoretically vacuous. For example, studies tested whether corporate charitable giving as a form of CSR affected return on investment as a performance measure but provided no theoretical rationale for why or how charitable giving could affect a firm's overall return on investment.

Wood and Jones argued responsibility performance studies needed to theoretically link the form of responsibility to the type of performance. They provided several ways integrating stakeholder theory into CSR studies could reduce stakeholder mismatching. First, understanding which stakeholder groups set expectations for how firms act would help theoretically justify why a relationship should exist between a responsibility measure and performance measure. Second, multiple stakeholders experience the effects of corporate action, and understanding the joint effects of those stakeholders on performance would clarify responsibility performance relationships. Third, stakeholders evaluate the outcomes of

corporate behavior, and stakeholder reaction based on those evaluations likely influences performance outcomes.

Relationship management can increase performance by fostering cooperation with stakeholders. Factors that foster cooperation include norms-based factors like trust, perceptions of fairness, and norms of reciprocity (Bosse et al., 2009; Bridoux & Stoelhorst, 2014, 2016; Hahn, 2015; Harrison et al., 2010; Harrison & Wicks, 2013; Tantalo & Priem, 2016) and instrumental factors like perceptions of competence, shared resource capabilities and needs, and interdependencies between firms and stakeholders (Bosse & Coughlan, 2016; Bridoux & Stoelhorst, 2014). Firms can have different levels of capabilities on each factor.

Instrumental stakeholder theory initially assumed stakeholders prioritize fairness and predicted strategies that treat stakeholders fairly would increase firm performance by building more trusting, productive relationships with stakeholders (Donaldson & Preston, 1995; Freeman, 1984; Harrison et al., 2010; T. M. Jones, 1995; Wood, 1991). Recent theoretical advances relax this assumption and consider stakeholders with heterogeneous preferences, including self-interested stakeholders, and how strategies treating stakeholders as self-interested parties affect firm performance (Bridoux & Stoelhorst, 2014). Firms that do not recognize heterogeneous stakeholder preferences and assume stakeholders only care about fairness risk alienating self-interested stakeholders.

Bosse and Coughlan (2016) examine stakeholders' perceived psychological bonds with the firm that influence whether the stakeholder continues its relationship with the firm and how much effort to contribute to the relationship. These psychological bonds would be a key element of the stakeholder relationship firms would want to understand and influence with responsibility actions to motivate continued relationships with profitable stakeholders,

discontinued relationships with unprofitable stakeholders, and increased effort from stakeholders that could improve firm performance.

The "fit" between the firm's actions and its stakeholders' motivations is another area of instrumental stakeholder theory development (Bundy et al., 2018). Congruence between firm and stakeholders on values is predicted to increase intrinsically motivated cooperation. Strategic complementarity between firm and stakeholder resource needs and/or capabilities will increase extrinsically motivated cooperation. Initial congruence on values leads to the development of strategic complementarity, and initial strategic complementarity will lead to congruence on values. Combative behavior emerges from firm-stakeholder relationships with high incongruence on values and high strategic incompatibility, but high values on one dimension with low on the other will lead to relational compromise. These predictions about firm-stakeholder fit remain untested.

These predictions also suggest stakeholder groups have different values and strategic resources and needs. Firms that attend to such differences could have more cooperative than combative relationships with stakeholders. Stakeholder cooperation with the firm can increase firm performance by allowing the firm to gain more information about stakeholders' preferences for improvements to products and services or which products and services to develop to serve unmet stakeholder preferences (Harrison et al., 2010).

Garcia-Castro and Francoeur (2016) argue instrumental stakeholder theory has assumed an additive, linear relationship between stakeholder investment and financial performance, implying that more investment in stakeholder relationships is always better. But stakeholder investments can be expensive and their financial returns contingent on complex complementarities within the firm and specific contextual factors outside the firm. The costs

and returns to responsibility actions might differ depending on the stakeholder group being invested in with those actions.

Henisz, Dorobantu, and Nartey (2014) analyze instrumental stakeholder theory's core proposition that improving relationships with stakeholders leads to increased firm financial performance. Using media reports and data on 26 gold mines owned by 19 firms from 1993-2008, they investigate the relationship between stakeholder perception of firms in media, firm value, and the net present value of unmined gold deposits and other firm physical assets. They find markets discount firms' physical assets less when firms have positive stakeholder perceptions in media, suggesting market performance increases when firms develop and maintain good relationships with stakeholders.

Also using data on mining firms, Dorobantu and Odziemkowska (2017) demonstrate the contingencies of stakeholder investment financial returns in their study of mining firms signing community benefit agreements with community stakeholders around mines. They examine the effects of these agreements on shareholder stakeholders through changes in firm market value associated with the signing of benefit agreements. Shareholders appear to reward firms that sign agreements with local communities more when those communities have stronger property rights claims and histories of activism against mining firms. Dorobantu and Odziemkowska infer shareholders react more positively because the firm signing the agreement reduces the likelihood of the community mobilizing against the firm in the future. These results demonstrate how competitive context, firm and stakeholder characteristics, and stakeholder group preferences and histories interact to connect responsibility actions to firm performance.

Translating responsibility into performance appears to require firms to have deep knowledge of stakeholders and of complementarities with existing firm resources. Responsibility after a crisis can affect performance in the food and beverage and the pharmaceuticals industries, but it does so differently depending on interactions between stakeholders and characteristics of the pre-crisis competitive environment (O'Higgins & Thevissen, 2017).

***Stakeholder Influence Capacity***

Stakeholder influence capacity offers a theoretical mechanism that can serve as the focal point for integrating social responsibility, stakeholder, and resource-based theories into an improved theory of social responsibility's effect on firm performance outcomes. Some firms have high capacity, others low capacity, and others no capacity. Stakeholder influence capacity is a learned capability to influence stakeholders to behave in ways that increase firm performance, one at which firms can become more and less adept over time. Firms develop their stakeholder influence capacity, becoming more efficient at increasing performance through responsibility. They can also lose the capability.

Only one study has tested the theory. Barnett and Salomon (2012) found a U-shaped relationship between responsibility and performance and inferred learning effects in stakeholder influence capacity drove the relationship. Firms with low capacity struggle to translate responsibility into performance but can improve through learning effects if they continue engaging in responsibility actions over time. Eventually, firms build their capability enough to be able to use responsibility to influence stakeholders in ways that increase firm performance.

However, Barnett and Salomon (2012) did not examine whether stakeholder influence capacity mediates the responsibility performance relationship. Instead, they examined stakeholder influence capacity as a *moderator*. "Mediators are those variables that explain the underlying processes and mechanisms of why [responsibility] initiatives are related to an outcome, while moderators describe the conditions under which [responsibility] initiatives influence outcomes" (Aguinis & Glavas, 2012, p. 934). Mediators are mechanisms. Stakeholder influence capacity was developed as a mechanism explaining the underlying process by which responsibility affects performance (Barnett, 2007). Examining stakeholder influence capacity as a moderator does not fully test the mechanism hypothesis.

Barnett and Salomon (2012) acknowledge the difference between mediation and moderation. Recognizing limitations in their data, they argue the relationship between responsibility, stakeholder influence capacity, and performance "is likely more complex than the available data allowed us to model herein, of course, and so we hope that this study will encourage future work that specifically examines how [stakeholder influence capacity] *mediates* the relationship between social and financial performance" (Barnett & Salomon, 2012, p. 1318 emphasis added).

Building on resource-based theory and instrumental stakeholder theory, stakeholder influence capacity theory provides a mechanism that explains how responsibility actions affect firm performance (Barnett, 2007). Stakeholder influence capacity links resource-based theory's emphasis on firm-specific capabilities with instrumental stakeholder theory's focus on the performance outcomes of how firms manage stakeholder relationships.

From resource-based theory, a firm's ability to influence stakeholders is a firm-level capability, and variation across firms in this capability could explain differences in

performance outcomes. It is a firm-level capability that cannot be purchased from factor markets. Instead, it must be developed over time through learning and experience (Dierickx & Cool, 1989), similar to absorptive capacity (Cohen & Levinthal, 1990). Inability to purchase the capacity combined with long development cycles creates variation across firms in stakeholder influence capacity. Because a firm's stakeholder influence capacity enables it to transform responsibility actions into financial performance, two firms that take the same responsibility action but differ on their stakeholder influence capacity will experience different financial performance outcomes.

From instrumental stakeholder theory, a firm's ability to influence its stakeholders is a means by which the firm manages the quality and content of stakeholder relationships, which then affects performance. Combining these theoretical expectations, stakeholder influence capacity is the firm's ability to use responsibility actions to profitably improve relationships with stakeholders, and "the benefits to firms from social responsibility come through improved stakeholder relationships" (Barnett & Salomon, 2012, p. 1306).

The idea that social responsibility is a way firms address stakeholder concerns about economic, social, and environmental impacts is not new. McGuire, Sundgren, and Schneeweis (1988, p. 865) claim responsibility affects firm financial performance "through its effects on stakeholders," and the challenge of being a socially responsible firm has been conceptualized as the problem of understanding and following the rules for acceptable behavior defined by the firm's various stakeholders (Chandler, 2015).

Despite reference to stakeholders in responsibility studies, the responsibility-stakeholder connection did not become a central pillar of either the stakeholder or social responsibility literatures. The stakeholder literature tends to focus on the quality and depth of

firms' relationships with stakeholders, implicitly assuming better relationships mean higher financial performance. The CSR literature tends to evaluate associations between CSR performance measures and financial performance measures, implicitly assuming a direct connection between the two.

Studies examining the direct relationship between responsibility and performance would not be able to capture differences in underlying stakeholder influence capacity. If one firm has low capacity and the other high, the firm with low capacity might experience a negative financial outcome but the firm with the high capacity might experience a positive financial outcome. Examining only the direct relationship between the responsibility action and financial outcome might in this case suggest no relationship, when in fact there is an underlying relationship dependent on the stakeholder influence capacity capability mechanism.

Methodological work in mediation analysis debates whether to hypothesize full or partial mediation in the absence of theoretical guidance (James, Mulaik, & Brett, 2006). A crucial difference in mediation is whether the mediation is full or partial. Full mediation is more parsimonious—requiring fewer assumptions—but less realistic given the complex relationships in organizations. If SIC fully mediates the responsibility-performance relationship, responsibility has no effect on performance except through its effect on SIC, which then affects performance. If SIC partially mediates the relationship, responsibility affects performance through affecting SIC, but responsibility also has an effect on performance independent of its effect through SIC. Hypothesis derivation should address whether mediation is full or partial (James et al., 2006). Assuming full mediation is a stronger assumption than partial, but testing partial often requires stronger assumptions than testing full mediation (DeVaro, 2011).

Stakeholder influence capacity theory only predicts that SIC mediates the effect of CSR on performance. It does not provide guidance on whether mediation is full or partial. I assume CSR could affect performance independent of a firm's SIC. This assumption leads to a hypothesis of partial mediation because it leaves open the possibility that CSR affects performance independent of CSR's effect on SIC. However, I also test for full mediation.

*Hypothesis 2: Stakeholder influence capacity partially mediates the effect of corporate social responsibility on performance.*

**Data and Sample**

The analysis sample combines data from three datasets: CSRHub, MSCI KLD ESG STATS, and Compustat North America. I merge these datasets on firm-year. CSRHub is originally firm-month. I aggregate the CSRHub data to firm-year level using the rating of the last month of a year. This procedure is described in the Data and Sample section of Chapter 2. All other datasets are firm-year level. MSCI KLD ESG STATS data only exist for companies based in the United States. Chapter 2 uses Compustat data from both North American and global firms, but merging those data with KLD data drops all firms located outside the United States. Due to KLD's restricted coverage, the combined dataset used in this chapter is limited to firms based in the United States.

Table 23 shows descriptive statistics for variables used in the empirical tests. Table 24 shows the correlation matrix.

Table 23: Descriptive statistics.

| Variable | Obs | Mean | Std.Dev. | Min | Max |
|---|---|---|---|---|---|
| Revenue ($millions) | 15585 | 6167.85 | 21151.72 | -1965 | 483521 |
| Inverse hyperbolic sine revenue | 15585 | 7.85 | 1.85 | -8.28 | 13.78 |
| Overall rating | 12880 | 52.07 | 6.61 | 21.92 | 78.88 |
| Net KLD | 15588 | 0.18 | 2.52 | -12 | 19 |
| Net KLD strengths | 15588 | 1.61 | 2.53 | 0 | 22 |
| Net KLD concerns | 15588 | -1.43 | 1.81 | -18 | 0 |
| Long-term debt ($millions) | 15525 | 2874.27 | 14916.29 | 0 | 459022 |
| Assets ($millions) | 15587 | 16464.5 | 96112.66 | .8 | 2570000 |
| Age (years) | 15506 | 26.51 | 17.69 | 1 | 67 |
| Employees (1000s) | 15508 | 17.24 | 67.51 | 0 | 2300 |
| Advertising ($millions) | 6835 | 167.73 | 577.26 | 0 | 9729 |
| R&D ($millions) | 8473 | 228.45 | 932.01 | 0 | 16085 |
| Year | 15588 | 2012.62 | 2.37 | 2008 | 2016 |

Table 24: Correlation matrix.

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Revenue ($millions) | 1.00 | | | | | | | | | | | | |
| (2) Inverse hyperbolic sine revenue | 0.49* | 1.00 | | | | | | | | | | | |
| (3) Overall rating | 0.11* | 0.08* | 1.00 | | | | | | | | | | |
| (4) Net KLD | 0.13* | 0.26* | 0.30* | 1.00 | | | | | | | | | |
| (5) Net KLD strengths | 0.44* | 0.51* | 0.27* | 0.74* | 1.00 | | | | | | | | |
| (6) Net KLD concerns | -0.43* | -0.35* | 0.02 | 0.35* | -0.37* | 1.00 | | | | | | | |
| (7) Long-term debt ($millions) | 0.40* | 0.29* | 0.06* | 0.14* | 0.33* | -0.26* | 1.00 | | | | | | |
| (8) Assets ($millions) | 0.39* | 0.27* | 0.06* | 0.16* | 0.31* | -0.21* | 0.80* | 1.00 | | | | | |
| (9) Age (years) | 0.24* | 0.42* | 0.10* | 0.18* | 0.35* | -0.24* | 0.15* | 0.12* | 1.00 | | | | |
| (10) Employees (1000s) | 0.71* | 0.36* | 0.09* | 0.10* | 0.34* | -0.33* | 0.27* | 0.24* | 0.19* | 1.00 | | | |
| (11) Advertising ($millions) | 0.58* | 0.50* | 0.19* | 0.30* | 0.51* | -0.37* | 0.43* | 0.30* | 0.29* | 0.38* | 1.00 | | |
| (12) R&D ($millions) | 0.36* | 0.33* | 0.21* | 0.36* | 0.52* | -0.25* | 0.37* | 0.53* | 0.21* | 0.18* | 0.55* | 1.00 | |
| (13) Year | -0.02* | -0.08* | 0.16* | 0.25* | -0.09* | 0.47* | -0.01 | -0.00 | -0.01 | -0.02* | -0.01 | 0.00 | 1.00 |

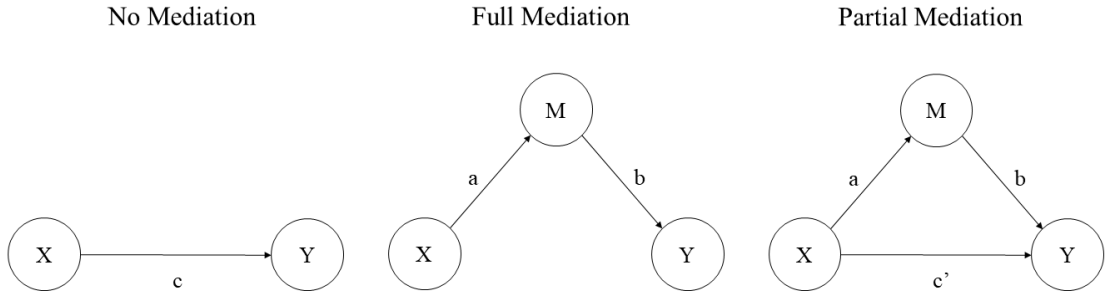
*p<0.05

## Empirical Approach

I use mediation analysis to test whether stakeholder influence capacity mediates the effect of responsibility on performance (Agler & De Boeck, 2017; Aguinis et al., 2017; Baron & Kenny, 1986; DeVaro, 2011; James et al., 2006; Kenny, 2008; Lee, Herbert, & McAuley, 2019; Shaver, 2005; Vancouver & Carlson, 2015). Several approaches to mediation are available. The most common approach in management research is the Baron and Kenny causal-steps procedure (Aguinis et al., 2017). I use that approach in this chapter.

Figure 7 graphically displays theoretical models of both a full and partial mediation relationship (Aguinis et al., 2017; Baron & Kenny, 1986; Shaver, 2005). If *X* = responsibility, *M* = stakeholder influence capacity, and *Y* = financial performance, Figure 7 shows either full or partial mediation of the responsibility-performance relationship by stakeholder influence capacity. Relationship *a* is the effect of responsibility on stakeholder influence capacity. Relationship *b* is the effect of stakeholder influence capacity on performance. Relationship *c'* only exists in partial mediation and is the effect of responsibility on performance independent of stakeholder influence capacity's effect on performance.

Figure 7: Mediation models.




Note: In each model, X is a cause, Y is an outcome, and M is a mediator. In full mediation, X does not affect Y (c' = 0). In partial mediation, X affects Y (c' ≠ 0) independent of the effect of X on Y through mediator M.

The Baron and Kenny mediation approach uses a three-step sequence of regression models to test relationships *a*, *b*, *c*, and *c'* from Figure 7 (Baron & Kenny, 1986; Kenny, 2008; Shaver, 2005). Step 1 estimates the direct relationship *c* between the cause *X* and outcome *Y* (Equation 4:

$$Y = \alpha_0 + cX + \varepsilon_0 \quad (4)$$

Step 2 estimates the main relationship *a* between the cause *X* and mediator *M* (Equation 5):

$$M = \alpha_1 + aX + \varepsilon_1 \quad (5)$$

Step 3 estimates the relationship between cause *X* and outcome *Y* while controlling for the mediator *M* (Equation 6):

$$Y = \alpha_2 + bM + c'X + \varepsilon_2 \quad (6)$$

Mediation is tested by comparing the estimates of *a*, *b*, and *c'*. If *a*, *b*, and *c'* test statistically different from zero, *M* partially mediates the effect of *X* on *Y*. If *a* and *b* test different from zero but *c*' does not, *M* fully mediates the effect of *X* on *Y*. Earlier applications of the Baron and Kenny test also required *c* to test different from zero, but later development of the method questioned this requirement because if *c'* and *b* are different from zero with opposite signs, *c* could not test different from zero when mediation exists (see Aguinis et al., 2017 for a review).

Testing mediation with the Baron and Kenny model assumes no measurement error in variables, causal relationships between variables are correctly specified, and no interaction effect between the cause *X* and mediator *M* (MacKinnon, Lockwood, & Williams, 2004). A literature has developed around exploring and refining the Baron and Kenny method. Shaver (2005) argues it is possible and even probable that the error terms in Equations 2 and 3 are correlated rather than independent as Baron and Kenny assume. Correlated error terms could bias estimation of *c'* and *b* in Equation 3, even under asymptotic assumptions. Biased estimates

decrease the validity of hypothesis tests using those estimates. Two-stage least squares estimation within the Baron and Kenny sequence or an alternative structural equation modeling approach can reduce the validity threat posed by correlated error terms. Two-stage least squares introduces an instrumental variable for *X* into Equation 2. Predicted values of *M* from the instrumented estimation can then be used in Equation 3, eliminating correlation between the error terms in Equations 2 and 3 and producing unbiased coefficient estimates in Equation 3. Structural equation modeling explicitly models the suspected correlation between error terms.

James, Mulaik, and Brett (2006) compare the Baron and Kenny approach to the structural equation modeling approach to mediation analysis contributed by James and Brett (1984). They argue the two approaches are similar for testing partial mediation. The approaches differ, however, for testing full mediation. They recommend researchers begin by determining whether they are testing complete or partial mediation, ideally by deriving hypotheses from theory and prior research. When theory and prior research are incapable of producing mediation hypotheses, James et al. recommend testing for complete mediation because the complete mediation requires fewer assumptions, i.e., it is more parsimonious than partial mediation. After determining mediation type, the researcher should use the structural equation modeling technique. However, James and Brett have a conflict of interest in this recommendation because they are recommending the use of methods that might generate citations to their 1984 article on the structural equation modeling approach to mediation analysis (James & Brett, 1984).

DeVaro (2011) compares the Baron and Kenny approach to the structural equation modeling approach, reiterates the problems identified in each approach and solutions to those

problems, and laments that known solutions have low adoption rates in published mediation analyses. DeVaro then sets out a program of *mediation remediation* based on recommendations to improve the use of mediation analysis in the field of strategic organization. The central recommendation mirrors Shaver's (2005) call to incorporate instrument-based methods into mediation analysis. Shaver recommends two-stage least squares regression; DeVaro seconds that recommendation and adds three-stage least squares estimation.

DeVaro reiterates James et al.'s (2006) recommendation to begin by using theory to determine if mediation is full or partial. DeVaro asserts that "organizational theory will rarely offer a compelling justification *a priori* [i.e., prior to analyzing data] for complete mediation" (DeVaro, 2011, p. 339), in part because the researcher might not be able to think of all possible indirect effects of *X* on *Y* that would produce partial mediation. Note, though, that it is theory's job, not the researcher, to incorporate such explanations of a phenomenon. If the researcher's goal is to test a theory, research design and analysis should remain within the world specified by the theory. If the theory repeatedly fails to explain the phenomenon, then additional theory building should examine whether there are missing indirect relationships that, if incorporated into the theory, would improve the theory's explanatory power. DeVaro concludes by recommending instrumental variable approaches to mediation analysis.

Aguinis, Edwards, and Bradley (2017) review methodological problems in articles using mediation or moderation analysis published between 2005 to 2014 in *Strategic Management Journal* and *Organization Science*. They describe six problems in papers using the Baron and Kenny approach:

1. Requiring *c* test different from zero in Step 1 to continue with the mediation analysis.
2. Ignoring the magnitude of the indirect mediation effect estimated as the product of the *a* and *b* coefficients.
3. Requiring *c′* test different from zero in Step 3.
4. Requiring *c′* test different from zero when testing complete mediation.
5. Testing mediation with cross-sectional data.
6. Ignoring measurement error.

Aguinis et al. recommend solutions to each problem. First, the estimate of *c* does not need to test different from zero for mediation to exist. Assuming *c* must test different from zero to continue mediation analysis leads researchers to abandon tests that would reveal partial mediation in which the direct effect and indirect effect have opposite effects. In such mediation, the main effect in Step 1 could be canceled out, resulting in the coefficient not testing different from zero. But that would not mean there is not mediation occurring in the model.

Second, testing the indirect mediation effect requires testing whether the product of coefficients *a* and *b* is different from zero. The Sobel test has been used for this test, but it assumes the distribution of the *a*b* product is normal. Aguinis et al. recommend dropping that assumption by using a nonparametric testing process.

Third, while original formulation of the Baron and Kenny procedure describes testing whether *c′=0*, subsequent work suggests testing *c′* is not required. Requiring a test of *c′*, and for that test to be significantly different from zero to proceed with analysis, leads researchers to abandon mediation analysis that would show that *M* mediates the effect of *X* on *Y* in models in which *X* has no direct effect on *Y* after mediation, i.e., full mediation models. Rather than

using the statistical significance of the test of *c′* to determine the presence of mediation, researchers should use tests of the *b*, the coefficient assessing mediation.

Fourth, including a test of *c′* when testing theory about complete mediation is a mismatch of theory and empirical testing strategy. If the theory being tested is one of complete mediation, *c′X* should not be included in the regression model. If *c′X* is included, the theory of the regression model is that *X* has a direct effect on *Y* when controlling for *M*, which is a partial mediation model.

Fifth, Aguinis et al. argue that mediation models imply the passage of time. Using cross-sectional data incapable of capturing time effects cannot test theoretical models the imply time passage. Instead, longitudinal data should be used that capture time effects.

Sixth, the problem of measurement error has been known for some time in mediation analysis (Shaver, 2005) but receives little attention in published studies. Measurement error can bias coefficient estimates, reducing the validity of hypothesis tests and inferences made from those tests. Researchers should attempt to create measures with less measurement error. When that is not possible, Aguinis et al. recommend multiple-item measures be analyzed with structural equation modeling.

Lee, Herbert, and McAuley (2019) show how mediation analysis can be used to partition effects into indirect and direct effects. They note the limitations of statistics-based mediation analysis like the Baron and Kenny and structural equation modeling approaches to accurately estimate mediation in the presence of non-linear relationships, including when there is an interaction effect between the treatment and the outcome. If responsibility and performance have interactive effects, the Baron and Kenny approach used in this chapter might not accurately estimate mediation effects. Lee et al. recommend a causal mediation analysis

approach rather than statistical analysis. However, they make this recommendation for medical research fields where experimental control of treatment assignment is more feasible than in organizational research.

The literature on mediation analysis suggests many questions of interest to organization and strategy researchers likely involve mediation effects, but the application of mediation analysis remains underdeveloped in published studies. Problems remain with the practice of mediation analysis despite known solutions to those problems. Implementation of solutions is slowed by the difficulty of finding instrumental variables and low-error measures. Methodological training also poses a problem: many researchers are trained in regression analysis but not structural equation modeling. The analysis in this chapter implements recommended solutions when possible.

***Dependent Variable***

In Equations 4 and 6, the dependent variable *Y* is revenue, measured using firm revenue reported in annual and other reports and collected by Compustat into Compustat North America and Global datasets accessed through the Wharton Research Data Services portal. The Chapter 2 dependent variable section further describes the variable.

***Independent Variable***

The independent variable *X* is corporate social responsibility, measured using the overall CSRHub rating data. This variable is described in the independent variable section of Chapter 2.

***Mediating Variable***

The mediating variable is stakeholder influence capacity, represented as *M* in Equations 5 and 6. SIC is measured as a firm's net corporate social responsibility rating in the MSCI KLD

STATS ESG dataset (KLD) maintained by MSCI. MSCI employs analysts who update and create new KLD ratings each year. The resulting KLD dataset "combines objective steps firms have (or have not) taken to improve (or not improve) their social performance with subjective assessments reached by KLD's analysts that are often primed or constructed by stakeholder activity" (Werner, 2015, pp. 1998–1999).

KLD ratings measure stakeholder influence capacity because the ratings incorporate both firms' responsibility actions and stakeholders' perceptions of those actions. KLD data also contain separate assessments of social responsibility strengths and concerns, capturing two dimensions of firms' ability to influence stakeholder attitudes toward the firm with responsibility actions. Distinguishing positive and negative influences from responsibility actions is an important methodological advance in the measurement of corporate social action (Mattingly & Berman, 2006). Strengths proxy for high stakeholder influence capacity because the firm's objective actions have been perceived positively by stakeholders. When stakeholders react positively to a firm's actions, it implies the firm has the capability to use responsibility actions to generate positive responses from stakeholders. Such firms can use social responsibility actions to influence stakeholders to respond in ways benefiting the firm.

KLD concerns proxy for low stakeholder influence capacity. The more concerns a firm has across responsibility dimensions, the weaker the firm's stakeholder influence capacity. If a firm's objective social responsibility actions generate negative stakeholder response, the firm does not have the capability to translate responsibility actions into stakeholder actions beneficial to the firm.

To support using KLD to measure stakeholder influence capacity, I describe how the data are created and structured, then explain the justification and assumptions I use to measure

stakeholder influence capacity with KLD data. The MSCI ESG KLD dataset is common in responsibility performance studies but my use of the data to measure stakeholder influence capacity departs from the usual use of the data to measure overall responsibility performance. However, Barnett and Salomon (2012) use KLD data to measure both firm's responsibility performance and stakeholder influence capacity.

The logic of the measure rests on the way KLD data are created. For each responsibility dimension, analysts evaluate the firm's responsibility performance on that dimension for the year of the data. I argue analysts proxy for stakeholders when evaluating firms on each dimension. Just as stakeholder groups view firms' responsibility actions and evaluate whether to change behavior in response to firm actions, KLD analysts view firms' responsibility actions and decide how to score each firm on that dimension. Firms with high stakeholder influence capacity should be able to take responsibility actions that influence KLD analysts to rate the firm in a way that would increase the firm's performance, presumably by increasing the number of strengths the firm has across KLD dimensions. Firms with low stakeholder influence capacity do not have the capability to take responsibility actions that influence stakeholders to respond in ways that increase their performance. KLD analysts will be more likely to rate these firms as having concerns on responsibility dimensions. Because KLD data are created through the perceptions of external observers, and the stakeholder influence capacity mechanism relies on how external stakeholders respond to firm responsibility actions, I use KLD data as a proxy for stakeholder influence capacity.

KLD data consist of firm-year ratings on more than 100 responsibility dimensions. The ratings are published near the end of each calendar year. KLD rates publicly traded firms, and the universe of rated firms changes over time: from 1991 – 2000, firms listed on the S&P 500;

from 2001 – 2002, firms listed on the Russell 1000; and from 2003 onward firms listed on the Russell 3000. The Russell 3000 Index tracks the 3,000 largest U.S.-traded stocks by market capitalization and includes both the Russell 1000 and the S&P 500. KLD changed its methodology for calculating ratings in 1998 by increasing the number of dimensions in which firms are rated (Barnett & Salomon, 2012). Studies using a sum of strengths and concerns must adjust for this addition of dimensions. One adjustment is to drop observations prior to 1998 (e.g., Barnett & Salomon, 2012).

For each firm in each year, MSCI ESG Research creates an initial rating by reviewing responsibility information from academic, government, and nongovernmental datasets, company disclosures (e.g., 10-K reports, sustainability reports, proxy reports), media reports, and other sources. After MSCI creates an initial rating, companies are invited to participate in verifying the rating, which increases measurement error and possible confounding because some firms might be able to systematically alter their ratings while others cannot. If a firm's ability to alter its ratings is caused by something that also affects performance, regressions of performance on KLD ratings that do not control for that ability would produce biased estimates.

KLD rates firms on twelve responsibility dimensions: community, diversity, employment, environment, governance, human rights, products, alcohol involvement, gambling involvement, military involvement, nuclear involvement, and tobacco involvement. The first seven dimensions include both strength and concern ratings. Dimensions 8-12 address controversial business involvement and only include concern ratings. Each dimension contains multiple sub-dimensions. Table 25 describes the sub-dimensions in the Environment dimension.

Each sub-dimension is an indicator variable for whether the firm in that year does or does not have the strength or concern. Each sub-dimension is scored either a 1 (presence) or a 0 (absence) of a strength or concern. Because the strength and concern sub-dimensions are not symmetric—i.e., a strength is not simply the opposite of a concern—a firm can have both strengths and weaknesses on the same dimension.

Table 25: Sub-dimension strengths and concerns of the KLD Environment dimension.

| **Strengths** | **Concerns** |
|---|---|
| Beneficial Products and Services | Hazardous Waste |
| Pollution Prevention | Regulatory Problems |
| Recycling | Ozone Depleting Chemicals |
| Clean Energy | Substantial Emissions |
| Property, Plant, Equipment | Agriculture Chemicals |
| Management Systems | Climate Change (from 1999) |
| Natural Resource Use: Water Stress | Negative Impact of Products & Services |
| Natural Resource Use: Biodiversity and Land Use | Land Use & Biodiversity |
| Natural Resource Use: Raw Material Sourcing | Non-Carbon Releases |
| Natural Resource Use: Financing Environmental Impact | Supply Chain Management |
| Environmental Opportunities: Green Buildings | Water Management |
| Environmental Opportunities in Renewable Energy | Environment Other Concerns |
| Waste Management: Electronic Waste | |
| Climate Change: Energy Efficiency | |
| Climate Change: Product Carbon Footprint | |
| Climate Change: Insuring Climate Change Risk | |
| Environment Other Strengths | |

The typical use of KLD data in measuring responsibility performance is to sum the strengths and concerns across all sub-dimensions for each firm-year and subtract the sum of concerns from the sum of strengths. This produces a "net KLD score" measuring a firm's overall responsibility performance in that year. However, use of the net KLD score approach has been criticized for conflating strengths and concerns into a single measure, ignoring that positive and negative responsibility actions are different theoretical constructs expected to influence stakeholders in different ways (Mattingly, 2017; Mattingly & Berman, 2006).

Table 26 reports descriptive statistics for each strength and concern on each dimension for the entire KLD dataset from 1991 – 2015.

Table 26: Descriptive statistics for KLD data 1991-2015. Both strengths and concerns are sums so values are always positive.

| Dimension | Type | Sub-dimensions | Obs. | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|---|---|---|
| Governance | Concern | 10 | 50,761 | 0.30 | 0.53 | 0 | 4 |
| | Strength | 8 | 41,804 | 0.16 | 0.39 | 0 | 3 |
| Community | Concern | 4 | 50,758 | 0.06 | 0.26 | 0 | 3 |
| | Strength | 8 | 42,890 | 0.17 | 0.50 | 0 | 5 |
| Diversity | Concern | 5 | 50,762 | 0.40 | 0.61 | 0 | 3 |
| | Strength | 9 | 42,856 | 0.50 | 0.96 | 0 | 7 |
| Employees | Concern | 7 | 50,761 | 0.28 | 0.56 | 0 | 5 |
| | Strength | 13 | 50,280 | 0.38 | 0.83 | 0 | 8 |
| Environment | Concern | 12 | 50,761 | 0.19 | 0.61 | 0 | 6 |
| | Strength | 17 | 50,659 | 0.31 | 0.76 | 0 | 6 |
| Human Rights | Concern | 10 | 50,760 | 0.05 | 0.23 | 0 | 3 |
| | Strength | 4 | 37,474 | 0.05 | 0.26 | 0 | 2 |
| Product | Concern | 6 | 50,761 | 0.19 | 0.52 | 0 | 4 |
| | Strength | 12 | 45,455 | 0.12 | 0.34 | 0 | 3 |
| Tobacco | Concern | 2 | 50,762 | 0.01 | 0.11 | 0 | 1 |
| Military | Concern | 4 | 50,762 | 0.05 | 0.21 | 0 | 2 |
| Gambling | Concern | 2 | 50,762 | 0.01 | 0.12 | 0 | 1 |
| Alcohol | Concern | 2 | 50,762 | 0.02 | 0.14 | 0 | 1 |
| Nuclear | Concern | 4 | 50,762 | 0.02 | 0.15 | 0 | 2 |

### *Control Variables*

I build on the model in the only other empirical test of SIC and control for total assets, long-term debt, firm age, firm size, advertising spending, and research and development spending

(Barnett & Salomon, 2012). Control variables are described in the Chapter 2 Control Variables section.

Controls for research and development and advertising spending require elaboration. McWilliams and Siegel (2000) argue responsibility performance models are misspecified if they omit research and development, so I include it as a control variable in some models. However, these variables are missing for many observations in Compustat North America data. I estimate models assuming missing values of research and development and advertising spending in North American data are equal to zero, an assumption made in prior research on stakeholder influence capacity and the responsibility-performance relationship (e.g., Barnett & Salomon, 2012).

**Results**

Hypothesis 2 predicts stakeholder influence capacity partially mediates the effect of CSR on performance. Table 27 summarizes the results of testing this hypothesis. Tests using an unadjusted performance measure reject Hypothesis 2. Tests using an adjusted performance measure correcting for the influence of outliers support Hypothesis 2. Three tests using the adjusted performance measure indicate full rather than partial mediation. The summary results suggest stakeholder influence capacity does moderate the effect of CSR on performance, but that the moderation effect is detectable only when controlling for the influence of outlier firms on the performance measure. Prior studies that do not control for the effects of performance outliers might have missed these mediation effects.

The Baron and Kenny approach tests mediation by comparing the coefficients in Equations 4, 5, and 6 on page 95. Mediation exists if *a* and *b* test different from zero. The mediation is full if *c'* does not test different from zero and partial if *c'* tests different from zero.

The tests utilize several estimation approaches and model assumptions, including two different specifications to explore temporal dynamics. Results in Panel A are from a specification in which all variables are measured in the same year. Panel B results are from a specification assuming a 1-year lag between each mediation step.

Table 27 compares coefficient estimates from a series of model specifications described by each column in each table in the Appendix. The "full" model in each estimation includes all variables. However, there are two full models in each table that differ by the assumptions each model makes about missing values of the advertising and research and development variables. Column 8 of each table reports the full model without assuming missing values of advertising and research and development are equal to 0. Column 9 of each table reports the full model assuming missing values are 0. One of the few other empirical tests of stakeholder influence capacity also makes this assumption (Barnett & Salomon, 2012). Compared to Model 9 with missing values assumed equal to 0, Model 8 without assumptions is more parsimonious but less statistically powerful. Model 9 has greater statistical power due to more observations, but assuming missing values are 0 is a strong assumption because some missing values occur when firms do not disclose advertising or research and development costs. Such firms do spend on these activities but appear as missing values in Compustat data created from corporate disclosures.

Table 27: Summary of mediation test results using the Baron and Kenny mediation analysis method.

| Model | Assume missing R&D & advertising = 0 | *a* | *Std. error* | *b* | *Std. error* | *c'* | *Std. error* | Mediation |
|---|---|---|---|---|---|---|---|---|
| **PANEL A: Same year** | | ***SIC=a(CSR)*** | | ***Rev=b(SIC)+c'(CSR)*** | | | | |
| Pooled | No | 0.1613*** | (0.0169) | -190.7880 | (184.6827) | -27.1075 | (34.4387) | No |
| Pooled | Yes | 0.1029*** | (0.0073) | -425.3357 | (246.4481) | 46.1960 | (39.2335) | No |
| Pooled IHS | No | 0.1613*** | (0.0169) | 0.1056*** | (0.0121) | -0.0131* | (0.0054) | Partial |
| Pooled IHS | Yes | 0.1029*** | (0.0073) | 0.1117*** | (0.0100) | -0.0095** | (0.0034) | Partial |
| Fixed effects | No | 0.0590*** | (0.0101) | 84.6574 | (43.9918) | -42.3308 | (25.4235) | No |
| Fixed effects | Yes | 0.0420*** | (0.0047) | -86.1643 | (61.4216) | -8.2062 | (12.5040) | No |
| Fixed effects IHS | No | 0.0590*** | (0.0101) | 0.0112*** | (0.0026) | -0.0013 | (0.0014) | Full |
| Fixed effects IHS | Yes | 0.0420*** | (0.0047) | 0.0033 | (0.0029) | -0.0012 | (0.0011) | No |
| **PANEL B: Time dynamics** | | $SIC_t=a(CSR_{t-1})$ | | $Rev_{t+1}=b(SIC_t)+c'(CSR_{t-1})$ | | | | |
| Pooled | No | 0.1365*** | (0.0166) | -59.1698 | (203.4813) | -11.0430 | (37.6858) | No |
| Pooled | Yes | 0.0835*** | (0.0074) | -347.9597 | (283.7297) | 66.1406 | (49.7025) | No |
| Pooled IHS | No | 0.1365*** | (0.0166) | 0.0954*** | (0.0117) | -0.0086 | (0.0057) | Full |
| Pooled IHS | Yes | 0.0835*** | (0.0074) | 0.0972*** | (0.0100) | -0.0070* | (0.0034) | Partial |
| Fixed effects | No | 0.0363** | (0.0120) | -72.6073 | (160.1584) | -18.3234 | (29.1385) | No |
| Fixed effects | Yes | 0.0243*** | (0.0053) | -71.8517 | (63.0057) | 33.0616 | (27.4861) | No |
| Fixed effects IHS | No | 0.0363** | (0.0120) | 0.0078* | (0.0032) | 0.0020 | (0.0013) | Full |
| Fixed effects IHS | Yes | 0.0243*** | (0.0053) | 0.0025 | (0.0020) | 0.0025** | (0.0008) | No |

Robust firm-clustered standard errors in parentheses.
*** p<0.001, ** p<0.01, * p<0.05
IHS: Inverse hyperbolic sine transformed dependent variable revenue to control for influence of outliers. Revenue is not the DV in estimation of *a*, so estimates *a* are not affected by transforming revenue.

Models using revenue as the dependent variable show no mediation effects. Models using the inverse hyperbolic sine transformation of revenue to control for outliers show a pattern of mediation effects across all models and specifications, except models that assume missing observations on research and development and advertising are equal to 0.

Pooled regression models assume all observations are independent after clustering errors by firm. Pooled regression models use both within-firm and between-firm variation to estimate coefficients. Coefficient estimates should be interpreted as the change in the dependent variable associated with a change in the independent variable. Pooled regression enables inference comparing firms to one another but suffers from possible omitted variable bias due to firm-specific confounds.

In Panel A of Table 27, the estimate of *b* is -190.7880 and not statistically different from zero. This implies that, after controlling for CSR, a change in SIC is not statistically associated with a change in revenue. The results of the same model using inverse hyperbolic sine (IHS) transformed revenue to control for extreme outliers on revenue suggest a different inference (Burbidge et al., 1988). In the IHS-transformed model without assumptions about advertising and R&D, the estimate of *b* is 0.1056 and statistically significant from zero at $p<0.001$. This implies that, after controlling for CSR, a 1-point increase in a firm's SIC causes revenue to increase by 10.56% on average. Because this is a pooled regression, the inference is across observations: an observation with 1 point higher SIC will have on average ~10% higher revenue than an observation with 1 point lower SIC. In the same model, the estimate of *c′* is -0.0131 and different from zero at $p<0.05$. This means that after controlling for SIC, observations with 1 point higher CSR will have on average 1.31% lower revenue than observations with 1 point lower CSR. The implication is that the direct effect of CSR on

revenue is negative, but the mediation effect of CSR working through SIC is positive, supporting the prediction of stakeholder influence capacity theory in this sample. These results hold in other IHS estimations, including in the Panel B alternative time dynamics specification.

The fixed effects regression models improve on pooled regression by controlling for firm-specific confounds, but only those that do not change over the time period of the panel. However, fixed effects regressions sacrifice pooled regression's ability to understand across observation relationships. Fixed effects regression models estimate within-firm associations only. Fixed effects coefficient estimates should be interpreted as the average change in a firm's dependent variable associated with a change in the independent variable. Because fixed effects estimates discard between-firm information, they do not enable inference comparing firms to one another.

In Panel A of Table 27, the fixed effects regressions with unadjusted revenue show no mediation. The IHS-adjusted revenue models show full mediation without advertising and research and development assumptions and no mediation with those assumptions. The estimate of *b* in the IHS-adjusted fixed effects regression without missing data assumptions is 0.0112, significantly different from 0 at $p<0.001$. The interpretation of this estimate is within-firm: the average increase in a firm's revenue from a 1-point increase in a firm's SIC is 1.12%. The estimate of *c'* is -0.0013 and not different from zero, implying that, within firms, SIC fully mediates the effect of CSR on performance. This pattern of results also appears in the Panel B alternative time dynamics specification.

What inferences can by made by comparing the pooled results to the fixed effects results? Both models show mediation with IHS-adjusted revenue but not with unadjusted revenue, suggesting outliers in the unadjusted data might have a large influence on estimation

and could potentially mask effects. The influence of outliers in this context is not surprising, given that unadjusted revenue is highly skewed.

Table 28: Descriptive statistics for unadjusted and inverse hyperbolic sine transformed revenue.

| Variables | Obs | Mean | Std.Dev. | Median | Min | Max | Skew |
|---|---|---|---|---|---|---|---|
| Revenue | 15585 | 6,167.85 | 21,151.72 | 1,238.27 | -1965 | 483,521 | 11.17 |
| IHS Revenue | 15585 | 7.85 | 1.85 | 7.81 | -8.28 | 13.78 | -.72 |

Note: Revenue in (unadjusted in $millions USD). IHS-transformed data are much less skewed, reducing the influence of outliers in the highly-skewed unadjusted data.

The main difference in results for IHS-adjusted models is whether mediation is partial or full. Three of four pooled regression models show partial mediation, and one pooled model shows full mediation. Two of four fixed effects regression models show full mediation, and zero show partial mediation. This implies the mediation process might work differently between firms rather than within firms. Distinguishing between between- and within-firm relationships has been neglected in strategy theory but needs more attention, especially as fixed effects regression models become the default estimation approach (Certo, Withers, & Semadeni, 2017).

Pooled regression models provide inferences that compare observatoins against one another. In those models, partial mediation across observations implies that CSR retains some direct effect on performance independent of its operation through the SIC mechanism. The fixed effects models showing full mediation imply that, within individual firms, CSR has no direct effect on performance and only affects performance through the SIC mechanism.

These differences in the mediation relationship depending on whether the relationship occurs across observations or instead within individual firms needs further research to

understand why CSR might have a direct effect on performance when comparing a firm against rivals but not when comparing the firm against its own past performance.

**Discussion and Limitations**

This chapter empirically tested the stakeholder influence capacity theory hypothesis that stakeholder influence capacity is a mechanism mediating the relationship between CSR and firm performance. It found evidence supporting that hypothesis in regression analyses measuring performance as revenue, but only in models in which the revenue measure was transformed to control for the influence of outlier firms on revenue.

The empirical tests in this chapter extend our understanding of stakeholder influence capacity through the first empirical test of SIC theory using separate measures of CSR and SIC. Barnett and Salomon's (2012) tests used the same measure for both CSR and SIC: net KLD score. This chapter measures CSR with a novel dataset—CSRHub—that incorporates information from many individual CSR evaluations into an aggregate assessment of firms' responsibility performance. This chapter measures SIC with KLD data that is created by analysts assessing both firms' objective responsibility actions and also inferring how stakeholders respond to those actions. KLD better measures SIC than responsibility because it combines perceptions of responsibility actions with actions themselves.

The empirical tests in this chapter have a number of limitations. First, the measure of stakeholder influence capacity is both a strength and limitation. KLD has been a standard dataset in the responsibility  performance literature for decades (Mattingly, 2017; Perrault & Quinn, 2018). KLD data have been criticized for several weaknesses. One concern is that KLD ratings do not accurately measure the underlying construct of social responsibility (Mattingly, 2017; Mattingly & Berman, 2006; Perrault & Quinn, 2018). Another criticism is that ratings

capture reputation in addition to social responsibility, introducing the possibility that changes in ratings better measure reputation than other constructs like SIC (Chatterji et al., 2009). Another criticism is that ratings are simply poor measures of underlying constructs. For example, a comparison of several different ratings that all claim to measure responsibility found a lack of convergence across the ratings, which would be unexpected if the ratings all accurately measured the same underlying construct (Chatterji et al., 2016). However, if KLD captures SIC, comparing it to other measures of CSR is not going to produce convergence.

Another limitation of the KLD data is that MSCI gives firms the opportunity to review and comment on their ratings. This raises the possibility of measurement error in the ratings that could cause problems using the data. If better-managed firms are more likely to protest their ratings and get them changed, and if better management is correlated with better firm performance, then unobserved firm influence on KLD ratings confounds the relationship between KLD ratings and firm performance. In this chapter, this confounding would cause bias in the estimate of stakeholder influence capacity's effect on performance. I know of no studies assessing which firms can and cannot alter their ratings through MSCI's review process.

Another limitation relates to stakeholder motivations. The drivers of a stakeholder continuing its relationship with the firm might differ from drivers of stakeholder effort in the relationship (Bosse & Coughlan, 2016). This distinction implies stakeholder influence capacity might have separate dimensions for firms being able to keep stakeholder relationships active and also for being able to alter stakeholder effort level within continued relationships. Discriminating between these two channels of influence could be an important future research area for stakeholder influence capacity and responsibility performance research.

## CHAPTER 4: IS THE RESPONSIBILITY PERFORMANCE RELATIONSHIP STAKEHOLDER-SPECIFIC?

This chapter examines variation in stakeholder influence capacity across several stakeholder groups. Stakeholder influence capacity (SIC) theory assumes firms have a single SIC capability used for all stakeholders (Barnett, 2007; Barnett & Salomon, 2012). This chapter explores whether SIC differs across stakeholder groups rather than being a generic firm capability applicable to all stakeholders.

Instrumental stakeholder theory suggests firms' SIC differs depending on stakeholder groups because stakeholder groups have heterogeneous preferences for how they are treated by firms (Bridoux & Stoelhorst, 2014; Bundy et al., 2018). A firm's CSR action might satisfy some stakeholders' preferences but not others. Firms might not be able to influence all stakeholders the same way with the same responsibility action. An SIC capability for employees might enable a firm to translate employee-focused CSR actions into increased performance, but those same actions might not influence customer stakeholder behavior at all or could negatively influence customer stakeholder behavior. To explore whether SIC is stakeholder specific, I conduct mediation tests for SIC and CSR related to different stakeholder groups: customers, employees, and the environment.

### Theory and Hypotheses

Stakeholder influence capacity theory explains firm performance as a function of stakeholder relationship maintenance through actions to improve social welfare (Barnett, 2007). An action is corporate social responsibility if it satisfies two conditions. First, the action seeks to increase social welfare for some group. Second, the action manages a stakeholder relationship. The emphasis on improving social welfare enables theorizing about what aspects of social welfare

matter to which stakeholder groups, including the degree to which firms understand what their stakeholders value and whether firms have the ability to identify and execute responsibility actions that improve social welfare for specific stakeholders.

The effect of responsibility actions on stakeholder groups varies according to how stakeholders view firm actions. Stakeholder groups vary in the degree to which they prioritize self-interest and the perceived fairness of distributional outcomes (Bosse et al., 2009). Self-interest is bounded by norms of fairness. How firms distribute profit among stakeholders affects stakeholder perceptions of self-interest and fairness, which in turn affects stakeholder behavior toward the firm. When firms allocate more to stakeholders than stakeholders need to satisfy their needs and demands, stakeholders reciprocate by providing firms more information about their preferences than the firm demands (Harrison et al., 2010). Additional preference information enables firms to create more value for stakeholders. If the firm captures some of that additional value, performance increases. Responsibility as a form of over-provision for some stakeholders can influence those stakeholders to provide additional information to the firm, connecting responsibility to performance through stakeholder influence.

Building on these ideas, I test mediation for three stakeholder groups of customers, employees, and environmental stakeholders. Table 29 summarizes the hypotheses tested in this chapter.

Table 29: Summary of hypotheses.

| Hypothesis | Prediction |
|---|---|
| 3 | Customer-focused SIC partially mediates the effect of customer-focused CSR on performance. |
| 4 | Employee-focused SIC partially mediates the effect of employee-focused CSR on performance. |
| 5 | Environment-focused SIC partially mediates the effect of environment-focused CSR on performance. |

All three hypotheses predict partial rather than full mediation. In full mediation, CSR would have no direct effect on performance. In partial mediation, CSR would have some direct effect on performance even after controlling for CSR's effect on SIC. Partial mediation hypotheses leave open the possibility that CSR affects performance through other channels than through influencing stakeholders. The following hypothesis development sections discuss some of these alternative channels through which CSR might affect performance independent of stakeholder influence.

***Customers***

I consider revenue as the firm performance outcome. The most direct link between revenue performance and responsibility might be through customers. Customers create revenue by trading money for the firm's products and services. Theoretically, customers should change their purchasing behavior in response to responsibility actions by firms, and responsibility information provided by sources other than the firm should influence customer behavior more than information provided by the firm itself (Schuler & Cording, 2006). Information about CSR from CSRHub should influence customer behavior more than firms' own self-disclosed CSR information.

Flammer (2015) examines how responsibility affects performance through customers. Adopting a responsible shareholder proposal influences customer stakeholders who care about responsibility to increase their purchases from the firm. Flammer finds a positive association between revenue and proposal adoption, suggesting this form of CSR action works through the customer channel. Firms that barely adopt responsibility-related shareholder proposals have higher sales one year after adoption, compared to firms that barely reject such proposals. The

weakly positive effect persists even four years after proposal adoption. These theoretical expectations and empirical findings suggest the hypothesis:

> *Hypothesis 3: Customer-focused SIC partially mediates the effect of customer-focused CSR on performance.*

Hypothesis 3 predicts partial mediation that allows for a direct effect of CSR on performance independent of CSR's effect on SIC. Partial mediation occurs when customer-focused CSR affects performance independent of its effect on customer-focused SIC. For example, efforts within the firm to increase employee-focused CSR might reveal opportunities for process improvements that increase performance independent of customer reactions to CSR actions.

***Employees***

Employees respond to responsibility actions by employers and potential employers. A firm's culture of organizational citizenship is positively associated with higher employee commitment to the firm (Maignan, Ferrell, & Hult, 1999). Glavas and Kelley (2014) survey 827 employees in 18 North American food and agriculture firms to understand how employee perceptions moderate the relationship between firms' responsibility actions and employee commitment to the firm and employee job satisfaction. They examine employee perception of work meaningfulness, measured using the three items for the meaning scale from the Overall Job Satisfaction Questionnaire (Cammann, Fichman, Jenkins, & Kelsh, 1983). The three items ask whether the respondent's work is valuable to them, their job activities are personally meaningful to them, and the work they do is meaningful to them. Higher work meaningfulness positively moderates the responsibility-employee commitment relationship and the responsibility-job satisfaction relationship. They also examine perceived organizational

support, measured using six questions related to whether the respondent's employer values the respondent's contributions, cares about employee well-being, strongly considers goals and values of employees, is willing to help employees if they need a special favor, shows little concern for employees, or takes pride in accomplishments of employees. Perceived organizational support has no moderating effect on the responsibility-commitment relationship and positively moderates the responsibility-job satisfaction relationship.

In an experimental setting, undergraduate students rated fictitious firms as more attractive places to work when manipulated websites for those firms mentioned community or environment social responsibility, providing some evidence for a causal effect of responsibility information on a firm's attractiveness as an employer (D. A. Jones, Willness, & Madey, 2014). A similar pattern was found in observational data from job seekers at a job fair, but only for firms whose promotional materials mentioned community responsibility and not for environment responsibility. Suggested mechanisms for these relationships include anticipated pride working for the firm, organizational prestige, perceived values fit between employee and firm, and expected employee treatment. While these results suggest responsibility can influence job seeker stakeholders, they do not allow inference about the performance impacts of that influence. Future studies of whether employees who chose firms based on these criteria contribute more to the firm's value appropriation than employees who do not choose based on these criteria could generate inferences about whether responsibility affects performance through employee selection.

Jones, Willness, and Madey (2014) study how information about a firm's responsibility actions affects job seekers' evaluation of how attractive the firm is as an employer. They find undergraduate experimental subjects rate firms as more attractive employers when the firms

include community and environmental responsibility information on their websites. They extend these findings to a non-experimental context of a job fair and report undergraduate job seekers rate firms including community responsibility information in promotional material as more attractive, but inclusion of environmental responsibility information has no association with employer attractiveness. Authors infer from these results that the effect of responsibility on firm attractiveness to potential employees is more due to how potential employees expect to be treated if they join the firm's community than how the firm treats the environment.

Passage of responsible shareholder proposals is associated with increased labor productivity the following year, but the relationship disappears after one year, suggesting a possible short-term influence of responsibility on employee stakeholders (Flammer, 2015). This implies adopting CSR proposals affects employee and customer behavior, which then effects two types of firm performance, labor productivity and revenue.

When states increase unemployment benefits, firms tend to increase their employee-focused responsibility actions, suggesting firms attempt to use employee-focused responsibility actions to influence employee behavior in response to increased outside options (Flammer & Luo, 2017). In states adopting more generous unemployment benefits, firms increase their responsibility actions targeting their relationship with employees. When contextual changes reduce the costs of employees getting fired, firms respond by providing more benefits to employees through responsibility actions. This result supports the idea that responsibility can act through the management of stakeholder behavior to influence firm performance, in this case by preventing employees from shirking after incentive changes that reduce the costs of being fired. These findings assume changes in state unemployment benefits are unrelated to firms' influence on the political process, which might be an unreasonable

assumption given research on corporate influence on political processes (Mellahi, Frynas, Sun, & Siegel, 2016).

These findings suggest that employee-focused responsibility actions have the potential to alter employee behavior in ways that increase firm revenues, such as through improved labor productivity (Flammer, 2015), increasing competition among potential employees for employment in the firm (D. A. Jones et al., 2014), and preventing employees from leaving the firm when outside compensation and employment options increase (Flammer & Luo, 2017).

*Hypothesis 4: Employee-focused SIC partially mediates the effect of employee-focused CSR on performance.*

***Environmental stakeholders***

Whether responsibility increases revenue through environmental stakeholders is less straightforward than for customer and employee stakeholders. Environmental stakeholders include groups that prioritize firms' impacts on natural environmental systems. These stakeholders often seek to prevent firms from impacting the environment. Environmental responsibility targeting environmental stakeholder could affect revenue in several ways. first, firms demonstrating or committing to reduced or eliminated environmental impacts might influence some environmental stakeholders to increase their purchases, which would increase revenue. Second, environmental responsibility might reduce stakeholder pressure on firms to change their practices, but this stakeholder response has no clear connection to firm revenue and could even reduce revenue by eliminating news attention to firms. Third, environmental responsibility actions might be used as a marketing tactic by firms. This approach could increase revenue by attracting new customers, but it could also decrease revenue if the action

is perceived as greenwashing. It is also difficult to clearly differentiate the customer and environmental channels because of the potential impact of changes in environmental CSR on customer behavior.

Empirical evidence is also mixed. Some studies find a positive association between environment focused responsibility and performance (Jiao, 2010). Barnett and Salomon (2006) find that the use of investment screens focused on community relations increase financial performance. Flammer (2013) examines how share prices change in response to new information about firms' responsibility actions over three decades 1980-2009. Over time, market reactions to eco-friendly announcements start positive and decay to no reaction. Over the same period, markets do not react to eco-harmful announcements early on, and market reaction steadily intensifies toward declines in share price by the end of the period. These findings suggest investors care about environment-related responsibility actions, care in different ways about positive and negative actions, and that the effect of environment-related responsibility on investors has changed over time. At the end of the study period, investors did not respond to eco-friendly news announcements and responded negatively to eco-harmful events.

Mattingly's (2017) review supports the idea that time effects are important for understanding responsibility performance. Firms with higher responsibility tend to have higher profitability. However, the time needed to build higher performance from higher responsibility appears to be long- rather than short-term. This supports Barnett's theorization that stakeholder influence capacity is a firm-level capability that takes time to learn and that firms can build over time through consistent investment. Consistent investment in responsibility over at least

5 years is more likely to be associated with increased performance than shorter-term responsibility investments (Garcia-Castro, Ariño, & Canela, 2011).

Hawn, Chatterji, and Mitchell (2018) examine how markets respond to firms being added to, removed from, or continuing on the Dow Jones Sustainability Index, using data on firms from 27 countries over the 17 years from 1999-2015, a shorter and later period than Flammer (2013). They find over the entire time period that markets penalize firms that are added to or continue on the index but do not react to firms removed from the index. When the data are analyzed for temporal trends, there is a temporal trend of markets responding slightly positively to firms being added to the index. However, when market reactions are analyzed in a regression model including control variables, investors do not react at all to firms being added to, removed from, or continuing on the index.

The results of Flammer (2013) and Hawn et al. (2018) are somewhat contradictory. Flammer finds markets react more negatively over time to eco-harmful events, but Hawn et al. find no reaction over time to firms being removed from the index. These conflicting results could be due to differences in what the two studies capture with their measure of responsibility. Flammer's measure of eco-harmful announcements captures actions firms take that generate enough attention to be covered by news outlets. Hawn et al.'s measure of removal from the index captures only one organization's once-yearly determination of whether a firm should be included on a list of 2,500 firms. The information value of the events studied in Hawn et al. might be less relevant to investors about firms' social responsibility than the events studied in Flammer.

Whereas positive environment-focused responsibility could be perceived as either genuine or as greenwashing, resulting in no clear causal effect of such responsibility on

revenue, negative responsibility has no clear theoretical means by which it might increase revenue.

*Hypothesis 5: Environment-focused SIC partially mediates the effect of environment-focused CSR on performance.*

**Data and Sample**

I test the hypotheses using CSRHub and Compustat data described in Chapter 2. Table 30 and Table 31 present descriptive statistics and correlations for the variables used in the hypothesis tests in this chapter.

Table 30: Descriptive statistics.

| Variable | Obs | Mean | Std.Dev. | Min | Max |
|---|---|---|---|---|---|
| Revenue ($millions) | 15585 | 6167.85 | 21151.72 | -1965 | 483521 |
| Inverse hyperbolic sine revenue | 15585 | 7.85 | 1.85 | -8.28 | 13.78 |
| Customer CSR rating | 12446 | 54.3 | 13.63 | 6.11 | 92.36 |
| Net KLD product | 12287 | -.02 | .62 | -4 | 3 |
| KLD product strengths | 12287 | .17 | .4 | 0 | 3 |
| KLD product concerns | 15588 | .17 | .49 | 0 | 4 |
| Employee CSR rating | 15412 | 53.88 | 9.75 | 14.33 | 93 |
| Net KLD employees | 15392 | .28 | 1.01 | -4 | 8 |
| KLD employee strengths | 15392 | .47 | .95 | 0 | 8 |
| KLD employee concerns | 15588 | .18 | .51 | 0 | 5 |
| Environment CSR rating | 12880 | 50.13 | 10.75 | 6 | 94 |
| Net KLD environment | 15544 | .26 | .89 | -5 | 6 |
| Net KLD environment strengths | 15544 | .41 | .9 | 0 | 6 |
| Net KLD environment concerns | 15588 | .15 | .52 | 0 | 5 |
| Long-term debt ($millions) | 15525 | 2874.27 | 14916.29 | 0 | 459022 |
| Assets ($millions) | 15587 | 16464.5 | 96112.66 | .8 | 2570000 |
| Age (years) | 15506 | 26.51 | 17.69 | 1 | 67 |
| Employees (1000s) | 15508 | 17.24 | 67.51 | 0 | 2300 |
| Advertising ($millions) | 6835 | 167.73 | 577.26 | 0 | 9729 |
| R&D ($millions) | 8473 | 228.45 | 932.01 | 0 | 16085 |
| Year | 15588 | 2012.62 | 2.37 | 2008 | 2016 |

Table 31: Correlation matrix.

| | Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | Revenue ($millions) | 1.00 | | | | | | | | | | |
| (2) | Inverse hyperbolic sine revenue | 0.49* | 1.00 | | | | | | | | | |
| (3) | Customer CSR rating | -0.04* | -0.22* | 1.00 | | | | | | | | |
| (4) | Net KLD product | -0.25* | -0.23* | 0.27* | 1.00 | | | | | | | |
| (5) | KLD product strengths | 0.16* | 0.18* | 0.20* | 0.53* | 1.00 | | | | | | |
| (6) | KLD product concerns | 0.38* | 0.37* | -0.15* | -0.76* | 0.15* | 1.00 | | | | | |
| (7) | Employee CSR rating | 0.11* | 0.14* | 0.49* | 0.01 | 0.14* | 0.09* | 1.00 | | | | |
| (8) | Net KLD employee | 0.09* | 0.17* | 0.11* | 0.13* | 0.20* | 0.00 | 0.18* | 1.00 | | | |
| (9) | KLD employee strengths | 0.26* | 0.35* | 0.02 | 0.00 | 0.26* | 0.18* | 0.20* | 0.87* | 1.00 | | |
| (10) | KLD employee concerns | 0.31* | 0.32* | -0.20* | -0.24* | 0.08* | 0.33* | 0.03* | -0.36* | 0.15* | 1.00 | |
| (11) | Environment CSR rating | 0.10* | 0.05* | 0.39* | 0.00 | 0.07* | 0.04* | 0.49* | 0.11* | 0.12* | 0.01 | 1.00 |
| (12) | Net KLD environment | 0.18* | 0.28* | 0.14* | 0.01 | 0.24* | 0.16* | 0.20* | 0.26* | 0.30* | 0.05* | 0.23* |
| (13) | Net KLD environment strengths | 0.37* | 0.45* | 0.04* | -0.11* | 0.27* | 0.31* | 0.23* | 0.24* | 0.39* | 0.26* | 0.25* |
| (14) | Net KLD environment concerns | 0.33* | 0.30* | -0.16* | -0.20* | 0.05* | 0.24* | 0.06* | -0.03* | 0.17* | 0.37* | 0.04* |
| (15) | Long-term debt ($millions) | 0.40* | 0.29* | -0.04* | -0.19* | 0.14* | 0.32* | 0.08* | 0.14* | 0.21* | 0.12* | 0.06* |
| (16) | Assets ($millions) | 0.39* | 0.27* | -0.03* | -0.19* | 0.13* | 0.33* | 0.09* | 0.16* | 0.21* | 0.07* | 0.05* |
| (17) | Age (years) | 0.24* | 0.42* | -0.08* | -0.15* | 0.12* | 0.22* | 0.13* | 0.10* | 0.22* | 0.22* | 0.07* |
| (18) | Employees (1000s) | 0.71* | 0.36* | -0.02 | -0.22* | 0.10* | 0.32* | 0.08* | 0.03* | 0.21* | 0.33* | 0.09* |
| (19) | Advertising ($millions) | 0.58* | 0.50* | -0.01 | -0.26* | 0.19* | 0.44* | 0.19* | 0.13* | 0.31* | 0.31* | 0.16* |
| (20) | R&D ($millions) | 0.36* | 0.33* | 0.06* | -0.15* | 0.28* | 0.39* | 0.19* | 0.32* | 0.41* | 0.14* | 0.15* |
| (21) | Year | -0.02* | -0.08* | 0.63* | 0.24* | 0.14* | -0.18* | 0.29* | 0.22* | 0.04* | -0.36* | 0.18* |

*p<0.05

| | Variables (continued) | (12) | (13) | (14) | (15) | (16) | (17) | (18) | (19) | (20) | (21) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (12) | Net KLD environment | 1.00 | | | | | | | | | |
| (13) | Net KLD environment strengths | 0.83* | 1.00 | | | | | | | | |
| (14) | Net KLD environment concerns | -0.28* | 0.31* | 1.00 | | | | | | | |
| (15) | Long-term debt ($millions) | 0.15* | 0.24* | 0.16* | 1.00 | | | | | | |
| (16) | Assets ($millions) | 0.15* | 0.21* | 0.10* | 0.80* | 1.00 | | | | | |
| (17) | Age (years) | 0.21* | 0.37* | 0.28* | 0.15* | 0.12* | 1.00 | | | | |
| (18) | Employees (1000s) | 0.21* | 0.29* | 0.14* | 0.27* | 0.24* | 0.19* | 1.00 | | | |
| (19) | Advertising ($millions) | 0.40* | 0.49* | 0.28* | 0.43* | 0.30* | 0.29* | 0.38* | 1.00 | | |
| (20) | R&D ($millions) | 0.36* | 0.43* | 0.18* | 0.37* | 0.53* | 0.21* | 0.18* | 0.55* | 1.00 | |
| (21) | Year | 0.13* | 0.02* | -0.19* | -0.01 | 0.00 | -0.01 | -0.02* | -0.01 | 0.00 | 1.00 |

*p<0.05

**Empirical Approach**

I use mediation analysis for three stakeholder subgroups: employees, customers, and the natural environment. I use the pooled regression and fixed effects specifications described in Chapter 3. Standard errors are clustered by firm in all models to correct for the non-independence of repeated observations on the same firms over time. Clustering standard errors by firm assumes observations are independent across firms.

I use two specifications differing on assumptions about time effects. The first specification uses same-year measures on all variables. Equations 4 and 5 describe the same-year specifications. Subscript *i* is firm and *t* is year.

$$SIC_{it} = a(CSR_{it}) + \varepsilon_{it} \quad (7)$$

$$Rev_{it} = b(SIC_{it}) + c'(CSR_{it}) + \varepsilon_{it} \quad (8)$$

Mediation tests examine two conditions. First, is *a* significantly different from zero in Equation 4. If *a* is not different from zero, *CSR* is not associated with *SIC*, rejecting mediation. Second, conditional on *a* testing different from zero, does *b* test different from zero. If yes, mediation exists, and the type of mediation depends on the test of *c'*. If *c'* tests different from zero, mediation is partial. If *c'* does not test different from zero, mediation is full.

The second specification assumes a 1-year time lag between each stage of the mediation chain, described in Equations 9 and 10.

$$SIC_{it} = a(CSR_{i,t-1}) + \varepsilon_{it} \quad (9)$$

$$Rev_{i,t+1} = b(SIC_{it}) + c'\left(CSR_{i,t-1}\right) + \varepsilon_{it} \quad (10)$$

In these equations, SIC is measured in the focal year *t*. CSR is assumed to take one year to affect a firm's SIC, so CSR is measured in year *t-1*. SIC is assumed to take one year to affect revenue, so *Rev* is measured in *t+1*. The result of this assumption about mediation time

dynamics is that the direct effect, if any, of CSR on revenue is assumed to take two years because CSR is measured in time *t-1* and *Rev* in year *t+1*.

***Dependent variable***

The dependent variable measuring performance is firm revenue. I estimate models with untransformed and transformed revenue to control for the influence of outlier firms. Revenue is positively skewed, with a small number of firms having much larger revenues than the mean and median revenue (Table 32). Firms with extremely large revenues tend to be oil and gas firms. An exception is Walmart, Inc., a retail firm with some of the largest revenues in the data.

Variable transformation is common in research on organizations, especially the logarithmic transformation (Becker, Robertson, & Vandenberg, 2018). The logarithmic transformation drops all observations with values equal to or below zero. Other approaches approximate the logarithmic and retain values less than or equal to zero. I use the inverse hyperbolic sine transformation that approximates the logarithmic transformation but retains observations with values equal to or below zero (for a review of transformations to handle extreme values, see Burbidge et al., 1988).

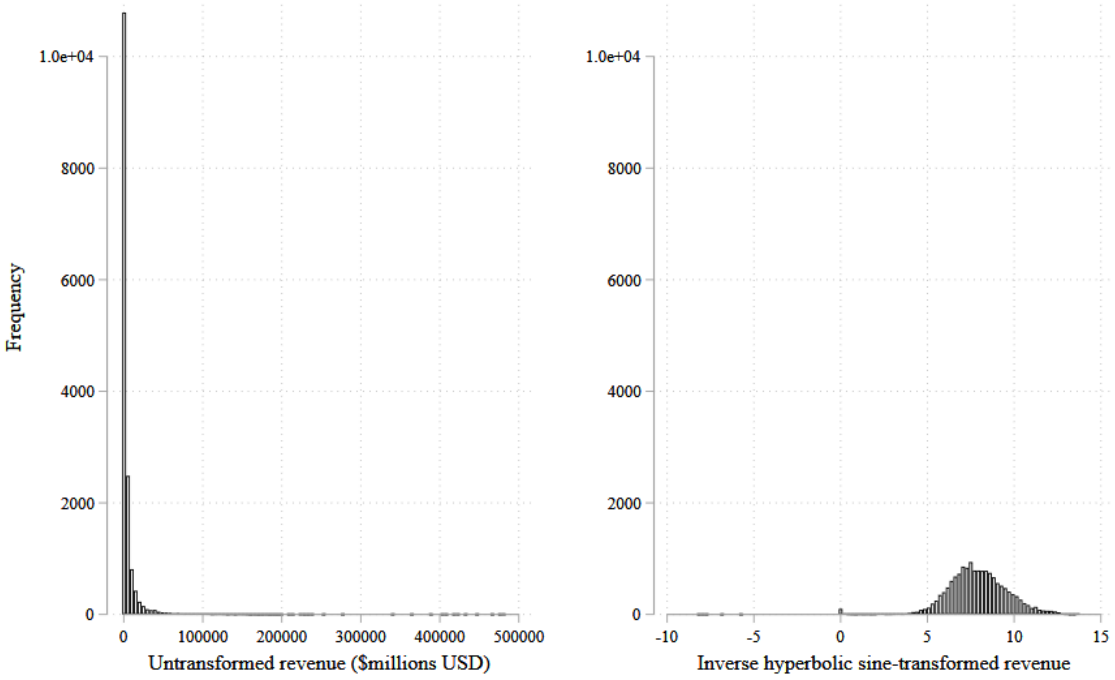
Table 32: Revenue descriptive statistics by industry and transformation.

| | | *Untransformed* | | | *Transformed* | | |
|---|---|---|---|---|---|---|---|
| **SIC 2-digit category** | **Obs.** | **Mean** | **Median** | **Skew** | **Mean** | **Median** | **Skew** |
| Ag, forestry, fishing | 41 | $ 3,980.39 | $ 1,699.64 | 1.30 | 7.80 | 8.13 | -0.56 |
| Construction | 253 | $ 4,019.05 | $ 2,086.19 | 2.53 | 8.46 | 8.34 | 0.13 |
| Finance | 3,171 | $ 4,317.83 | $ 650.70 | 6.11 | 7.42 | 7.17 | -0.36 |
| Manufacture | 5,954 | $ 5,882.64 | $ 1,306.13 | 10.91 | 7.74 | 7.87 | -0.95 |
| Mining | 673 | $ 5,580.26 | $ 1,351.85 | 9.03 | 7.80 | 7.90 | -2.04 |
| Public administration | 38 | $ 60,205.04 | $ 34,949.50 | 0.90 | 9.99 | 11.15 | -0.8 |
| Retail | 1,123 | $ 13,798.56 | $ 2,675.21 | 7.87 | 8.77 | 8.58 | 0.59 |
| Services | 2,422 | $ 2,892.77 | $ 919.34 | 8.44 | 7.59 | 7.52 | 0.1 |
| Transportation | 1,457 | $ 7,899.37 | $ 2,380.65 | 5.18 | 8.48 | 8.47 | -1.12 |
| Wholesale | 453 | $ 13,629.19 | $ 3,415.67 | 3.62 | 8.97 | 8.83 | 0.26 |
| Total | 15,585 | $ 6,167.85 | $ 1,238.27 | 11.17 | 7.85 | 7.81 | -0.72 |

Note: "Public administration" includes Berkshire Hathaway and General Electric. Mean and median untransformed revenue ($millions USD) and inverse hyperbolic sine-transformed revenue by 2-digit SIC code, demonstrating skewness and the skewness reduction of the transformation. The transformation reduces the influence of outlier firms.

The inverse hyperbolic sine transformation reduces skewness across all SIC categories and in the total dataset. Figure 8 shows the distributions of the untransformed and transformed revenue variable.

Figure 8: Revenue distribution by transformation.




***Independent and mediating variables***

Hypotheses 3, 4, and 5 predict how stakeholder-specific SIC mediates the effect of stakeholder-specific CSR on performance for customers, employees, and the environment. Table 33 describes the variables and datasets for each measure capturing stakeholder-specific CSR and mediating variables capturing stakeholder-specific SIC.

Table 33: Independent and mediating variables for mediation hypothesis tests.

| | Hypothesis | Independent variable (CSRHub) | Mediating variable (KLD) |
|---|---|---|---|
| 3 | Customer SIC partially mediates the effect of customer-focused CSR on performance. | Customer CSR rating | Product strengths and concerns |
| 4 | Employee SIC partially mediates the effect of employee-focused CSR on performance. | Employee CSR rating | Employee strengths and concerns |
| 5 | Environment SIC partially mediates the effect of environment-focused CSR on performance. | Environment CSR rating | Environment strengths and concerns |

I use the KLD data for mediating variables capturing stakeholder-specific SIC. KLD rates firms on twelve dimensions: Community, Diversity, Employment, Environment, Governance, Human Rights, Products, Alcohol Involvement, Gambling Involvement, Military Involvement, Nuclear Involvement, and Tobacco Involvement. I use the Products dimension as the mediating variable capturing a firm's SIC with customer stakeholders, the Employment dimension for a firm's SIC with employee stakeholders, and the Environment dimension for SIC with environment stakeholders.

***Control variables***

I use the same control variables for each empirical approach as described in the control variables section of Chapter 2.

**Results**

The results provide little evidence for mediation for customers in these data, some evidence of mediation for employees, and moderate evidence of mediation for environment stakeholders. Table 34 summarizes the results of all hypothesis tests. The table reports estimation results from full models that do and do not assume missing observations of advertising and research and development spending are equal to 0. Full estimation results for all models are in this chapter's Appendix.

Table 34: Stakeholder-specific mediation test results.

| **Stakeholder** | | **Customer** | | **Employee** | | **Environment** | |
|---|---|---|---|---|---|---|---|
| *Missing data assumption* | | *No* | *Yes* | *No* | *Yes* | *No* | *Yes* |
| Model | Time | | | | | | |
| Pooled | Same year | No | No | No | No | No | Full |
| | Dynamic | No | No | No | No | No | No |
| Pooled IHS | Same year | No | No | Full | Partial | Full | Partial |
| | Dynamic | No | No | Partial | Partial | Full | Partial |
| Fixed Effects | Same year | No | Partial | No | No | No | No |
| | Dynamic | No | No | No | No | No | No |
| Fixed Effects IHS | Same year | No | No | No | No | Full | Full |
| | Dynamic | No | No | No | No | No | No |

Note: Missing data assumption is "Yes" when missing values of advertising and research and development are assumed equal to 0. Same year "Time" models measure all variables in the same year. Dynamic "Time" models assume 1-year lag between mediation effects. "IHS" models control for outliers on firm performance by using inverse hyperbolic sine-transformed revenue as the dependent variable.

I test hypotheses with standard mediation analysis (Aguinis et al., 2017; Baron & Kenny, 1986; Shaver, 2005), using two estimation strategies of pooled ordinary least squares regression and fixed effects regression. Each estimation strategy makes different assumptions about the underlying data generating process. Pooled ordinary least squares regression assumes time-invariant firm characteristics do not confound the estimation. This is a strong assumption. However, pooled regression uses information from both between- and within-firm comparisons for estimation. Fixed effects regression does not assume time-invariant firm characteristics are not confounds but instead controls for them. However, the tradeoff is that controlling for time-invariant firm characteristics throws away between-firm information, and the fixed-effects estimates only test whether mediation occurs within firms, not across firms (Certo et al., 2017).

***Hypothesis 3: Customer stakeholders***

The bulk of evidence from mediation tests for customer SIC and customer CSR do not support Hypothesis 3. Table 35 summarizes the results of the hypothesis tests. Panel A reports the results of same-year tests. Panel B reports results from models assuming 1-year lag time dynamics.

Taken together, the evidence from same-year pooled models is that customer SIC does not mediate the effect of customer CSR on revenue performance. All same-year models in Panel A show a strong positive relationship between customer CSR and customer SIC, satisfying the first condition for mediation. Two models satisfy the second condition for mediation and suggest customer SIC mediates the effect of customer CSR on performance. Pooled models with untransformed revenue show mixed evidence depending on assumptions about missing observations of R&D and advertising. The model that does not assume missing observations equal 0 shows no evidence for mediation. The model assuming missing observations equal 0 shows evidence for full mediation, but the mediation effect is negative: controlling for customer CSR, customer SIC is associated with reduced revenues. This contradicts stakeholder influence capacity theory that predicts firms with higher SIC are better able to translate CSR into performance gains.

The three other same-year pooled models show no evidence for mediation. The pooled models using inverse hyperbolic sine-transformed revenue to control for outliers show customer CSR has a direct, negative effect on revenue independent of customer SIC. This result suggests firms that improve customer CSR have decreased revenues in the same year as the customer CSR improvement.

Compared to the pooled regression models, the fixed effects same-year models control for unobserved, time-invariant firm characteristics. Fixed effects models with untransformed revenue as the dependent variable show mixed evidence for mediation. The model that does not assume missing R&D and advertising observations equal 0 shows no evidence for mediation. The model assuming missing observations equal 0 shows evidence for partial mediation, with customer SIC positively affecting revenue and customer CSR negatively affecting revenue. This is a within-firm model, and coefficients are the average within-firm change in the conditional mean of revenue associated with a change in the independent variable. The partial mediation results suggest a 1-point increase in customer SIC is associated with a within-firm average increase of ~$347,000,000 in revenue. A 1-point increase in customer CSR is associated with a within-firm average decrease of ~$24,000,000 in revenue.

Fixed effects models using IHS-transformed revenue to control for outliers imply no mediation effect. Instead, both models suggest customer CSR has a positive effect on within-firm revenue after controlling for customer SIC. The average within-firm change in revenue associated with a 1-point increase in customer CSR is 0.61% in the model that does not assume missing observations equal 0 and 0.42% in the model assuming missing observations equal 0.

The evidence from time dynamics models in which effects are assumed to occur over 1 year show no evidence for mediation. Pooled models show a positive relationship between customer CSR and customer SIC, satisfying the first condition for mediation, but fixed effects models do not. The pooled model using IHS-transformed revenue suggests customer CSR has a negative effect on revenue independent of customer SIC. Fixed effects models using IHS-transformed revenue show customer CSR has a positive effect on within-firm revenue independent of customer SIC. However, the fixed effects time dynamic models show no

evidence that customer CSR effects within-firm SIC in the following year. This result strongly contradicts stakeholder influence capacity theory's prediction that SIC is a capability built through experiential learning within firms. The model, though, assumes a 1-year lag between changes in CSR and changes in SIC. If the learning effect requires more or less than 1 year, then the model might not be able to capture the effect.

Table 35: Mediation test results for customer SIC and customer CSR.

| Model | Assume missing R&D & advertising = 0 | *a* | *Std. error* | *b* | *Std. error* | *c'* | *Std. error* | Mediation |
|---|---|---|---|---|---|---|---|---|
| **PANEL A: Same year** | | ***SIC = a(CSR)*** | | ***Rev = b(SIC) + c'(CSR)*** | | | | |
| Pooled | No | 0.0170*** | (0.0024) | 24.3278 | (560.1630) | 23.5669 | (26.1637) | No |
| Pooled | Yes | 0.0109*** | (0.0010) | -924.1630* | (432.2209) | -14.5762 | (21.9219) | Full |
| Pooled IHS | No | 0.0170*** | (0.0024) | 0.0564 | (0.0681) | -0.0215*** | (0.0040) | No |
| Pooled IHS | Yes | 0.0109*** | (0.0010) | -0.0107 | (0.0389) | -0.0295*** | (0.0026) | No |
| Fixed effects | No | 0.0068** | (0.0023) | 493.4205 | (324.7857) | -13.0437 | (9.7658) | No |
| Fixed effects | Yes | 0.0076*** | (0.0012) | 347.0784* | (159.0567) | -24.6657*** | (7.4201) | Partial |
| Fixed effects IHS | No | 0.0068** | (0.0023) | -0.0115 | (0.0110) | 0.0061*** | (0.0012) | No |
| Fixed effects IHS | Yes | 0.0076*** | (0.0012) | -0.0154 | (0.0112) | 0.0042*** | (0.0009) | No |
| **PANEL B: Time dynamics** | | $SIC_t=a(CSR_{t-1})$ | | $Rev_{t+1}=b(SIC_t)+c'(CSR_{t-1})$ | | | | |
| Pooled | No | 0.0171*** | (0.0026) | -536.0375 | (640.8732) | 44.3036 | (33.4309) | No |
| Pooled | Yes | 0.0085*** | (0.0012) | -789.3677 | (490.8322) | 27.9137 | (26.2548) | No |
| Pooled IHS | No | 0.0171*** | (0.0026) | 0.0106 | (0.0713) | -0.0694 | (0.0435) | No |
| Pooled IHS | Yes | 0.0085*** | (0.0012) | -0.0035 | (0.0042) | -0.0094** | (0.0029) | No |
| Fixed effects | No | 0.0035 | (0.0026) | 151.2192 | (477.4810) | 0.0885 | (21.1451) | No |
| Fixed effects | Yes | 0.0019 | (0.0013) | 227.0754 | (219.4250) | -16.6682 | (12.8627) | No |
| Fixed effects IHS | No | 0.0035 | (0.0026) | -0.0030 | (0.0118) | 0.0052*** | (0.0011) | No |
| Fixed effects IHS | Yes | 0.0019 | (0.0013) | -0.0124 | (0.0182) | 0.0024*** | (0.0006) | No |

Note: IHS models use inverse hyperbolic sine-transformed revenue to control for the influence of outlier firms on revenue. Robust standard errors in parentheses.
*** p<0.001, ** p<0.01, * p<0.05

***Hypothesis 4: Employee stakeholders***

Table 36 summarizes the results of hypothesis 4 tests. Panel A reports the results of same-year tests. Panel B reports models with 1-year lag time dynamics.

Panel A tests for mediation in models where all variables are measured in the same year. All pooled models show a positive, statistically significant relationship between employee SIC and employee CSR, satisfying the first condition of mediation. Pooled models with untransformed revenue as the dependent variable reject the hypothesis of mediation. Pooled models using inverse hyperbolic sine-transformed revenue to control for outliers on revenue support the hypothesis. Mediation is full without assuming missing observations of R&D and advertising are 0 and partial assuming missing observations are equal to 0. Models assuming missing observations are zero have higher statistical power because they have more observations.

Pooled models using the transformed revenue variable report mediation while models without the transformed variable do not. The skewed distribution of revenue suggests outliers have a large influence on estimation, and models using the untransformed variable might lead to inference errors. The fixed effects models are less affected by transforming the dependent variable. Fixed effects models only estimate within-firm relationships and excludes all between-firm information. Pooled regression retains some between-firm information. Revenue differences are larger across firms than within firms because firms tend to have similar revenues year over year. Pooled regression's use of between-firm information might make it more vulnerable to the skewed revenue distribution.

Fixed effects models in Panel A estimate within-firm mediation and control for unmeasured time-invariant firm characteristics. Models that do not assume missing

observations of R&D and advertising are 0 show no association between employee SIC and employee CSR within a firm, rejecting the first condition for mediation. However, models assuming missing observations are zero show positive association between employee SIC and employee CSR within firms. In the second stage of mediation testing, these models reject mediation.

Taking all models in Panel A together, the evidence is against the hypothesis that SIC for employees mediates the effect of employee CSR on revenue. Only the pooled regression models with inverse hyperbolic sine-transformed revenue show evidence for mediation. Untransformed pooled models reject mediation. Untransformed and transformed fixed effects models reject mediation.

Panel B estimates time dynamics models assuming employee CSR takes 1 year to directly affect employee SIC and 2 years to directly affect revenue. The model also assumes employee SIC takes 1 year to directly affect revenue. Pooled regressions show a strong, positive relationship between employee CSR and next-year employee SIC, satisfying the first condition of mediation. Pooled models without a transformed dependent variable reject the mediation hypothesis. Both pooled models with transformed revenue to control for outliers show employee SIC partially mediates the effect of employee CSR on revenue. Partial mediation in a model specified with 1-year lags suggests employee SIC positively affects next-year revenue and, independent of the effect of employee SIC on next-year revenue, employee CSR retains an independent positive effect on revenue two years after the change in employee CSR. Fixed effects models specified with 1-year lags reject the hypothesis of mediation and show no relationships between employee SIC, employee CSR, or revenue.

Taken together, the results in Panel B suggest employee SIC does not mediate the effect of employee CSR on revenue, rejecting Hypothesis 4.

Table 36: Mediation test results for employee SIC and employee-focused CSR.

| Model | Assume missing R&D & advertising = 0 | *a* | *Std. error* | *b* | *Std. error* | *c'* | *Std. error* | Mediation |
|---|---|---|---|---|---|---|---|---|
| **PANEL A: Same year** | | ***SIC = a(CSR)*** | | ***Rev = b(SIC) + c'(CSR)*** | | | | |
| Pooled | No | 0.0198*** | (0.0034) | 195.6673 | (394.4084) | -52.6325* | (24.0797) | No |
| Pooled | Yes | 0.0160*** | (0.0015) | -209.7548 | (284.2636) | 26.0522 | (19.6504) | No |
| Pooled IHS | No | 0.0198*** | (0.0034) | 0.1612*** | (0.0315) | 0.0064 | (0.0038) | Full |
| Pooled IHS | Yes | 0.0160*** | (0.0015) | 0.2096*** | (0.0193) | 0.0059* | (0.0024) | Partial |
| Fixed effects | No | 0.0035 | (0.0026) | 358.5702* | (175.7152) | -26.5995* | (12.6472) | No |
| Fixed effects | Yes | 0.0064*** | (0.0013) | 115.9044 | (80.2161) | -2.6704 | (7.7438) | No |
| Fixed effects IHS | No | 0.0035 | (0.0026) | -0.0004 | (0.0072) | 0.0009 | (0.0009) | No |
| Fixed effects IHS | Yes | 0.0064*** | (0.0013) | -0.0045 | (0.0046) | 0.0017* | (0.0007) | No |
| **PANEL B: Time dynamics** | | $SIC_t=a(CSR_{t-1})$ | | $Rev_{t+1}=b(SIC_t)+c'(CSR_{t-1})$ | | | | |
| Pooled | No | 0.0174*** | (0.0035) | 482.7647 | (405.9814) | -54.8042* | (27.3921) | No |
| Pooled | Yes | 0.0120*** | (0.0015) | -131.3381 | (350.1463) | 44.1672* | (21.2244) | No |
| Pooled IHS | No | 0.0174*** | (0.0035) | 0.1588*** | (0.0322) | 0.0112** | (0.0038) | Partial |
| Pooled IHS | Yes | 0.0120*** | (0.0015) | 0.1952*** | (0.0200) | 0.0095*** | (0.0024) | Partial |
| Fixed effects | No | 0.0004 | (0.0027) | 130.4599 | (289.3392) | -33.5505 | (18.2356) | No |
| Fixed effects | Yes | 0.0020 | (0.0014) | 157.7259 | (80.7981) | -0.1407 | (10.1725) | No |
| Fixed effects IHS | No | 0.0004 | (0.0027) | -0.0050 | (0.0056) | -0.0002 | (0.0008) | No |
| Fixed effects IHS | Yes | 0.0020 | (0.0014) | -0.0010 | (0.0034) | 0.0003 | (0.0005) | No |

Note: SIC = employee SIC. CSR = employee-focused CSR. IHS models use inverse hyperbolic sine-transformed revenue to control for the influence of large outlier firms on revenue. Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05

***Hypothesis 5: Environment stakeholders***

Table 37 summarizes the results of hypothesis 5 tests. Panel A reports the results of same-year tests. Panel B reports models with 1-year lag time dynamics.

All models in Panel A show a positive relationship between environment SIC and environment CSR, satisfying the first condition for mediation. Pooled models with untransformed revenue as the dependent variable show no mediation when not assuming missing R&D and advertising observations are 0 and full mediation when assuming missing observations equal 0. The full mediation result suggests the direct effect of SIC on revenue is *negative*. This contradicts stakeholder influence capacity theory that predicts the higher a firm's SIC the better the firm is at translating CSR into increased performance. Additional research will be needed to determine whether and how increasing environmental SIC decreases revenue.

Fixed effects models with untransformed revenue as the dependent variable show no evidence for mediation. Fixed effects models with transformed revenue to control for outliers show evidence of full mediation. Again, mediation is negative with SIC having a strong negative association with revenue. This result contradicts stakeholder influence capacity theory.

Taken together, the results in Panel A suggest environment SIC mediates the effect of environment CSR on performance, but the mediation effect occurs in opposite directions depending on the model. Pooled models with a transformed dependent variable show a positive mediation effect of environment SIC. Fixed effects models with a transformed dependent variable show a negative mediation effect of environment SIC. Differences in these models could be driven by the firm-specific, time-invariant characteristics controlled for in fixed-effects models but uncontrolled for in pooled regression models. Confounding bias from time-

invariant firm-specific characteristics could cause the estimates in pooled regression to differ from those in fixed effects regression. However, the fixed effects models report negative mediation, which cannot be explained using stakeholder influence capacity theory.

Fixed effects models estimate the relationship within a firm. Negative within-firm mediation suggests that a firm that increases its stakeholder influence capacity will experience a decrease in revenue. This result could be explained due to time dynamics. Negative mediation is reported in same-year models in which all variables are measured in the same year. Increasing environment CSR might be very expensive, involving changing production processes, supply chain configurations, and other core components of a firm's business model. Changing such components might require diverting spending from other functions to increasing stakeholder influence capacity, such as from marketing or R&D. This could reduce revenues by altering product and service offerings, producing a negative within-firm estimate of SIC mediation for environment stakeholders.

Pooled IHS models instead show positive mediation. These models, in addition to not controlling for time-invariant firm-specific characteristics, combine within-firm and across-firm information. A positive mediation effect in these models could be due to bias from the omitted firm characteristics, but it could also result from a true positive mediation relationship across firms that dominates the negative within-firm relationship found in the fixed effects models. More research is needed to understand whether the performance effects of environmental CSR and environmental SIC differ within firms versus across firms (Certo et al., 2017).

Table 37: Mediation test results for environment SIC and environment-focused CSR.

| Model | Assume missing R&D & advertising = 0 | *a* | *Std. error* | *b* | *Std. error* | *c'* | *Std. error* | Mediation |
|---|---|---|---|---|---|---|---|---|
| **PANEL A: Same year** | | ***SIC = a(CSR)*** | | ***Rev = b(SIC) + c'(CSR)*** | | | | |
| Pooled | No | 0.0247*** | (0.0028) | -728.6945 | (725.7241) | 7.8462 | (27.9340) | No |
| Pooled | Yes | 0.0192*** | (0.0014) | -1,954.2959* | (987.4302) | 53.6664 | (35.5883) | Full |
| Pooled IHS | No | 0.0247*** | (0.0028) | 0.3220*** | (0.0384) | -0.0054 | (0.0033) | Full |
| Pooled IHS | Yes | 0.0192*** | (0.0014) | 0.2827*** | (0.0338) | -0.0049* | (0.0021) | Partial |
| Fixed effects | No | 0.0081*** | (0.0020) | 247.4962 | (254.8147) | -7.2906 | (11.5509) | No |
| Fixed effects | Yes | 0.0068*** | (0.0009) | -561.8177 | (325.3208) | 4.4612 | (7.0534) | No |
| Fixed effects IHS | No | 0.0081*** | (0.0020) | -0.0325*** | (0.0088) | -0.0008 | (0.0007) | Full |
| Fixed effects IHS | Yes | 0.0068*** | (0.0009) | -0.0362*** | (0.0075) | -0.0011 | (0.0006) | Full |
| **PANEL B: Time dynamics** | | $SIC_t=a(CSR_{t-1})$ | | $Rev_{t+1}=b(SIC_t)+c'(CSR_{t-1})$ | | | | |
| Pooled | No | 0.0155*** | (0.0027) | -502.1050 | (720.7886) | 26.8901 | (29.0845) | No |
| Pooled | Yes | 0.0138*** | (0.0014) | -2,235.3079 | (1,141.2048) | 48.8680 | (38.1585) | No |
| Pooled IHS | No | 0.0155*** | (0.0027) | 0.2982*** | (0.0393) | -0.0068 | (0.0035) | Full |
| Pooled IHS | Yes | 0.0138*** | (0.0014) | 0.2353*** | (0.0350) | -0.0074*** | (0.0022) | Partial |
| Fixed effects | No | -0.0017 | (0.0019) | -48.5614 | (428.0955) | 13.6475 | (15.9518) | No |
| Fixed effects | Yes | 0.0002 | (0.0010) | -499.3873 | (283.9163) | 25.4013 | (13.3725) | No |
| Fixed effects IHS | No | -0.0017 | (0.0019) | -0.0212* | (0.0084) | 0.0015 | (0.0008) | No |
| Fixed effects IHS | Yes | 0.0002 | (0.0010) | -0.0124* | (0.0063) | 0.0021*** | (0.0004) | No |

Note: SIC = environment SIC. CSR = environment-focused CSR. IHS models use inverse hyperbolic sine-transformed revenue to control for the influence of large outlier firms on revenue. Robust, firm-clustered standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05

## Discussion and Future Research

This chapter developed and tested three hypotheses that incorporate stakeholder heterogeneity into social influence capacity theory. Each hypothesis predicted how customer-, employee-, and environment-stakeholder SIC mediates the effect of CSR for each of those stakeholder groups on firm performance, measured as revenue. The tests support the proposition that SIC is stakeholder-specific rather than a single firm capability that operates the same way regardless of which stakeholder group's welfare is targeted by the CSR actions.

The tests suggest SIC translates CSR into performance effects when the CSR targets the social welfare of employees or the environment, but not when it targets the social welfare of customer stakeholders. Existing theory claims customer-focused CSR actions can influence consumer behavior (Schuler & Cording, 2006). The tests in this chapter do not contradict that theory, but they do suggest important boundary condition on the theory. That customer-focused CSR does not mediate the CSR-performance relationship does not mean such CSR has no influence on consumer behavior. It is possible that consumer behavior is influenced by customer-focused CSR actions. But the test results in these data suggest a boundary condition that customer-focused CSR does not change consumer behavior in ways that alter firm revenue performance. That does not mean customer-focused CSR has no effect on performance, only that the effect does not operate through changing customer behavior. Fixed effects mediation tests using a transformed dependent variable found that customer-focused CSR has a strong positive effect on performance independent of customer-focused SIC. This suggests customer-focused CSR increases firm performance through some other channel than by altering customer behavior. Future research could examine channels by which customer-focused CSR affects revenue performance other than by influencing the behavior of existing customers. For

example, developing customer-focused CSR might require analyzing the firm's current customer base, which might reveal unserved markets. Beginning to serve such markets could increase revenue, but not by influencing existing customer-behavior. Future research could examine whether customer-focused CSR affects existing customers or leads to the firm identifying new customers and markets.

Several tests suggest the direct effect of SIC on revenue is negative, independent of the direct effect of CSR on revenue. One explanation for a negative mediation effect comes from stakeholder influence capacity theory's basis in organizational learning. Firms begin with zero SIC and must learn how to influence stakeholder behavior with CSR. SIC is a capability that is built over time from experience and learning, and in the initial learning phase, increases in SIC are predicted to decrease performance because firms are building an SIC capability. At some point, the SIC capability develops enough to begin returning more in performance than it costs in resources, and the relationship between SIC and performance becomes positive (Barnett & Salomon, 2012). Negative mediation could result for stakeholder groups for which firms generally have a weakly-developed SIC capability. The regression coefficient is an average value across all firms. If the average firm in the data has low SIC and is in the capability learning phase where increased SIC relates to decreased performance, a negative mediation result is possible and expected. Future research could examine the SIC learning process to understand the inflection point in different industries and CSR issue areas at which enough learning has occurred to change the negative effect of CSR on performance to a positive effect.

**Limitations**

The hypothesis tests in this chapter have several limitations. First, testing mediation requires measures of both CSR and SIC, raising concerns about measurement quality. Second, mediation implies a temporal sequence between three constructs, raising concerns about whether the temporal sequence is correctly specified. Third, the data are observational in nature, rather than experimentally controlled, raising the problem of biased estimation.

Testing mediation requires measures of three constructs: the cause, the mediator, and the outcome. In this chapter, the cause is CSR, the mediator is SIC, and the outcome is performance. CSR is measured using the CSRHub dataset, SIC is measured using the KLD dataset, and performance is measured using revenue from the Compustat Fundamentals Annual dataset. Measurement quality becomes a potential limitation of the study, especially given recent criticism of common CSR measures (Chatterji et al., 2016, 2009). This limitation is most concerning with using KLD to measure SIC. To date, there is no accepted measure of SIC, and this chapter is the first empirical study I am aware of that attempts to measure SIC. The only other empirical test of SIC theory uses the same measure for CSR as for SIC and tests moderation, not mediation (Barnett & Salomon, 2012). If KLD is not a good measure of SIC, the mediation tests are less useful for testing the hypotheses developed in this chapter.

The second limitation arises from the temporal sequence implied by a mediation model. In mediation, the cause must affect the mediator, which must then affect the outcome, implying at least a two-step temporal model. I attempt to capture this two-step model by using 1-year lags between the cause and mediator and the mediator and the outcome, which forces a 2-year lag between the cause and the outcome. If this temporal sequence does not match the

underlying, true temporal sequence between CSR, SIC, and firm performance, the models will not provide accurate tests of the theory.

Third, the data used in this chapter are observational rather than experimentally controlled, raising the potential for bias caused by various problems that arise when using observational data. Omitted variable bias might exist if the regression model used in the hypothesis tests does not include all potential confounds between the independent and dependent variables. Reverse causality in which changes in a firm's SIC causes subsequent changes in a firm's CSR could bias the estimates. I attempt to control for various biases arising from endogeneity by using control variables and fixed effects regressions, but it is impossible to entirely discount the possibility of endogeneity biases when using observational rather than experimentally generated data.

## CHAPTER 5: CONCLUSION

The chapters of this dissertation test and extend theory about the mechanisms by which CSR affects firm performance, specifically whether stakeholder influence capacity links CSR to performance.

Chapter 2 tests whether CSR affects revenue performance using three empirical strategies: propensity score matching, difference-in-differences estimation, and fixed effects regression. Together, the tests provide no consensus on whether CSR affects revenue performance, matching the lack of consensus in the overall CSR performance literature that now contains more than three decades of empirical research on a direct effect of CSR on performance.

For increased CSR, propensity score models suggest the most extreme increases in CSR cause higher revenue. This result is robust across models using from 1-10 nearest neighbors for matching. However, moderate increases in CSR have either no effect on revenue or, when the number of neighbors used for matching exceeds 4, a negative effect on revenue. As the number of neighbors increases, bias becomes a greater concern, but estimates become more precise. The negative result could be driven by bias, but, even if that is true, estimation with few neighbors (and the least bias) show no effect of moderate CSR on revenue performance. Finally, smaller changes in CSR also have a positive effect on revenue across models using from 1-10 nearest neighbors for propensity score matching.

This pattern of results suggests large and small increases in CSR can increase revenues, but moderate increases in CSR cannot or can even reduce revenues. The pattern suggests a non-linear relationship between CSR and performance in which the effect is positive over the range from small to moderate increase, negative from moderate to extreme increase, and

positive for extreme increases in CSR. Barnett (2007) theorizes and Barnett and Salomon (2012) finds evidence of a non-linear, U-shaped relationship between stakeholder influence capacity and performance. Though their theory is not about the direct effect of CSR on performance, evidence for non-linearity in both my empirical results and their tests of stakeholder influence capacity together suggest there might not be a linear, constant effect of CSR on performance but that the effect might instead vary across the range of CSR. For decreases in CSR, I find no effect of decreased CSR on revenue performance when using all years of data, regardless of the size of CSR decrease.

The results of difference-in-differences models show a different pattern than the propensity score matching models. The difference-in-differences models estimate effects for individual years rather than all years in the propensity score models described above. The models are thus somewhat incomparable.

Difference-in-differences models struggle to estimate effects for the extreme changes in CSR due to a small number of events in some years. For moderate changes in CSR, difference-in-differences models show a positive effect on revenue for *both* increased and decreased CSR in the majority of years. This result suggests firms that experience moderate changes in CSR also have higher revenues than firms that do not experience moderate changes in CSR. A similar pattern holds for small changes in CSR. The pattern of results is robust to using transformed revenue to control for the influence of outlier firms.

Fixed effects regression models estimate the within-firm change in revenue associated with within-firm changes in CSR. These models use the raw CSR measure rather than the threshold measures used in the propensity score matching and difference-in-differences

models. Fixed effects models find no relationship between within-firm changes in CSR and within-firm changes in revenue.

Chapter 3 conducts mediation analyses to test whether firm stakeholder influence capacity mediates the effect of CSR on performance. I use two different estimation strategies. The first is pooled regression, and the second is fixed effects regression. I use two specifications of time effects. The first assumes mediation happens quickly and uses variables measured in the same year. The second assumes mediation occurs with a time lag of one year. In that specification, variables are measured one year apart. For each estimation strategy and model, I make two assumptions about missing data on research and development and advertising capabilities. The first assumption is that missing data should be left missing. The second assumption is that missing observations are equal to zero (Barnett & Salomon, 2012 makes this assumption). Assuming missing observations are zero increases the number of observations and, consequently, the statistical power of the tests, but if missing observations are not truly zero, then assuming they are zero might bias estimates.

The results of mediation analysis show a mixed picture. Pooled same-year models show partial mediation when controlling for outlier firms on revenue. This model shows stakeholder influence capacity has a positive effect on revenue performance. The model also shows that CSR has a negative direct effect on revenue after controlling for its influence on stakeholder influence capacity.

Fixed effects models differ from pooled regression models in that fixed effects models only estimate within-firm associations, while pooled models use both within- and between-firm information. Pooled models do not control for time-invariant firm characteristics controlled for in fixed effects models. Fixed effects same-year models show no mediation

except in models using a transformed revenue variable to control for outliers and not assuming missing values equal 0. That model shows full mediation by SIC. The results for one-year lagged models are similar to those for same-year models.

Together, the mediation analysis results in Chapter 3 show limited evidence that SIC mediates CSR's effect on performance as predicted by stakeholder influence capacity theory. However, stakeholder influence capacity theory assumes firms have a single SIC that applies to all stakeholders. The tests in Chapter 3 follow that assumption and do not differentiate between types of CSR targeted at different stakeholders or stakeholder groups.

Chapter 4 relaxes the stakeholder-blind assumption of stakeholder influence capacity theory and examines whether SIC mediation differs by stakeholder group. I examine three stakeholder groups: customers, employees, and the environment. I conduct the same mediation tests as Chapter 3 except I use measures of stakeholder-specific CSR and stakeholder-specific SIC, rather than the overall measures used in Chapter 3.

The results of Chapter 4 suggest SIC mediates the CSR-performance relationship for some stakeholders but not others. There is little evidence that SIC mediates customer-focused CSR, some evidence it mediates employee-focused CSR, and moderate evidence it mediates environment-focused CSR.

The results of Chapter 4 contribute a new emphasis on stakeholder heterogeneity to theory about the performance impacts of CSR. CSR theory increasingly considers CSR as targeted toward the social welfare of specific stakeholder groups, rather than a generic society-level conceptualization of responsibility. Developments in stakeholder theory are recognizing the possibility that not all stakeholder groups want to be treated the same way by a firm. Instead, the response of stakeholders to firm actions might depend on how the stakeholder

wants to be treated by the firm and on how firms are perceived to be treating other stakeholders. These developments complicate the stakeholder-management approach by implying that firms cannot treat stakeholders as the same or even as unique groups whose social welfare can be managed through compartmentalized or generic CSR actions.

Instead, ongoing integration of CSR and stakeholder theories point toward firms customizing CSR strategies for the social welfare of specific stakeholder groups, while addressing how CSR strategies for one stakeholder group will be perceived by and will influence the behavior of other stakeholder groups. These theoretical developments imply that stakeholder influence capacity—the ability of a firm to recognize how to influence stakeholders with CSR actions—will become increasingly important in the future. Such development also implies possible future research directions in this research area.

**Future Research Directions**

The most promising future research direction implied by the results of this dissertation is that CSR does affect performance through stakeholder influence capacity, supporting stakeholder influence capacity theory, but stakeholder influence capacity is not a single firm capability transcending stakeholders and CSR issues. Instead, firms appear to have different SIC for specific stakeholders, and SIC does not appear to mediate the CSR-performance relationship for some stakeholders, especially customers.

Future research could build on this work to further explore how CSR affects performance through specific stakeholder groups. Research is already turning in this direction as CSR scholars seek to identify mechanisms by which CSR plausibly affects performance. For example, studies have shown some types of CSR appear to influence performance through increasing sales, implying a customer mechanism (Flammer, 2015), and by decreasing

shirking, implying an employee mechanism (Flammer, 2015; Flammer & Luo, 2017). The results of this dissertation do not fully support the customer mechanism and partially support the employee mechanism. Strongest support is for the environment mechanism, which has not to my knowledge yet been examined in empirical CSR research.

Stakeholder influence capacity theory suggests CSR research should start focusing on specific stakeholder groups rather than continuing to examine relationships between firm-level CSR and firm-level performance measures. This direction meshes well with recent developments in instrumental stakeholder theory that stakeholder groups require heterogeneous management from firms if firms are going to benefit from managing their relationships with those groups. Integration of stakeholder influence capacity with instrumental stakeholder theory in this area is an exciting new direction for both CSR research and stakeholder theory research.

CSR research increasingly views CSR as a means of relationship management with key actors external and internal to the firm. Instrumental stakeholder theory holds that firm performance depends on the quality of relationships firms build with various stakeholder groups, some of which are more important to the firm than others. Stakeholder influence capacity has the potential to become the bridge between these two areas of inquiry around firm performance, a bridge that could lead to increased understanding of when, why, where, and how firms engaging on social issues rather than focusing only on traditional business issues affects firm performance.

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## Appendix 1: Chapter 2

Table 38: Empirical tests of CSR performance since 2010.

| | Study | Year | Outcome | Predictor | Data | Time period | Method | Relationship | Mechanism | Counterfactual design |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Surroca et al. (2010) | 2010 | Relationship between responsibility and performance | Firms' intangible resources (culture, human capital, reputation) | Responsibility: Sustainalytics Performance: COMPUSTAT | 2002-2004 | Baron & Kenney mediation with fixed effects regression | Full mediation by intangible resources | Intangible resources | N |
| 2 | Lev et al. (2010) | 2010 | Revenue growth | Philanthropy growth (lag) | Compustat: Revenue; Taft Corporate Giving Directory | 1989-2000 | Granger causality | + | | |
| 3 | "" | 2010 | Philanthropy growth | Revenue growth (lag) | "" | "" | "" | +/- | | |
| 4 | Mishina et al. (2010) | 2010 | Corporate illegality | Performance above aspirations | Illegality: News; Performance and abnormal returns: CRSP; Prominence: Fortune magazine | 1990-1999 | Logistic regression | + | | N |
| 5 | "" | "" | "" | Abnormal market returns | "" | "" | "" | +/- | | N |
| 6 | "" | "" | "" | Firm prominence | "" | "" | "" | +/- | | N |
| 7 | Jiao (2010) | 2010 | Tobin's q | Aggregate CSR | Compustat: Tobin's q; KLD net scores | 1992-2003 | IV Regression | + | | N |
| 8 | "" | 2010 | "" | CSR Community | "" | "" | "" | +/- | | N |
| 9 | "" | 2010 | "" | CSR Diversity | "" | "" | "" | +/- | | N |
| 10 | "" | 2010 | "" | CSR Environment | "" | "" | "" | + | | N |
| 11 | "" | 2010 | "" | CSR Employee | "" | "" | "" | + | | N |
| 12 | "" | 2010 | "" | CSR Product | "" | "" | "" | +/- | | N |
| 13 | Flammer (2013) | 2013 | Share price | Announcement of eco-friendly news | Share price: CRSP; Eco-news: Wall Street Journal | 1980-2009 | Event study | + becoming +/- | Shareholders | Y |
| 14 | "" | "" | "" | Announcement of eco-harmful news | "" | "" | "" | +/- becoming - | Shareholders | Y |
| 15 | Jones, Willness, & Madey (2014) | 2014 | Attractiveness to job seekers | Community responsibility | Experiment with 180 undergraduates | No date | Experiment | + | Employees (4 channels) | Y |
| 16 | "" | 2014 | "" | Environmental responsibility | "" | "" | "" | + | "" | Y |
| 17 | "" | 2014 | "" | Community responsibility | Field experiment with 171 job fair attendees | "" | Observational | + | "" | N |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 18 | "" | 2014 | "" | Environmental responsibility | "" | "" | "" | +/- | "" | N |
| 19 | Glavas & Kelley (2014) | 2014 | Responsibility-commitment relationship | Employee perception of meaningful work | 827 employees, 18 North American food & ag firms | | Survey and SEM | + | Employee | N |
| 20 | "" | | "" | Employee perception of firm support | "" | | "" | +/- | "" | N |
| 21 | "" | | Responsibility- job satisfaction relationship | Employee perception of meaningful work | "" | | "" | + | "" | N |
| 22 | "" | | "" | Employee perception of firm support | "" | | "" | + | "" | N |
| 23 | Flammer (2015) | 2015 | Share price | CSR shareholder proposals | CRSP; RiskMetrics & SharkRepellent | 1997-2012 | Regression discontinuity | + | | Y |
| 24 | "" | 2015 | Labor productivity | "" | "" | "" | "" | + | Employees | |
| 25 | "" | 2015 | Sales growth | "" | "" | "" | "" | + | Customers | |
| 26 | "" | 2015 | Capital expenditures | "" | "" | "" | "" | +/- | Efficiency | |
| 27 | Hawn and Ioannou (2016) | 2016 | Financial performance (log Tobin's q) | Prior internal and current external CSR | Compustat: Tobin's q; CSR: ASSET4; Analysts: I/B/E/S; Accounting: WorldScope | 2002-2008 | Fixed effects regression | + | | N |
| 28 | "" | 2016 | "" | Gap between prior internal and current external CSR | "" | 2002-2008 | Fixed effects regression | - | | N |
| 29 | Shea and Hawn (2019) | 2019 | Firm reputation | CSR, moderated by corporate warmth | Amazon MTurk | | Experiment | + | | Y |
| 30 | "" | 2019 | Purchase intention | "" | "" | | "" | + | | Y |
| 31 | "" | 2019 | Perceived quality | "" | "" | | "" | +/- | | Y |
| 32 | "" | 2019 | Purchase price | "" | "" | | "" | +/- | | Y |
| 33 | | | | | | | | | | |
| 34 | | | | | | | | | | |

Notes: Positive association: + Negative association: - No association: +/-

## Appendix 2: Chapter 3 Full Estimation Results

This Appendix presents the full regression results of all mediation tests.

***Same year***

Pooled regression

Table 39: Pooled regression estimates of the effect of CSR on performance. Standard errors are clustered by firm.

| VARIABLES | (1) Revenue | (2) Revenue | (3) Revenue | (4) Revenue | (5) Revenue | (6) Revenue | (7) Revenue | (8) Revenue | (9) Revenue |
|---|---|---|---|---|---|---|---|---|---|
| CSR | 385.1838*** | 470.1205*** | 368.0587*** | 361.6000*** | 149.6154*** | 116.3507*** | 42.3940 | -57.8872 | 2.4142 |
| | (62.0919) | (73.3217) | (62.2724) | (58.1559) | (39.1271) | (34.8411) | (40.6377) | (47.1300) | (28.9505) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0009 | 0.2970 | 0.2197 | 0.9335 |
| Long-term debt | | | 0.5731*** | 0.3656* | 0.1581 | 0.1462 | 0.8424*** | -0.5162 | 0.0901 |
| | | | (0.1026) | (0.1623) | (0.1038) | (0.1034) | (0.1661) | (0.4645) | (0.0950) |
| | | | 0.0000 | 0.0243 | 0.1277 | 0.1575 | 0.0000 | 0.2668 | 0.3429 |
| Assets | | | | 0.0389 | 0.0322 | 0.0321 | -0.0589*** | 0.6202** | 0.0341 |
| | | | | (0.0252) | (0.0204) | (0.0201) | (0.0150) | (0.2161) | (0.0195) |
| | | | | 0.1217 | 0.1139 | 0.1101 | 0.0001 | 0.0042 | 0.0810 |
| Employees | | | | | 198.6517*** | 194.6057*** | 167.9365*** | 155.4914*** | 183.0731*** |
| | | | | | (9.4815) | (9.6460) | (17.0386) | (13.9539) | (12.8770) |
| | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Age | | | | | | 114.6509*** | 32.1589 | 37.4678 | 89.9270** |
| | | | | | | (28.4093) | (28.6945) | (31.1417) | (27.8902) |
| | | | | | | 0.0001 | 0.2626 | 0.2293 | 0.0013 |
| Advertising | | | | | | | 7.9132*** | -0.8780 | 3.9814* |
| | | | | | | | (1.8196) | (2.2617) | (1.6689) |
| | | | | | | | 0.0000 | 0.6980 | 0.0171 |
| R&D | | | | | | | | -1.0928 | 4.6223*** |
| | | | | | | | | (1.8271) | (0.9579) |
| | | | | | | | | 0.5499 | 0.0000 |
| Observations | 12,877 | 12,877 | 12,824 | 12,824 | 12,770 | 12,699 | 5,626 | 3,358 | 12,699 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses.
*** p<0.001, ** p<0.01, * p<0.05

Table 40: Pooled regression estimates of the effect of CSR on the mediator variable SIC. Standard errors are clustered by firm.

| VARIABLES | (1) SIC | (2) SIC | (3) SIC | (4) SIC | (5) SIC | (6) SIC | (7) SIC | (8) SIC | (9) SIC |
|---|---|---|---|---|---|---|---|---|---|
| CSR | 0.1148*** | 0.1298*** | 0.1265*** | 0.1260*** | 0.1247*** | 0.1190*** | 0.1379*** | 0.1613*** | 0.1029*** |
| | (0.0075) | (0.0092) | (0.0091) | (0.0091) | (0.0092) | (0.0087) | (0.0138) | (0.0169) | (0.0073) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Long-term debt | | | 0.0000*** | 0.0000 | 0.0000 | -0.0000 | -0.0000 | 0.0000 | -0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0009 | 0.6844 | 0.8155 | 0.9757 | 0.1805 | 0.9326 | 0.3494 |
| Assets | | | | 0.0000* | 0.0000* | 0.0000* | 0.0000* | -0.0000 | 0.0000* |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.0337 | 0.0356 | 0.0335 | 0.0417 | 0.4794 | 0.0154 |
| Employees | | | | | 0.0013 | 0.0006 | -0.0019 | -0.0012 | -0.0010 |
| | | | | | (0.0026) | (0.0022) | (0.0014) | (0.0013) | (0.0015) |
| | | | | | 0.6203 | 0.8003 | 0.1743 | 0.3645 | 0.5118 |
| Age | | | | | | 0.0197*** | 0.0293*** | 0.0273*** | 0.0163*** |
| | | | | | | (0.0028) | (0.0046) | (0.0061) | (0.0026) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0009*** | 0.0006* | 0.0005** |
| | | | | | | | (0.0002) | (0.0002) | (0.0002) |
| | | | | | | | 0.0000 | 0.0111 | 0.0057 |
| R&D | | | | | | | | 0.0007** | 0.0007*** |
| | | | | | | | | (0.0002) | (0.0001) |
| | | | | | | | | 0.0012 | 0.0000 |
| Observations | 12,880 | 12,880 | 12,826 | 12,826 | 12,772 | 12,701 | 5,626 | 3,358 | 12,701 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses.
*** p<0.001, ** p<0.01, * p<0.05

Table 41: Pooled regression estimates from the mediation test. Standard errors are clustered by firm.

| VARIABLES | (1) Revenue | (2) Revenue | (3) Revenue | (4) Revenue | (5) Revenue | (6) Revenue | (7) Revenue | (8) Revenue | (9) Revenue |
|---|---|---|---|---|---|---|---|---|---|
| SIC | 820.8253* | 967.7847** | 495.1650 | 415.7281 | 188.9766 | 65.5717 | 114.1903 | -190.7880 | -425.3357 |
| | (355.0205) | (358.5466) | (370.4083) | (386.3527) | (208.6889) | (233.1605) | (143.0524) | (184.6827) | (246.4481) |
| | 0.0208 | 0.0070 | 0.1814 | 0.2820 | 0.3653 | 0.7786 | 0.4249 | 0.3019 | 0.0845 |
| CSR | 290.9722*** | 344.4893*** | 305.4394*** | 309.2309*** | 126.0434** | 108.5472* | 26.6481 | -27.1075 | 46.1960 |
| | (77.4610) | (90.8520) | (82.7135) | (80.9390) | (48.5743) | (44.3376) | (36.3211) | (34.4387) | (39.2335) |
| | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0095 | 0.0144 | 0.4633 | 0.4314 | 0.2391 |
| Long-term debt | | | 0.5638*** | 0.3643* | 0.1578 | 0.1462 | 0.8447*** | -0.5155 | 0.0866 |
| | | | (0.1048) | (0.1631) | (0.1040) | (0.1036) | (0.1663) | (0.4598) | (0.0948) |
| | | | 0.0000 | 0.0255 | 0.1293 | 0.1584 | 0.0000 | 0.2626 | 0.3611 |
| Assets | | | | 0.0377 | 0.0316 | 0.0319 | -0.0592*** | 0.6181** | 0.0354 |
| | | | | (0.0253) | (0.0207) | (0.0206) | (0.0150) | (0.2148) | (0.0202) |
| | | | | 0.1370 | 0.1272 | 0.1210 | 0.0001 | 0.0041 | 0.0800 |
| Employees | | | | | 198.4102*** | 194.5690*** | 168.1522*** | 155.2605*** | 182.6561*** |
| | | | | | (9.5294) | (9.6900) | (17.1471) | (13.8268) | (12.4168) |
| | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Age | | | | | | 113.3579*** | 28.8117 | 42.6701 | 96.8467** |
| | | | | | | (31.7869) | (29.6445) | (32.0643) | (30.8829) |
| | | | | | | 0.0004 | 0.3313 | 0.1837 | 0.0017 |
| Advertising | | | | | | | 7.8083*** | -0.7619 | 4.1931** |
| | | | | | | | (1.8179) | (2.2700) | (1.5993) |
| | | | | | | | 0.0000 | 0.7373 | 0.0088 |
| R&D | | | | | | | | -0.9672 | 4.9085*** |
| | | | | | | | | (1.8482) | (1.0511) |
| | | | | | | | | 0.6009 | 0.0000 |
| Observations | 12,877 | 12,877 | 12,824 | 12,824 | 12,770 | 12,699 | 5,626 | 3,358 | 12,699 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses.
*** p<0.001, ** p<0.01, * p<0.05

Pooled regression: transformed DV to reduce outlier influence

Table 42: Pooled regression estimates of the effect of CSR on performance. The performance measure is transformed to control for the influence of outliers, using the inverse hyperbolic sine transformation. Standard errors are clustered by firm.

| VARIABLES | (1) IHS Revenue | (2) IHS Revenue | (3) IHS Revenue | (4) IHS Revenue | (5) IHS Revenue | (6) IHS Revenue | (7) IHS Revenue | (8) IHS Revenue | (9) IHS Revenue |
|---|---|---|---|---|---|---|---|---|---|
| CSR | 0.0216*** | 0.0330*** | 0.0274*** | 0.0271*** | 0.0191*** | 0.0091* | 0.0101* | 0.0039 | 0.0020 |
| | (0.0045) | (0.0047) | (0.0046) | (0.0045) | (0.0050) | (0.0041) | (0.0048) | (0.0057) | (0.0036) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0001 | 0.0276 | 0.0354 | 0.4956 | 0.5722 |
| Long-term debt | | | 0.0000*** | 0.0000* | 0.0000* | 0.0000 | 0.0000*** | 0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0000 | 0.0105 | 0.0350 | 0.0599 | 0.0007 | 0.3162 | 0.1283 |
| Assets | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000** | 0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.2085 | 0.2047 | 0.1796 | 0.0085 | 0.5312 | 0.1297 |
| Employees | | | | | 0.0072* | 0.0060* | 0.0030* | 0.0025 | 0.0052* |
| | | | | | (0.0034) | (0.0027) | (0.0015) | (0.0013) | (0.0025) |
| | | | | | 0.0325 | 0.0276 | 0.0487 | 0.0504 | 0.0341 |
| Age | | | | | | 0.0345*** | 0.0302*** | 0.0327*** | 0.0329*** |
| | | | | | | (0.0020) | (0.0023) | (0.0026) | (0.0018) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0006*** | 0.0002 | 0.0003** |
| | | | | | | | (0.0002) | (0.0001) | (0.0001) |
| | | | | | | | 0.0004 | 0.1033 | 0.0023 |
| R&D | | | | | | | | 0.0002** | 0.0003*** |
| | | | | | | | | (0.0001) | (0.0000) |
| | | | | | | | | 0.0020 | 0.0000 |
| Observations | 12,877 | 12,877 | 12,824 | 12,824 | 12,770 | 12,699 | 5,626 | 3,358 | 12,699 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 43: Pooled regression estimates of the effect of CSR on the mediator SIC. Standard errors are clustered by firm.

| VARIABLES | (1) SIC | (2) SIC | (3) SIC | (4) SIC | (5) SIC | (6) SIC | (7) SIC | (8) SIC | (9) SIC |
|---|---|---|---|---|---|---|---|---|---|
| CSR | 0.1148*** | 0.1298*** | 0.1265*** | 0.1260*** | 0.1247*** | 0.1190*** | 0.1379*** | 0.1613*** | 0.1029*** |
| | (0.0075) | (0.0092) | (0.0091) | (0.0091) | (0.0092) | (0.0087) | (0.0138) | (0.0169) | (0.0073) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Long-term debt | | | 0.0000*** | 0.0000 | 0.0000 | -0.0000 | -0.0000 | 0.0000 | -0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0009 | 0.6844 | 0.8155 | 0.9757 | 0.1805 | 0.9326 | 0.3494 |
| Assets | | | | 0.0000* | 0.0000* | 0.0000* | 0.0000* | -0.0000 | 0.0000* |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.0337 | 0.0356 | 0.0335 | 0.0417 | 0.4794 | 0.0154 |
| Employees | | | | | 0.0013 | 0.0006 | -0.0019 | -0.0012 | -0.0010 |
| | | | | | (0.0026) | (0.0022) | (0.0014) | (0.0013) | (0.0015) |
| | | | | | 0.6203 | 0.8003 | 0.1743 | 0.3645 | 0.5118 |
| Age | | | | | | 0.0197*** | 0.0293*** | 0.0273*** | 0.0163*** |
| | | | | | | (0.0028) | (0.0046) | (0.0061) | (0.0026) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0009*** | 0.0006* | 0.0005** |
| | | | | | | | (0.0002) | (0.0002) | (0.0002) |
| | | | | | | | 0.0000 | 0.0111 | 0.0057 |
| R&D | | | | | | | | 0.0007** | 0.0007*** |
| | | | | | | | | (0.0002) | (0.0001) |
| | | | | | | | | 0.0012 | 0.0000 |
| Observations | 12,880 | 12,880 | 12,826 | 12,826 | 12,772 | 12,701 | 5,626 | 3,358 | 12,701 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 44: Pooled regression estimates of the mediator test. The performance measure is transformed to control for the influence of outliers, using the inverse hyperbolic sine transformation. Standard errors are clustered by firm.

| VARIABLES | (1) IHS Revenue | (2) IHS Revenue | (3) IHS Revenue | (4) IHS Revenue | (5) IHS Revenue | (6) IHS Revenue | (7) IHS Revenue | (8) IHS Revenue | (9) IHS Revenue |
|---|---|---|---|---|---|---|---|---|---|
| SIC | 0.1687*** | 0.2024*** | 0.1781*** | 0.1755*** | 0.1675*** | 0.1334*** | 0.1113*** | 0.1056*** | 0.1117*** |
| | (0.0120) | (0.0110) | (0.0107) | (0.0110) | (0.0138) | (0.0116) | (0.0107) | (0.0121) | (0.0100) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| CSR | 0.0022 | 0.0067 | 0.0049 | 0.0050 | -0.0018 | -0.0068 | -0.0052 | -0.0131* | -0.0095** |
| | (0.0040) | (0.0042) | (0.0042) | (0.0041) | (0.0040) | (0.0036) | (0.0042) | (0.0054) | (0.0034) |
| | 0.5782 | 0.1098 | 0.2494 | 0.2278 | 0.6592 | 0.0577 | 0.2141 | 0.0154 | 0.0055 |
| Long-term debt | | | 0.0000*** | 0.0000** | 0.0000* | 0.0000* | 0.0000*** | 0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0000 | 0.0088 | 0.0254 | 0.0430 | 0.0002 | 0.2732 | 0.0756 |
| Assets | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000** | 0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.3161 | 0.3159 | 0.2587 | 0.0024 | 0.4208 | 0.1997 |
| Employees | | | | | 0.0070* | 0.0060* | 0.0032* | 0.0027* | 0.0053* |
| | | | | | (0.0030) | (0.0025) | (0.0014) | (0.0012) | (0.0023) |
| | | | | | 0.0184 | 0.0153 | 0.0193 | 0.0251 | 0.0207 |
| Age | | | | | | 0.0319*** | 0.0270*** | 0.0298*** | 0.0311*** |
| | | | | | | (0.0018) | (0.0022) | (0.0025) | (0.0017) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0005** | 0.0001 | 0.0003** |
| | | | | | | | (0.0002) | (0.0001) | (0.0001) |
| | | | | | | | 0.0013 | 0.2688 | 0.0079 |
| R&D | | | | | | | | 0.0001 | 0.0002*** |
| | | | | | | | | (0.0001) | (0.0000) |
| | | | | | | | | 0.1036 | 0.0000 |
| Observations | 12,877 | 12,877 | 12,824 | 12,824 | 12,770 | 12,699 | 5,626 | 3,358 | 12,699 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Longitudinal regression

Table 45: Fixed effects regression estimates of the effect of CSR on performance. Standard errors are clustered by firm.

| VARIABLES | (1) Revenue | (2) Revenue | (3) Revenue | (4) Revenue | (5) Revenue | (6) Revenue | (7) Revenue | (8) Revenue | (9) Revenue |
|---|---|---|---|---|---|---|---|---|---|
| CSR | 4.9701 | -27.4119 | -29.0303* | -27.0146 | -11.6903 | -11.7654 | -26.9959 | -37.3349 | -11.8232 |
| | (9.2532) | (14.3148) | (14.1007) | (14.2233) | (11.9344) | (11.9712) | (18.2223) | (25.7553) | (11.9353) |
| | 0.5912 | 0.0556 | 0.0396 | 0.0576 | 0.3274 | 0.3258 | 0.1387 | 0.1476 | 0.3220 |
| Long-term debt | | | 0.2006** | 0.0887 | 0.0668 | 0.0668 | 0.1494 | -0.1855 | 0.0532 |
| | | | (0.0673) | (0.0607) | (0.0706) | (0.0706) | (0.1264) | (0.1763) | (0.0777) |
| | | | 0.0029 | 0.1440 | 0.3441 | 0.3442 | 0.2374 | 0.2931 | 0.4939 |
| Assets | | | | 0.0590* | 0.0478* | 0.0478* | 0.0024 | 0.2989*** | 0.0453* |
| | | | | (0.0269) | (0.0232) | (0.0232) | (0.0181) | (0.0903) | (0.0228) |
| | | | | 0.0287 | 0.0392 | 0.0392 | 0.8937 | 0.0010 | 0.0475 |
| Employees | | | | | 183.2033*** | 183.1970*** | 132.1620** | 108.5976* | 169.4444*** |
| | | | | | (46.5318) | (46.5341) | (47.2045) | (48.8953) | (46.0200) |
| | | | | | 0.0001 | 0.0001 | 0.0052 | 0.0266 | 0.0002 |
| Age | | | | | | -56.2629 | 236.5772** | 15.4378 | -79.8959 |
| | | | | | | (122.2837) | (85.5222) | (86.2327) | (122.3479) |
| | | | | | | 0.6455 | 0.0058 | 0.8580 | 0.5138 |
| Advertising | | | | | | | 5.7358** | 4.6638** | 2.7530*** |
| | | | | | | | (1.8289) | (1.6550) | (0.6390) |
| | | | | | | | 0.0018 | 0.0050 | 0.0000 |
| R&D | | | | | | | | 0.9977 | 2.6653*** |
| | | | | | | | | (0.8294) | (0.6769) |
| | | | | | | | | 0.2294 | 0.0001 |
| Observations | 12,877 | 12,877 | 12,824 | 12,824 | 12,770 | 12,699 | 5,626 | 3,358 | 12,699 |
| Number of firms | 2,940 | 2,940 | 2,933 | 2,933 | 2,922 | 2,893 | 1,289 | 780 | 2,893 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 46: Fixed effects regression estimates of the effect of CSR on SIC. Standard errors are clustered by firm.

| VARIABLES | (1) SIC | (2) SIC | (3) SIC | (4) SIC | (5) SIC | (6) SIC | (7) SIC | (8) SIC | (9) SIC |
|---|---|---|---|---|---|---|---|---|---|
| CSR | 0.0403*** | 0.0429*** | 0.0426*** | 0.0425*** | 0.0422*** | 0.0421*** | 0.0393*** | 0.0590*** | 0.0420*** |
| | (0.0046) | (0.0047) | (0.0047) | (0.0047) | (0.0047) | (0.0047) | (0.0078) | (0.0101) | (0.0047) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Long-term debt | | | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 | 0.0000 | -0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0001) | (0.0000) |
| | | | 0.5230 | 0.6821 | 0.6976 | 0.6978 | 0.2901 | 0.8661 | 0.6929 |
| Assets | | | | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.9244 | 0.9493 | 0.9494 | 0.5418 | 0.4907 | 0.9558 |
| Employees | | | | | -0.0022 | -0.0022 | 0.0015 | 0.0051 | -0.0021 |
| | | | | | (0.0042) | (0.0042) | (0.0044) | (0.0034) | (0.0043) |
| | | | | | 0.6018 | 0.6017 | 0.7293 | 0.1314 | 0.6334 |
| Age | | | | | | 0.4475*** | 0.3738*** | 0.3949*** | 0.4468*** |
| | | | | | | (0.0216) | (0.0329) | (0.0437) | (0.0217) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0008 | 0.0016* | -0.0003 |
| | | | | | | | (0.0005) | (0.0007) | (0.0004) |
| | | | | | | | 0.1081 | 0.0149 | 0.4176 |
| R&D | | | | | | | | -0.0001 | 0.0001 |
| | | | | | | | | (0.0003) | (0.0003) |
| | | | | | | | | 0.6057 | 0.6353 |
| Observations | 12,880 | 12,880 | 12,826 | 12,826 | 12,772 | 12,701 | 5,626 | 3,358 | 12,701 |
| Number of firms | 2,940 | 2,940 | 2,933 | 2,933 | 2,922 | 2,893 | 1,289 | 780 | 2,893 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 47: Fixed effects regression estimates of the mediation test. Standard errors are clustered by firm.

| VARIABLES | (1) Revenue | (2) Revenue | (3) Revenue | (4) Revenue | (5) Revenue | (6) Revenue | (7) Revenue | (8) Revenue | (9) Revenue |
|---|---|---|---|---|---|---|---|---|---|
| SIC | 40.3744 | -104.4231 | -97.7358 | -96.7296 | -86.0744 | -86.1930 | 38.5719 | 84.6574 | -86.1643 |
| | (73.7781) | (68.2816) | (66.1185) | (65.5498) | (62.3694) | (62.4421) | (40.3921) | (43.9918) | (61.4216) |
| | 0.5843 | 0.1263 | 0.1395 | 0.1401 | 0.1677 | 0.1676 | 0.3398 | 0.0547 | 0.1608 |
| CSR | 3.3432 | -22.9404 | -24.8713 | -22.8998 | -8.0570 | -8.1361 | -28.5118 | -42.3308 | -8.2062 |
| | (9.8155) | (14.8432) | (14.5979) | (14.8532) | (12.5080) | (12.5417) | (17.8354) | (25.4235) | (12.5040) |
| | 0.7334 | 0.1223 | 0.0885 | 0.1232 | 0.5195 | 0.5166 | 0.1102 | 0.0963 | 0.5117 |
| Long-term debt | | | 0.1999** | 0.0881 | 0.0664 | 0.0663 | 0.1503 | -0.1863 | 0.0527 |
| | | | (0.0671) | (0.0606) | (0.0706) | (0.0706) | (0.1274) | (0.1756) | (0.0779) |
| | | | 0.0029 | 0.1458 | 0.3474 | 0.3476 | 0.2381 | 0.2889 | 0.4986 |
| Assets | | | | 0.0589* | 0.0478* | 0.0478* | 0.0025 | 0.3003*** | 0.0453* |
| | | | | (0.0271) | (0.0233) | (0.0233) | (0.0182) | (0.0902) | (0.0229) |
| | | | | 0.0297 | 0.0403 | 0.0403 | 0.8902 | 0.0009 | 0.0486 |
| Employees | | | | | 183.0148*** | 183.0082*** | 132.1032** | 108.1638* | 169.2669*** |
| | | | | | (46.3552) | (46.3573) | (47.2378) | (48.8783) | (45.8347) |
| | | | | | 0.0001 | 0.0001 | 0.0052 | 0.0272 | 0.0002 |
| Age | | | | | | -17.6912 | 222.1587* | -17.9913 | -41.3949 |
| | | | | | | (109.9408) | (93.2154) | (91.1260) | (110.0504) |
| | | | | | | 0.8722 | 0.0173 | 0.8435 | 0.7068 |
| Advertising | | | | | | | 5.7063** | 4.5276** | 2.7251*** |
| | | | | | | | (1.8350) | (1.6694) | (0.6459) |
| | | | | | | | 0.0019 | 0.0068 | 0.0000 |
| R&D | | | | | | | | 1.0095 | 2.6773*** |
| | | | | | | | | (0.8235) | (0.6820) |
| | | | | | | | | 0.2206 | 0.0001 |
| Observations | 12,877 | 12,877 | 12,824 | 12,824 | 12,770 | 12,699 | 5,626 | 3,358 | 12,699 |
| Number of firms | 2,940 | 2,940 | 2,933 | 2,933 | 2,922 | 2,893 | 1,289 | 780 | 2,893 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Longitudinal regression: transformed DV to reduce outlier influence

Table 48: Fixed effects regression estimates of the effect of CSR on performance. The performance measure is transformed to control for the influence of outliers, using the inverse hyperbolic sine transformation. Standard errors are clustered by firm.

| VARIABLES | (1) IHS Revenue | (2) IHS Revenue | (3) IHS Revenue | (4) IHS Revenue | (5) IHS Revenue | (6) IHS Revenue | (7) IHS Revenue | (8) IHS Revenue | (9) IHS Revenue |
|---|---|---|---|---|---|---|---|---|---|
| CSR | 0.0031*** | -0.0016 | -0.0016 | -0.0015 | -0.0011 | -0.0010 | -0.0015 | -0.0006 | -0.0011 |
| | (0.0009) | (0.0011) | (0.0011) | (0.0011) | (0.0011) | (0.0011) | (0.0010) | (0.0014) | (0.0011) |
| | 0.0007 | 0.1341 | 0.1544 | 0.1633 | 0.3158 | 0.3363 | 0.1415 | 0.6446 | 0.3309 |
| Long-term debt | | | 0.0000* | 0.0000 | 0.0000 | 0.0000 | -0.0000 | -0.0000** | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0114 | 0.0756 | 0.2864 | 0.2958 | 0.7094 | 0.0068 | 0.6076 |
| Assets | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000* | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.1187 | 0.2091 | 0.2101 | 0.7642 | 0.0442 | 0.2620 |
| Employees | | | | | 0.0060*** | 0.0060*** | 0.0036*** | 0.0029** | 0.0055*** |
| | | | | | (0.0012) | (0.0012) | (0.0009) | (0.0010) | (0.0012) |
| | | | | | 0.0000 | 0.0000 | 0.0001 | 0.0047 | 0.0000 |
| Age | | | | | | 0.0288*** | 0.0334*** | 0.0372*** | 0.0280*** |
| | | | | | | (0.0069) | (0.0032) | (0.0038) | (0.0069) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0001 |
| Advertising | | | | | | | 0.0003*** | 0.0002* | 0.0001 |
| | | | | | | | (0.0001) | (0.0001) | (0.0000) |
| | | | | | | | 0.0000 | 0.0113 | 0.1084 |
| R&D | | | | | | | | 0.0000 | 0.0001* |
| | | | | | | | | (0.0000) | (0.0000) |
| | | | | | | | | 0.3462 | 0.0310 |
| Observations | 12,877 | 12,877 | 12,824 | 12,824 | 12,770 | 12,699 | 5,626 | 3,358 | 12,699 |
| Number of firms | 2,940 | 2,940 | 2,933 | 2,933 | 2,922 | 2,893 | 1,289 | 780 | 2,893 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 49: Fixed effects regression estimates of effect of CSR on SIC. Standard errors are clustered by firm.

| VARIABLES | (1) SIC | (2) SIC | (3) SIC | (4) SIC | (5) SIC | (6) SIC | (7) SIC | (8) SIC | (9) SIC |
|---|---|---|---|---|---|---|---|---|---|
| CSR | 0.0403*** | 0.0429*** | 0.0426*** | 0.0425*** | 0.0422*** | 0.0421*** | 0.0393*** | 0.0590*** | 0.0420*** |
| | (0.0046) | (0.0047) | (0.0047) | (0.0047) | (0.0047) | (0.0047) | (0.0078) | (0.0101) | (0.0047) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Long-term debt | | | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 | 0.0000 | -0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0001) | (0.0000) |
| | | | 0.5230 | 0.6821 | 0.6976 | 0.6978 | 0.2901 | 0.8661 | 0.6929 |
| Assets | | | | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.9244 | 0.9493 | 0.9494 | 0.5418 | 0.4907 | 0.9558 |
| Employees | | | | | -0.0022 | -0.0022 | 0.0015 | 0.0051 | -0.0021 |
| | | | | | (0.0042) | (0.0042) | (0.0044) | (0.0034) | (0.0043) |
| | | | | | 0.6018 | 0.6017 | 0.7293 | 0.1314 | 0.6334 |
| Age | | | | | | 0.4475*** | 0.3738*** | 0.3949*** | 0.4468*** |
| | | | | | | (0.0216) | (0.0329) | (0.0437) | (0.0217) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0008 | 0.0016* | -0.0003 |
| | | | | | | | (0.0005) | (0.0007) | (0.0004) |
| | | | | | | | 0.1081 | 0.0149 | 0.4176 |
| R&D | | | | | | | | -0.0001 | 0.0001 |
| | | | | | | | | (0.0003) | (0.0003) |
| | | | | | | | | 0.6057 | 0.6353 |
| Observations | 12,880 | 12,880 | 12,826 | 12,826 | 12,772 | 12,701 | 5,626 | 3,358 | 12,701 |
| Number of firms | 2,940 | 2,940 | 2,933 | 2,933 | 2,922 | 2,893 | 1,289 | 780 | 2,893 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 50: Fixed effects regression estimates of the mediation test.

| VARIABLES | (1) IHS Revenue | (2) IHS Revenue | (3) IHS Revenue | (4) IHS Revenue | (5) IHS Revenue | (6) IHS Revenue | (7) IHS Revenue | (8) IHS Revenue | (9) IHS Revenue |
|---|---|---|---|---|---|---|---|---|---|
| SIC | 0.0201*** | 0.0028 | 0.0029 | 0.0030 | 0.0033 | 0.0033 | 0.0105*** | 0.0112*** | 0.0033 |
| | (0.0024) | (0.0030) | (0.0030) | (0.0030) | (0.0029) | (0.0029) | (0.0026) | (0.0026) | (0.0029) |
| | 0.0000 | 0.3554 | 0.3262 | 0.3238 | 0.2611 | 0.2525 | 0.0000 | 0.0000 | 0.2548 |
| CSR | 0.0023* | -0.0018 | -0.0017 | -0.0017 | -0.0012 | -0.0012 | -0.0020 | -0.0013 | -0.0012 |
| | (0.0009) | (0.0011) | (0.0011) | (0.0011) | (0.0011) | (0.0011) | (0.0010) | (0.0014) | (0.0011) |
| | 0.0108 | 0.1139 | 0.1301 | 0.1378 | 0.2660 | 0.2832 | 0.0558 | 0.3413 | 0.2789 |
| Long-term debt | | | 0.0000* | 0.0000 | 0.0000 | 0.0000 | -0.0000 | -0.0000** | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0118 | 0.0769 | 0.2817 | 0.2907 | 0.8516 | 0.0066 | 0.5965 |
| Assets | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000* | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.1148 | 0.2039 | 0.2048 | 0.8250 | 0.0389 | 0.2570 |
| Employees | | | | | 0.0060*** | 0.0060*** | 0.0036*** | 0.0028** | 0.0055*** |
| | | | | | (0.0012) | (0.0012) | (0.0010) | (0.0010) | (0.0012) |
| | | | | | 0.0000 | 0.0000 | 0.0002 | 0.0061 | 0.0000 |
| Age | | | | | | 0.0273*** | 0.0294*** | 0.0327*** | 0.0265*** |
| | | | | | | (0.0077) | (0.0034) | (0.0039) | (0.0077) |
| | | | | | | 0.0004 | 0.0000 | 0.0000 | 0.0006 |
| Advertising | | | | | | | 0.0003*** | 0.0002* | 0.0001 |
| | | | | | | | (0.0001) | (0.0001) | (0.0000) |
| | | | | | | | 0.0000 | 0.0198 | 0.0971 |
| R&D | | | | | | | | 0.0000 | 0.0001* |
| | | | | | | | | (0.0000) | (0.0000) |
| | | | | | | | | 0.3125 | 0.0309 |
| Observations | 12,877 | 12,877 | 12,824 | 12,824 | 12,770 | 12,699 | 5,626 | 3,358 | 12,699 |
| Number of firms | 2,940 | 2,940 | 2,933 | 2,933 | 2,922 | 2,893 | 1,289 | 780 | 2,893 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Note: The performance measure is transformed to control for the influence of outliers, using the inverse hyperbolic sine transformation. Robust standard errors clustered by firm in parentheses. *** p<0.001, ** p<0.01, * p<0.05

### *Time dynamics*

The Baron and Kenny mediation approach assumes correctly specified causal relationships. This section presents the results of an exploration of whether analysis results change based on assumptions about the temporal relationships between independent, outcome, and mediator variables. Mediation relationships imply the passage of time. If *M* mediates the relationship between *X* and *Y*, *M* must occur after *X* but before *Y*. However, the exact timing of occurrence and lag between variables is uncertain. Examining temporal dynamics assesses the possibility of "alternative causal flows" in the mediation relationship (Aguinis et al., 2017, p. 677).

Pooled regression

Table 51: Pooled regression estimates of the effect of CSR on performance using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| $CSR_{t-1}$ | 385.7899*** | 508.8450*** | 389.6923*** | 395.2628*** | 180.8716*** | 150.6861*** | 59.1093 | -19.4273 | 37.2439 |
| | (68.5240) | (83.3477) | (65.4185) | (66.4447) | (49.3399) | (42.8810) | (48.2051) | (43.4141) | (35.5474) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0003 | 0.0005 | 0.2205 | 0.6547 | 0.2949 |
| Long-term $debt_{t-1}$ | | | 0.6168*** | 0.4359* | 0.1399 | 0.1259 | 0.9655*** | -0.3766 | 0.0649 |
| | | | (0.1242) | (0.1988) | (0.1348) | (0.1361) | (0.2248) | (0.5560) | (0.1345) |
| | | | 0.0000 | 0.0284 | 0.2994 | 0.3550 | 0.0000 | 0.4986 | 0.6297 |
| $Assets_{t-1}$ | | | | 0.0323 | 0.0342 | 0.0346 | -0.0726*** | 0.6127** | 0.0370 |
| | | | | (0.0316) | (0.0266) | (0.0265) | (0.0216) | (0.2184) | (0.0264) |
| | | | | 0.3079 | 0.1995 | 0.1925 | 0.0008 | 0.0052 | 0.1618 |
| $Employees_{t-1}$ | | | | | 202.4073*** | 199.0800*** | 174.7611*** | 161.3231*** | 189.2236*** |
| | | | | | (10.7971) | (11.4953) | (18.6668) | (14.8177) | (15.2528) |
| | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Age_{t-1}$ | | | | | | 115.2883** | 33.9283 | 43.3583 | 86.1923* |
| | | | | | | (35.7941) | (36.6134) | (36.4794) | (35.0873) |
| | | | | | | 0.0013 | 0.3544 | 0.2351 | 0.0141 |
| $Advertising_{t-1}$ | | | | | | | 7.5555*** | -1.5951 | 3.9559* |
| | | | | | | | (2.0847) | (2.0541) | (1.9115) |
| | | | | | | | 0.0003 | 0.4378 | 0.0386 |
| $R\&D_{t-1}$ | | | | | | | | -1.4092 | 4.4606*** |
| | | | | | | | | (1.8596) | (1.0288) |
| | | | | | | | | 0.4489 | 0.0000 |
| Observations | 7,320 | 7,320 | 7,290 | 7,290 | 7,269 | 7,247 | 3,247 | 1,949 | 7,247 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 52: Pooled regression estimates of the effect of CSR on SIC using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $SIC_t$ | (2) $SIC_t$ | (3) $SIC_t$ | (4) $SIC_t$ | (5) $SIC_t$ | (6) $SIC_t$ | (7) $SIC_t$ | (8) $SIC_t$ | (9) $SIC_t$ |
|---|---|---|---|---|---|---|---|---|---|
| $CSR_{t-1}$ | 0.0920*** | 0.1105*** | 0.1072*** | 0.1073*** | 0.1061*** | 0.1013*** | 0.1222*** | 0.1365*** | 0.0835*** |
| | (0.0079) | (0.0098) | (0.0097) | (0.0097) | (0.0098) | (0.0093) | (0.0141) | (0.0166) | (0.0074) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Long-term $debt_{t-1}$ | | | 0.0000** | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0073 | 0.9526 | 0.7861 | 0.5813 | 0.3796 | 0.8832 | 0.0709 |
| $Assets_{t-1}$ | | | | 0.0000* | 0.0000* | 0.0000* | 0.0000 | -0.0000 | 0.0000** |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.0380 | 0.0345 | 0.0298 | 0.1476 | 0.5700 | 0.0069 |
| $Employees_{t-1}$ | | | | | 0.0014 | 0.0008 | -0.0019 | -0.0011 | -0.0008 |
| | | | | | (0.0026) | (0.0023) | (0.0014) | (0.0013) | (0.0016) |
| | | | | | 0.5898 | 0.7312 | 0.1726 | 0.4066 | 0.6182 |
| $Age_{t-1}$ | | | | | | 0.0194*** | 0.0281*** | 0.0250*** | 0.0150*** |
| | | | | | | (0.0031) | (0.0051) | (0.0066) | (0.0028) |
| | | | | | | 0.0000 | 0.0000 | 0.0002 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0009*** | 0.0006** | 0.0006** |
| | | | | | | | (0.0002) | (0.0002) | (0.0002) |
| | | | | | | | 0.0001 | 0.0058 | 0.0012 |
| $R\&D_{t-1}$ | | | | | | | | 0.0007*** | 0.0008*** |
| | | | | | | | | (0.0002) | (0.0001) |
| | | | | | | | | 0.0000 | 0.0000 |
| Observations | 9,723 | 9,723 | 9,681 | 9,681 | 9,649 | 9,608 | 4,306 | 2,579 | 9,608 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 53: Pooled regression estimates of the mediation test using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| $SIC_t$ | 956.6806* | 978.6008* | 617.6357 | 552.2029 | 279.1175 | 176.7458 | 155.0976 | -59.1698 | -347.9597 |
| | (428.1352) | (436.9712) | (445.1071) | (459.1515) | (240.4898) | (264.8225) | (170.3775) | (203.4813) | (283.7297) |
| | 0.0256 | 0.0252 | 0.1654 | 0.2293 | 0.2459 | 0.5046 | 0.3629 | 0.7713 | 0.2202 |
| $CSR_{t-1}$ | 299.9565*** | 399.4085*** | 322.6277*** | 334.9339*** | 150.6745* | 132.4190* | 39.6636 | -11.0430 | 66.1406 |
| | (84.3325) | (106.1413) | (90.0113) | (93.2696) | (62.1488) | (56.5630) | (40.5394) | (37.6858) | (49.7025) |
| | 0.0004 | 0.0002 | 0.0003 | 0.0003 | 0.0154 | 0.0193 | 0.3281 | 0.7696 | 0.1834 |
| Long-term $debt_{t-1}$ | | | 0.6072*** | 0.4393* | 0.1422 | 0.1278 | 0.9683*** | -0.3770 | 0.0574 |
| | | | (0.1249) | (0.1972) | (0.1363) | (0.1384) | (0.2256) | (0.5541) | (0.1390) |
| | | | 0.0000 | 0.0260 | 0.2971 | 0.3562 | 0.0000 | 0.4966 | 0.6800 |
| $Assets_{t-1}$ | | | | 0.0301 | 0.0331 | 0.0339 | -0.0730*** | 0.6118** | 0.0385 |
| | | | | (0.0316) | (0.0272) | (0.0272) | (0.0216) | (0.2183) | (0.0276) |
| | | | | 0.3402 | 0.2230 | 0.2134 | 0.0008 | 0.0053 | 0.1628 |
| $Employees_{t-1}$ | | | | | 202.0041*** | 198.9256*** | 175.1087*** | 161.2567*** | 188.9126*** |
| | | | | | (11.1319) | (11.7484) | (18.8332) | (14.7915) | (14.7567) |
| | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Age_{t-1}$ | | | | | | 111.8226** | 29.1705 | 44.9425 | 91.2024* |
| | | | | | | (39.4186) | (37.0208) | (36.8664) | (37.9586) |
| | | | | | | 0.0046 | 0.4309 | 0.2234 | 0.0164 |
| $Advertising_{t-1}$ | | | | | | | 7.3904*** | -1.5506 | 4.2031* |
| | | | | | | | (2.0897) | (2.1013) | (1.8163) |
| | | | | | | | 0.0004 | 0.4609 | 0.0208 |
| $R\&D_{t-1}$ | | | | | | | | -1.3614 | 4.7381*** |
| | | | | | | | | (1.9149) | (1.1841) |
| | | | | | | | | 0.4774 | 0.0001 |
| Observations | 7,320 | 7,320 | 7,290 | 7,290 | 7,269 | 7,247 | 3,247 | 1,949 | 7,247 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Pooled regression: transformed DV to reduce outlier influence

Table 54: Pooled regression estimates of the effect of CSR on performance using a time-delayed specification and an inverse hyperbolic sine transformed performance variable to control for the influence of outliers. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| $CSR_{t-1}$ | 0.0144** | 0.0278*** | 0.0218*** | 0.0221*** | 0.0155** | 0.0084* | 0.0087 | 0.0049 | 0.0011 |
| | (0.0045) | (0.0048) | (0.0045) | (0.0044) | (0.0047) | (0.0041) | (0.0052) | (0.0060) | (0.0036) |
| | 0.0015 | 0.0000 | 0.0000 | 0.0000 | 0.0010 | 0.0392 | 0.0973 | 0.4116 | 0.7691 |
| Long-term $debt_{t-1}$ | | | 0.0000*** | 0.0000 | 0.0000 | 0.0000 | 0.0000** | 0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0000 | 0.0536 | 0.1486 | 0.2243 | 0.0039 | 0.5351 | 0.3963 |
| $Assets_{t-1}$ | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000* | 0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.3749 | 0.2729 | 0.2269 | 0.0303 | 0.2708 | 0.1622 |
| $Employees_{t-1}$ | | | | | 0.0061* | 0.0053* | 0.0028* | 0.0022* | 0.0046* |
| | | | | | (0.0028) | (0.0023) | (0.0013) | (0.0011) | (0.0021) |
| | | | | | 0.0293 | 0.0241 | 0.0386 | 0.0499 | 0.0284 |
| $Age_{t-1}$ | | | | | | 0.0269*** | 0.0258*** | 0.0268*** | 0.0250*** |
| | | | | | | (0.0020) | (0.0025) | (0.0028) | (0.0018) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0006** | 0.0001 | 0.0003** |
| | | | | | | | (0.0002) | (0.0001) | (0.0001) |
| | | | | | | | 0.0017 | 0.2050 | 0.0032 |
| $R\&D_{t-1}$ | | | | | | | | 0.0001* | 0.0003*** |
| | | | | | | | | (0.0001) | (0.0000) |
| | | | | | | | | 0.0223 | 0.0000 |
| Observations | 7,320 | 7,320 | 7,290 | 7,290 | 7,269 | 7,247 | 3,247 | 1,949 | 7,247 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 55: Pooled regression estimates of the effect of CSR on SIC using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $SIC_t$ | (2) $SIC_t$ | (3) $SIC_t$ | (4) $SIC_t$ | (5) $SIC_t$ | (6) $SIC_t$ | (7) $SIC_t$ | (8) $SIC_t$ | (9) $SIC_t$ |
|---|---|---|---|---|---|---|---|---|---|
| $CSR_{t-1}$ | 0.0920*** | 0.1105*** | 0.1072*** | 0.1073*** | 0.1061*** | 0.1013*** | 0.1222*** | 0.1365*** | 0.0835*** |
| | (0.0079) | (0.0098) | (0.0097) | (0.0097) | (0.0098) | (0.0093) | (0.0141) | (0.0166) | (0.0074) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Long-term $debt_{t-1}$ | | | 0.0000** | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0073 | 0.9526 | 0.7861 | 0.5813 | 0.3796 | 0.8832 | 0.0709 |
| $Assets_{t-1}$ | | | | 0.0000* | 0.0000* | 0.0000* | 0.0000 | -0.0000 | 0.0000** |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.0380 | 0.0345 | 0.0298 | 0.1476 | 0.5700 | 0.0069 |
| $Employees_{t-1}$ | | | | | 0.0014 | 0.0008 | -0.0019 | -0.0011 | -0.0008 |
| | | | | | (0.0026) | (0.0023) | (0.0014) | (0.0013) | (0.0016) |
| | | | | | 0.5898 | 0.7312 | 0.1726 | 0.4066 | 0.6182 |
| $Age_{t-1}$ | | | | | | 0.0194*** | 0.0281*** | 0.0250*** | 0.0150*** |
| | | | | | | (0.0031) | (0.0051) | (0.0066) | (0.0028) |
| | | | | | | 0.0000 | 0.0000 | 0.0002 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0009*** | 0.0006** | 0.0006** |
| | | | | | | | (0.0002) | (0.0002) | (0.0002) |
| | | | | | | | 0.0001 | 0.0058 | 0.0012 |
| $R\&D_{t-1}$ | | | | | | | | 0.0007*** | 0.0008*** |
| | | | | | | | | (0.0002) | (0.0001) |
| | | | | | | | | 0.0000 | 0.0000 |
| Observations | 9,723 | 9,723 | 9,681 | 9,681 | 9,649 | 9,608 | 4,306 | 2,579 | 9,608 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 56: Pooled regression estimates of the mediation test using a time-delayed specification and an inverse hyperbolic sine transformed performance variable to control for the influence of outliers. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| $SIC_t$ | 0.1631*** | 0.1691*** | 0.1523*** | 0.1504*** | 0.1428*** | 0.1210*** | 0.1045*** | 0.0954*** | 0.0972*** |
| | (0.0122) | (0.0112) | (0.0109) | (0.0109) | (0.0129) | (0.0115) | (0.0113) | (0.0117) | (0.0100) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $CSR_{t-1}$ | -0.0002 | 0.0089* | 0.0053 | 0.0057 | 0.0000 | -0.0041 | -0.0045 | -0.0086 | -0.0070* |
| | (0.0041) | (0.0043) | (0.0040) | (0.0040) | (0.0038) | (0.0035) | (0.0045) | (0.0057) | (0.0034) |
| | 0.9619 | 0.0383 | 0.1880 | 0.1559 | 0.9992 | 0.2496 | 0.3272 | 0.1308 | 0.0417 |
| Long-term $debt_{t-1}$ | | | 0.0000*** | 0.0000* | 0.0000 | 0.0000 | 0.0000** | 0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0000 | 0.0280 | 0.0801 | 0.1322 | 0.0018 | 0.4620 | 0.2260 |
| $Assets_{t-1}$ | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000* | 0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.5374 | 0.4147 | 0.3311 | 0.0134 | 0.1703 | 0.2503 |
| $Employees_{t-1}$ | | | | | 0.0059* | 0.0052* | 0.0030* | 0.0023* | 0.0047* |
| | | | | | (0.0024) | (0.0020) | (0.0012) | (0.0010) | (0.0019) |
| | | | | | 0.0142 | 0.0112 | 0.0115 | 0.0234 | 0.0150 |
| $Age_{t-1}$ | | | | | | 0.0245*** | 0.0226*** | 0.0243*** | 0.0236*** |
| | | | | | | (0.0018) | (0.0024) | (0.0027) | (0.0017) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0004** | 0.0001 | 0.0002* |
| | | | | | | | (0.0002) | (0.0001) | (0.0001) |
| | | | | | | | 0.0048 | 0.5186 | 0.0112 |
| $R\&D_{t-1}$ | | | | | | | | 0.0001 | 0.0002*** |
| | | | | | | | | (0.0001) | (0.0000) |
| | | | | | | | | 0.3025 | 0.0000 |
| Observations | 7,320 | 7,320 | 7,290 | 7,290 | 7,269 | 7,247 | 3,247 | 1,949 | 7,247 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Longitudinal regression

Table 57: Fixed effects regression estimates of the effect of CSR on performance using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| $CSR_{t-1}$ | 4.9151 | 19.9044 | 23.1240 | 21.3430 | 30.4634 | 30.4805 | -20.8196 | -21.1910 | 31.2096 |
| | (13.6325) | (30.1996) | (29.9987) | (27.9464) | (27.1188) | (27.1435) | (18.7604) | (28.2196) | (27.4001) |
| | 0.7185 | 0.5099 | 0.4409 | 0.4451 | 0.2614 | 0.2616 | 0.2674 | 0.4530 | 0.2548 |
| Long-term $debt_{t-1}$ | | | 0.1746* | 0.2026** | 0.1672* | 0.1672* | 0.1315 | 0.2261 | 0.1664* |
| | | | (0.0769) | (0.0773) | (0.0763) | (0.0763) | (0.0766) | (0.5832) | (0.0770) |
| | | | 0.0233 | 0.0089 | 0.0286 | 0.0286 | 0.0861 | 0.6984 | 0.0307 |
| $Assets_{t-1}$ | | | | -0.0193 | -0.0271 | -0.0271 | -0.0096 | 0.0229 | -0.0278 |
| | | | | (0.0268) | (0.0277) | (0.0277) | (0.0162) | (0.2506) | (0.0280) |
| | | | | 0.4719 | 0.3280 | 0.3280 | 0.5538 | 0.9273 | 0.3201 |
| $Employees_{t-1}$ | | | | | 159.2795*** | 159.2757*** | 93.8398* | 89.1854 | 156.6610** |
| | | | | | (47.9981) | (47.9997) | (42.3526) | (46.5805) | (48.4682) |
| | | | | | 0.0009 | 0.0009 | 0.0270 | 0.0561 | 0.0012 |
| $Age_{t-1}$ | | | | | | 214.8303 | 322.8802* | 194.6438 | 207.2838 |
| | | | | | | (124.6605) | (127.9655) | (166.5748) | (125.5402) |
| | | | | | | 0.0850 | 0.0118 | 0.2431 | 0.0989 |
| $Advertising_{t-1}$ | | | | | | | 0.8445 | 0.7119 | 0.3548 |
| | | | | | | | (1.8566) | (2.4460) | (1.2723) |
| | | | | | | | 0.6493 | 0.7711 | 0.7804 |
| $R\&D_{t-1}$ | | | | | | | | 0.8543 | 0.9171 |
| | | | | | | | | (1.6850) | (0.6543) |
| | | | | | | | | 0.6123 | 0.1612 |
| Observations | 7,320 | 7,320 | 7,290 | 7,290 | 7,269 | 7,247 | 3,247 | 1,949 | 7,247 |
| Number of firms | 1,933 | 1,933 | 1,928 | 1,928 | 1,922 | 1,912 | 879 | 527 | 1,912 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 58: Fixed effects regression estimates of the effect of CSR on SIC using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $SIC_t$ | (2) $SIC_t$ | (3) $SIC_t$ | (4) $SIC_t$ | (5) $SIC_t$ | (6) $SIC_t$ | (7) $SIC_t$ | (8) $SIC_t$ | (9) $SIC_t$ |
|---|---|---|---|---|---|---|---|---|---|
| $CSR_{t-1}$ | 0.0196*** | 0.0250*** | 0.0248*** | 0.0245*** | 0.0245*** | 0.0246*** | 0.0294*** | 0.0363** | 0.0243*** |
| | (0.0046) | (0.0052) | (0.0052) | (0.0052) | (0.0053) | (0.0053) | (0.0084) | (0.0120) | (0.0053) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0005 | 0.0025 | 0.0000 |
| Long-term $debt_{t-1}$ | | | -0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0000 | -0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0001) | (0.0000) |
| | | | 0.9644 | 0.6738 | 0.6532 | 0.6546 | 0.7533 | 0.6214 | 0.5966 |
| $Assets_{t-1}$ | | | | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.3103 | 0.3353 | 0.3360 | 0.2011 | 0.9877 | 0.3882 |
| $Employees_{t-1}$ | | | | | -0.0033 | -0.0033 | 0.0032 | 0.0100 | -0.0021 |
| | | | | | (0.0052) | (0.0052) | (0.0061) | (0.0053) | (0.0051) |
| | | | | | 0.5284 | 0.5297 | 0.5996 | 0.0596 | 0.6739 |
| $Age_{t-1}$ | | | | | | 0.5221*** | 0.4218*** | 0.4327*** | 0.5243*** |
| | | | | | | (0.0265) | (0.0407) | (0.0541) | (0.0266) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | -0.0001 | -0.0001 | -0.0006 |
| | | | | | | | (0.0007) | (0.0010) | (0.0004) |
| | | | | | | | 0.8871 | 0.9526 | 0.0878 |
| $R\&D_{t-1}$ | | | | | | | | 0.0000 | -0.0002 |
| | | | | | | | | (0.0005) | (0.0004) |
| | | | | | | | | 0.9852 | 0.6847 |
| Observations | 9,723 | 9,723 | 9,681 | 9,681 | 9,649 | 9,608 | 4,306 | 2,579 | 9,608 |
| Number of firms | 2,383 | 2,383 | 2,375 | 2,375 | 2,368 | 2,349 | 1,088 | 658 | 2,349 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 59: Fixed effects regression estimates of the mediation test using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| $SIC_t$ | 13.1645 | -73.8804 | -76.5966 | -79.8045 | -73.9424 | -73.8467 | -60.2399 | -72.6073 | -71.8517 |
| | (69.2248) | (65.7721) | (65.1653) | (64.6863) | (63.1660) | (63.2199) | (116.4551) | (160.1584) | (63.0057) |
| | 0.8492 | 0.2615 | 0.2400 | 0.2175 | 0.2419 | 0.2429 | 0.6051 | 0.6505 | 0.2543 |
| $CSR_{t-1}$ | 4.7022 | 21.8616 | 25.1484 | 23.4212 | 32.3942 | 32.4151 | -18.8304 | -18.3234 | 33.0616 |
| | (13.9493) | (30.1154) | (29.9792) | (28.0223) | (27.2374) | (27.2641) | (19.1956) | (29.1385) | (27.4861) |
| | 0.7361 | 0.4680 | 0.4017 | 0.4034 | 0.2345 | 0.2346 | 0.3269 | 0.5297 | 0.2292 |
| Long-term $debt_{t-1}$ | | | 0.1751* | 0.2036** | 0.1682* | 0.1682* | 0.1312 | 0.2227 | 0.1674* |
| | | | (0.0770) | (0.0774) | (0.0763) | (0.0763) | (0.0752) | (0.5758) | (0.0770) |
| | | | 0.0231 | 0.0086 | 0.0276 | 0.0276 | 0.0814 | 0.6991 | 0.0297 |
| $Assets_{t-1}$ | | | | -0.0196 | -0.0274 | -0.0274 | -0.0099 | 0.0226 | -0.0281 |
| | | | | (0.0267) | (0.0275) | (0.0275) | (0.0161) | (0.2504) | (0.0279) |
| | | | | 0.4621 | 0.3205 | 0.3205 | 0.5395 | 0.9281 | 0.3138 |
| $Employees_{t-1}$ | | | | | 159.0910*** | 159.0894*** | 94.0349* | 89.7274 | 156.5809** |
| | | | | | (47.7602) | (47.7626) | (42.1173) | (46.5073) | (48.2573) |
| | | | | | 0.0009 | 0.0009 | 0.0258 | 0.0542 | 0.0012 |
| $Age_{t-1}$ | | | | | | 255.6230* | 350.2906** | 230.2913 | 247.2390* |
| | | | | | | (113.8104) | (108.5510) | (134.1280) | (114.8052) |
| | | | | | | 0.0248 | 0.0013 | 0.0866 | 0.0314 |
| $Advertising_{t-1}$ | | | | | | | 0.8095 | 0.6580 | 0.2873 |
| | | | | | | | (1.8437) | (2.3837) | (1.2680) |
| | | | | | | | 0.6607 | 0.7826 | 0.8208 |
| $R\&D_{t-1}$ | | | | | | | | 0.8666 | 0.9034 |
| | | | | | | | | (1.7023) | (0.6543) |
| | | | | | | | | 0.6109 | 0.1675 |
| Observations | 7,320 | 7,320 | 7,290 | 7,290 | 7,269 | 7,247 | 3,247 | 1,949 | 7,247 |
| Number of firms | 1,933 | 1,933 | 1,928 | 1,928 | 1,922 | 1,912 | 879 | 527 | 1,912 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Longitudinal regression: transformed DV to reduce outlier influence

Table 60: Fixed effects regression estimates of the effect of CSR on performance using a time-delayed specification and an inverse hyperbolic sine transformed performance variable to control for the influence of outliers.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| $CSR_{t-1}$ | 0.0038*** | 0.0023** | 0.0023** | 0.0023** | 0.0026*** | 0.0025*** | 0.0016 | 0.0024 | 0.0026*** |
| | (0.0007) | (0.0008) | (0.0008) | (0.0008) | (0.0008) | (0.0008) | (0.0009) | (0.0013) | (0.0008) |
| | 0.0000 | 0.0033 | 0.0023 | 0.0027 | 0.0009 | 0.0010 | 0.0843 | 0.0682 | 0.0008 |
| Long-term $debt_{t-1}$ | | | 0.0000* | 0.0000* | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0159 | 0.0127 | 0.0597 | 0.0588 | 0.3581 | 0.8957 | 0.0655 |
| $Assets_{t-1}$ | | | | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.6011 | 0.2309 | 0.2263 | 0.0591 | 0.5907 | 0.1622 |
| $Employees_{t-1}$ | | | | | 0.0039** | 0.0039** | 0.0021 | 0.0021 | 0.0037** |
| | | | | | (0.0012) | (0.0012) | (0.0013) | (0.0016) | (0.0012) |
| | | | | | 0.0013 | 0.0013 | 0.1138 | 0.1831 | 0.0019 |
| $Age_{t-1}$ | | | | | | 0.0241*** | 0.0328*** | 0.0308*** | 0.0238*** |
| | | | | | | (0.0037) | (0.0042) | (0.0053) | (0.0037) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0001 | 0.0001 | 0.0000 |
| | | | | | | | (0.0001) | (0.0001) | (0.0000) |
| | | | | | | | 0.0975 | 0.2799 | 0.3176 |
| $R\&D_{t-1}$ | | | | | | | | 0.0001 | 0.0000 |
| | | | | | | | | (0.0000) | (0.0000) |
| | | | | | | | | 0.2248 | 0.1710 |
| Observations | 7,320 | 7,320 | 7,290 | 7,290 | 7,269 | 7,247 | 3,247 | 1,949 | 7,247 |
| Number of firms | 1,933 | 1,933 | 1,928 | 1,928 | 1,922 | 1,912 | 879 | 527 | 1,912 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Note: Subscript *t* indicates year. Standard errors are clustered by firm. Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05

Table 61: Fixed effects regression estimates of the effect of CSR on SIC using a time-delayed specification.

| VARIABLES | (1) $SIC_t$ | (2) $SIC_t$ | (3) $SIC_t$ | (4) $SIC_t$ | (5) $SIC_t$ | (6) $SIC_t$ | (7) $SIC_t$ | (8) $SIC_t$ | (9) $SIC_t$ |
|---|---|---|---|---|---|---|---|---|---|
| $CSR_{t-1}$ | 0.0196*** | 0.0250*** | 0.0248*** | 0.0245*** | 0.0245*** | 0.0246*** | 0.0294*** | 0.0363** | 0.0243*** |
| | (0.0046) | (0.0052) | (0.0052) | (0.0052) | (0.0053) | (0.0053) | (0.0084) | (0.0120) | (0.0053) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0005 | 0.0025 | 0.0000 |
| Long-term $debt_{t-1}$ | | | -0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0000 | -0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0001) | (0.0000) |
| | | | 0.9644 | 0.6738 | 0.6532 | 0.6546 | 0.7533 | 0.6214 | 0.5966 |
| $Assets_{t-1}$ | | | | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.3103 | 0.3353 | 0.3360 | 0.2011 | 0.9877 | 0.3882 |
| $Employees_{t-1}$ | | | | | -0.0033 | -0.0033 | 0.0032 | 0.0100 | -0.0021 |
| | | | | | (0.0052) | (0.0052) | (0.0061) | (0.0053) | (0.0051) |
| | | | | | 0.5284 | 0.5297 | 0.5996 | 0.0596 | 0.6739 |
| $Age_{t-1}$ | | | | | | 0.5221*** | 0.4218*** | 0.4327*** | 0.5243*** |
| | | | | | | (0.0265) | (0.0407) | (0.0541) | (0.0266) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | -0.0001 | -0.0001 | -0.0006 |
| | | | | | | | (0.0007) | (0.0010) | (0.0004) |
| | | | | | | | 0.8871 | 0.9526 | 0.0878 |
| $R\&D_{t-1}$ | | | | | | | | 0.0000 | -0.0002 |
| | | | | | | | | (0.0005) | (0.0004) |
| | | | | | | | | 0.9852 | 0.6847 |
| Observations | 9,723 | 9,723 | 9,681 | 9,681 | 9,649 | 9,608 | 4,306 | 2,579 | 9,608 |
| Number of firms | 2,383 | 2,383 | 2,375 | 2,375 | 2,368 | 2,349 | 1,088 | 658 | 2,349 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Note: Subscript *t* indicates year. Standard errors are clustered by firm. Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05

Table 62: Fixed effects regression estimates of the mediation test using a time-delayed specification and an inverse hyperbolic sine transformed performance variable to control for outliers.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| $SIC_t$ | 0.0083*** | 0.0021 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0089** | 0.0078* | 0.0025 |
| | (0.0023) | (0.0021) | (0.0021) | (0.0021) | (0.0020) | (0.0020) | (0.0028) | (0.0032) | (0.0020) |
| | 0.0003 | 0.3209 | 0.3361 | 0.3393 | 0.2837 | 0.2513 | 0.0013 | 0.0150 | 0.2175 |
| $CSR_{t-1}$ | 0.0036*** | 0.0022** | 0.0023** | 0.0023** | 0.0025** | 0.0025** | 0.0013 | 0.0020 | 0.0025** |
| | (0.0007) | (0.0008) | (0.0008) | (0.0008) | (0.0008) | (0.0008) | (0.0009) | (0.0013) | (0.0008) |
| | 0.0000 | 0.0047 | 0.0034 | 0.0038 | 0.0014 | 0.0015 | 0.1518 | 0.1061 | 0.0013 |
| Long-term $debt_{t-1}$ | | | 0.0000* | 0.0000* | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0166 | 0.0134 | 0.0632 | 0.0626 | 0.3566 | 0.9430 | 0.0695 |
| $Assets_{t-1}$ | | | | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.6182 | 0.2413 | 0.2375 | 0.1227 | 0.6067 | 0.1711 |
| $Employees_{t-1}$ | | | | | 0.0039** | 0.0039** | 0.0021 | 0.0021 | 0.0037** |
| | | | | | (0.0012) | (0.0012) | (0.0014) | (0.0016) | (0.0012) |
| | | | | | 0.0013 | 0.0013 | 0.1236 | 0.1999 | 0.0019 |
| $Age_{t-1}$ | | | | | | 0.0229*** | 0.0287*** | 0.0270*** | 0.0224*** |
| | | | | | | (0.0035) | (0.0043) | (0.0055) | (0.0035) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0001 | 0.0001 | 0.0000 |
| | | | | | | | (0.0001) | (0.0001) | (0.0000) |
| | | | | | | | 0.0651 | 0.2201 | 0.2857 |
| $R\&D_{t-1}$ | | | | | | | | 0.0001 | 0.0000 |
| | | | | | | | | (0.0000) | (0.0000) |
| | | | | | | | | 0.2119 | 0.1625 |
| Observations | 7,320 | 7,320 | 7,290 | 7,290 | 7,269 | 7,247 | 3,247 | 1,949 | 7,247 |
| Number of firms | 1,933 | 1,933 | 1,928 | 1,928 | 1,922 | 1,912 | 879 | 527 | 1,912 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Note: Subscript *t* indicates year. Standard errors are clustered by firm. Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05

## Appendix 3: Chapter 4 Full Estimation Results

***Same year***

Pooled regression

Table 63: Pooled regression estimates of the effect of CUSTOMER CSR on performance. Standard errors are clustered by firm.

| VARIABLES | (1) Revenue | (2) Revenue | (3) Revenue | (4) Revenue | (5) Revenue | (6) Revenue | (7) Revenue | (8) Revenue | (9) Revenue |
|---|---|---|---|---|---|---|---|---|---|
| Environment CSR | 212.0612*** | 311.2126*** | 238.9628*** | 240.8738*** | 91.9095*** | 75.7165** | 36.7900 | -10.1374 | 16.0868 |
| | (42.6284) | (59.4714) | (49.8616) | (49.1630) | (27.5061) | (24.5083) | (23.0442) | (25.0988) | (20.8567) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0008 | 0.0020 | 0.1106 | 0.6864 | 0.4406 |
| Long-term debt | | | 0.5723*** | 0.3602* | 0.1562 | 0.1445 | 0.8400*** | -0.5133 | 0.0898 |
| | | | (0.1023) | (0.1627) | (0.1046) | (0.1040) | (0.1654) | (0.4661) | (0.0951) |
| | | | 0.0000 | 0.0269 | 0.1352 | 0.1648 | 0.0000 | 0.2711 | 0.3452 |
| Assets | | | | 0.0397 | 0.0325 | 0.0324 | -0.0586*** | 0.6196** | 0.0341 |
| | | | | (0.0253) | (0.0205) | (0.0202) | (0.0149) | (0.2165) | (0.0195) |
| | | | | 0.1164 | 0.1119 | 0.1083 | 0.0001 | 0.0043 | 0.0811 |
| Employees | | | | | 198.6383*** | 194.5018*** | 167.8433*** | 155.4647*** | 182.9505*** |
| | | | | | (9.4715) | (9.6185) | (17.0296) | (13.9915) | (12.8950) |
| | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Age | | | | | | 115.6802*** | 32.0545 | 35.8263 | 89.4775** |
| | | | | | | (28.2473) | (28.7492) | (31.0617) | (27.7298) |
| | | | | | | 0.0000 | 0.2651 | 0.2491 | 0.0013 |
| Advertising | | | | | | | 7.9105*** | -0.9167 | 3.9676* |
| | | | | | | | (1.8118) | (2.2580) | (1.6749) |
| | | | | | | | 0.0000 | 0.6849 | 0.0179 |
| R&D | | | | | | | | -1.1372 | 4.6034*** |
| | | | | | | | | (1.8245) | (0.9493) |
| | | | | | | | | 0.5333 | 0.0000 |
| Observations | 12,877 | 12,877 | 12,824 | 12,824 | 12,770 | 12,699 | 5,626 | 3,358 | 12,699 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 64: Pooled regression estimates of the effect of CUSTOMER CSR on the mediator CUSTOMER SIC. Standard errors are clustered by firm.

| VARIABLES | (1) Environment SIC | (2) Environment SIC | (3) Environment SIC | (4) Environment SIC | (5) Environment SIC | (6) Environment SIC | (7) Environment SIC | (8) Environment SIC | (9) Environment SIC |
|---|---|---|---|---|---|---|---|---|---|
| Environment CSR | 0.0205*** | 0.0263*** | 0.0254*** | 0.0254*** | 0.0238*** | 0.0225*** | 0.0240*** | 0.0247*** | 0.0192*** |
| | (0.0014) | (0.0017) | (0.0017) | (0.0017) | (0.0017) | (0.0015) | (0.0021) | (0.0028) | (0.0014) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Long-term debt | | | 0.0000*** | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0003 | 0.1968 | 0.4676 | 0.6317 | 0.1192 | 0.1672 | 0.5977 |
| Assets | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000 | -0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.1244 | 0.1300 | 0.1232 | 0.2416 | 0.1985 | 0.0684 |
| Employees | | | | | 0.0021 | 0.0018 | 0.0003 | 0.0005 | 0.0011 |
| | | | | | (0.0012) | (0.0011) | (0.0005) | (0.0005) | (0.0008) |
| | | | | | 0.0874 | 0.0942 | 0.5599 | 0.2963 | 0.1621 |
| Age | | | | | | 0.0086*** | 0.0124*** | 0.0135*** | 0.0071*** |
| | | | | | | (0.0012) | (0.0017) | (0.0024) | (0.0011) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0004*** | 0.0003* | 0.0003*** |
| | | | | | | | (0.0001) | (0.0001) | (0.0001) |
| | | | | | | | 0.0000 | 0.0108 | 0.0000 |
| R&D | | | | | | | | 0.0002*** | 0.0002*** |
| | | | | | | | | (0.0001) | (0.0000) |
| | | | | | | | | 0.0005 | 0.0000 |
| Observations | 12,857 | 12,857 | 12,804 | 12,804 | 12,751 | 12,680 | 5,617 | 3,355 | 12,680 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 65: Pooled regression estimates of the mediation test. Standard errors are clustered by firm.

| VARIABLES | (1) Revenue | (2) Revenue | (3) Revenue | (4) Revenue | (5) Revenue | (6) Revenue | (7) Revenue | (8) Revenue | (9) Revenue |
|---|---|---|---|---|---|---|---|---|---|
| Environment SIC | 3,951.8247*** | 4,143.4019*** | 2,716.9014** | 2,578.7537** | -52.7567 | -472.3451 | 192.3444 | -728.6945 | -1,954.2959* |
| | (973.2270) | (991.6274) | (925.8248) | (956.9400) | (874.7915) | (961.7665) | (779.4313) | (725.7241) | (987.4302) |
| | 0.0001 | 0.0000 | 0.0034 | 0.0071 | 0.9519 | 0.6234 | 0.8051 | 0.3156 | 0.0479 |
| Environment CSR | 132.2953** | 202.7014*** | 170.4140** | 175.7517** | 93.2472* | 86.4666* | 32.1800 | 7.8462 | 53.6664 |
| | (42.4821) | (60.1000) | (54.3962) | (54.7895) | (41.5022) | (39.1266) | (31.5518) | (27.9340) | (35.5883) |
| | 0.0019 | 0.0008 | 0.0017 | 0.0014 | 0.0247 | 0.0272 | 0.3080 | 0.7789 | 0.1317 |
| Long-term debt | | | 0.5497*** | 0.3486* | 0.1563 | 0.1452 | 0.8378*** | -0.4874 | 0.0869 |
| | | | (0.0998) | (0.1591) | (0.1033) | (0.1028) | (0.1694) | (0.4519) | (0.0935) |
| | | | 0.0000 | 0.0285 | 0.1303 | 0.1579 | 0.0000 | 0.2812 | 0.3531 |
| Assets | | | | 0.0379 | 0.0326 | 0.0327 | -0.0585*** | 0.6124** | 0.0355 |
| | | | | (0.0252) | (0.0208) | (0.0206) | (0.0152) | (0.2123) | (0.0200) |
| | | | | 0.1333 | 0.1181 | 0.1125 | 0.0001 | 0.0040 | 0.0762 |
| Employees | | | | | 198.7411*** | 195.3344*** | 167.7830*** | 155.8090*** | 185.0385*** |
| | | | | | (9.7336) | (9.6362) | (17.1086) | (13.6794) | (12.0892) |
| | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Age | | | | | | 119.7719*** | 29.6299 | 45.6323 | 103.4487** |
| | | | | | | (34.8706) | (32.8709) | (33.2479) | (33.4478) |
| | | | | | | 0.0006 | 0.3675 | 0.1703 | 0.0020 |
| Advertising | | | | | | | 7.8379*** | -0.7206 | 4.4973** |
| | | | | | | | (1.7631) | (2.2072) | (1.5250) |
| | | | | | | | 0.0000 | 0.7442 | 0.0032 |
| R&D | | | | | | | | -0.9643 | 5.0606*** |
| | | | | | | | | (1.7944) | (1.0801) |
| | | | | | | | | 0.5912 | 0.0000 |
| Observations | 12,854 | 12,854 | 12,802 | 12,802 | 12,749 | 12,678 | 5,617 | 3,355 | 12,678 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Pooled regression: transformed DV to reduce outlier influence

Table 66: Pooled regression estimates of the effect of CUSTOMER CSR on performance. The performance measure is transformed to control for the influence of outliers, using the inverse hyperbolic sine transformation. Standard errors are clustered by firm.

| VARIABLES | (1) IHS Revenue | (2) IHS Revenue | (3) IHS Revenue | (4) IHS Revenue | (5) IHS Revenue | (6) IHS Revenue | (7) IHS Revenue | (8) IHS Revenue | (9) IHS Revenue |
|---|---|---|---|---|---|---|---|---|---|
| Environment CSR | 0.0081*** | 0.0186*** | 0.0147*** | 0.0148*** | 0.0091** | 0.0042 | 0.0086** | 0.0025 | 0.0004 |
| | (0.0024) | (0.0029) | (0.0027) | (0.0027) | (0.0028) | (0.0024) | (0.0028) | (0.0034) | (0.0021) |
| | 0.0007 | 0.0000 | 0.0000 | 0.0000 | 0.0014 | 0.0806 | 0.0019 | 0.4605 | 0.8349 |
| Long-term debt | | | 0.0000*** | 0.0000* | 0.0000* | 0.0000 | 0.0000*** | 0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0000 | 0.0112 | 0.0359 | 0.0606 | 0.0008 | 0.3208 | 0.1286 |
| Assets | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000** | 0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.1975 | 0.1966 | 0.1757 | 0.0091 | 0.5294 | 0.1289 |
| Employees | | | | | 0.0073* | 0.0060* | 0.0030 | 0.0025 | 0.0052* |
| | | | | | (0.0034) | (0.0027) | (0.0015) | (0.0013) | (0.0025) |
| | | | | | 0.0334 | 0.0280 | 0.0509 | 0.0511 | 0.0342 |
| Age | | | | | | 0.0347*** | 0.0302*** | 0.0327*** | 0.0330*** |
| | | | | | | (0.0020) | (0.0023) | (0.0026) | (0.0018) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0006*** | 0.0002 | 0.0003** |
| | | | | | | | (0.0002) | (0.0001) | (0.0001) |
| | | | | | | | 0.0003 | 0.0998 | 0.0023 |
| R&D | | | | | | | | 0.0002** | 0.0003*** |
| | | | | | | | | (0.0001) | (0.0000) |
| | | | | | | | | 0.0017 | 0.0000 |
| Observations | 12,877 | 12,877 | 12,824 | 12,824 | 12,770 | 12,699 | 5,626 | 3,358 | 12,699 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 67: Pooled regression estimates of the effect of CUSTOMER CSR on the mediator Environment SIC. Standard errors are clustered by firm.

| VARIABLES | (1) Environment SIC | (2) Environment SIC | (3) Environment SIC | (4) Environment SIC | (5) Environment SIC | (6) Environment SIC | (7) Environment SIC | (8) Environment SIC | (9) Environment SIC |
|---|---|---|---|---|---|---|---|---|---|
| Environment CSR | 0.0205*** | 0.0263*** | 0.0254*** | 0.0254*** | 0.0238*** | 0.0225*** | 0.0240*** | 0.0247*** | 0.0192*** |
| | (0.0014) | (0.0017) | (0.0017) | (0.0017) | (0.0017) | (0.0015) | (0.0021) | (0.0028) | (0.0014) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Long-term debt | | | 0.0000*** | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0003 | 0.1968 | 0.4676 | 0.6317 | 0.1192 | 0.1672 | 0.5977 |
| Assets | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000 | -0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.1244 | 0.1300 | 0.1232 | 0.2416 | 0.1985 | 0.0684 |
| Employees | | | | | 0.0021 | 0.0018 | 0.0003 | 0.0005 | 0.0011 |
| | | | | | (0.0012) | (0.0011) | (0.0005) | (0.0005) | (0.0008) |
| | | | | | 0.0874 | 0.0942 | 0.5599 | 0.2963 | 0.1621 |
| Age | | | | | | 0.0086*** | 0.0124*** | 0.0135*** | 0.0071*** |
| | | | | | | (0.0012) | (0.0017) | (0.0024) | (0.0011) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0004*** | 0.0003* | 0.0003*** |
| | | | | | | | (0.0001) | (0.0001) | (0.0001) |
| | | | | | | | 0.0000 | 0.0108 | 0.0000 |
| R&D | | | | | | | | 0.0002*** | 0.0002*** |
| | | | | | | | | (0.0001) | (0.0000) |
| | | | | | | | | 0.0005 | 0.0000 |
| Observations | 12,857 | 12,857 | 12,804 | 12,804 | 12,751 | 12,680 | 5,617 | 3,355 | 12,680 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 68: Pooled regression estimates of the mediator test. The performance measure is transformed to control for the influence of outliers, using the inverse hyperbolic sine transformation. Standard errors are clustered by firm.

| VARIABLES | (1) IHS Revenue | (2) IHS Revenue | (3) IHS Revenue | (4) IHS Revenue | (5) IHS Revenue | (6) IHS Revenue | (7) IHS Revenue | (8) IHS Revenue | (9) IHS Revenue |
|---|---|---|---|---|---|---|---|---|---|
| Environment SIC | 0.5853*** | 0.6186*** | 0.5463*** | 0.5410*** | 0.4579*** | 0.3473*** | 0.3700*** | 0.3220*** | 0.2827*** |
| | (0.0396) | (0.0368) | (0.0362) | (0.0358) | (0.0478) | (0.0389) | (0.0356) | (0.0384) | (0.0338) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Environment CSR | -0.0037 | 0.0024 | 0.0009 | 0.0011 | -0.0018 | -0.0036 | -0.0002 | -0.0054 | -0.0049* |
| | (0.0022) | (0.0026) | (0.0025) | (0.0025) | (0.0024) | (0.0022) | (0.0025) | (0.0033) | (0.0021) |
| | 0.0896 | 0.3552 | 0.7234 | 0.6614 | 0.4627 | 0.1040 | 0.9480 | 0.0957 | 0.0199 |
| Long-term debt | | | 0.0000*** | 0.0000** | 0.0000* | 0.0000* | 0.0000*** | 0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0000 | 0.0070 | 0.0211 | 0.0396 | 0.0004 | 0.4341 | 0.0788 |
| Assets | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000** | 0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.2408 | 0.2360 | 0.2035 | 0.0057 | 0.2400 | 0.1576 |
| Employees | | | | | 0.0063* | 0.0054* | 0.0029* | 0.0024* | 0.0049* |
| | | | | | (0.0029) | (0.0024) | (0.0013) | (0.0012) | (0.0023) |
| | | | | | 0.0316 | 0.0257 | 0.0321 | 0.0467 | 0.0306 |
| Age | | | | | | 0.0317*** | 0.0256*** | 0.0284*** | 0.0309*** |
| | | | | | | (0.0018) | (0.0021) | (0.0025) | (0.0017) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0005** | 0.0001 | 0.0003** |
| | | | | | | | (0.0001) | (0.0001) | (0.0001) |
| | | | | | | | 0.0017 | 0.3326 | 0.0093 |
| R&D | | | | | | | | 0.0001 | 0.0002*** |
| | | | | | | | | (0.0001) | (0.0000) |
| | | | | | | | | 0.1023 | 0.0000 |
| Observations | 12,854 | 12,854 | 12,802 | 12,802 | 12,749 | 12,678 | 5,617 | 3,355 | 12,678 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Longitudinal regression

Table 69: Fixed effects regression estimates of the effect of Environment CSR on performance. Standard errors are clustered by firm.

| VARIABLES | (1) Revenue | (2) Revenue | (3) Revenue | (4) Revenue | (5) Revenue | (6) Revenue | (7) Revenue | (8) Revenue | (9) Revenue |
|---|---|---|---|---|---|---|---|---|---|
| Environment CSR | 13.3095** | -2.1817 | -4.2262 | -4.3766 | 0.1986 | 0.2063 | -2.4498 | -5.2992 | 0.6097 |
| | (4.0915) | (6.7388) | (6.4358) | (6.2802) | (5.6012) | (5.6193) | (7.9744) | (10.9362) | (5.6025) |
| | 0.0012 | 0.7461 | 0.5114 | 0.4859 | 0.9717 | 0.9707 | 0.7587 | 0.6281 | 0.9133 |
| Long-term debt | | | 0.2004** | 0.0883 | 0.0665 | 0.0665 | 0.1495 | -0.1840 | 0.0529 |
| | | | (0.0674) | (0.0607) | (0.0706) | (0.0706) | (0.1269) | (0.1748) | (0.0777) |
| | | | 0.0030 | 0.1457 | 0.3458 | 0.3460 | 0.2392 | 0.2926 | 0.4960 |
| Assets | | | | 0.0591* | 0.0479* | 0.0479* | 0.0024 | 0.2987** | 0.0453* |
| | | | | (0.0269) | (0.0232) | (0.0232) | (0.0181) | (0.0906) | (0.0228) |
| | | | | 0.0283 | 0.0389 | 0.0389 | 0.8939 | 0.0010 | 0.0471 |
| Employees | | | | | 183.4533*** | 183.4484*** | 132.7524** | 109.3161* | 169.7025*** |
| | | | | | (46.5604) | (46.5633) | (47.3907) | (49.1887) | (46.0593) |
| | | | | | 0.0001 | 0.0001 | 0.0052 | 0.0265 | 0.0002 |
| Age | | | | | | -56.1309 | 232.9438** | 14.6331 | -79.9129 |
| | | | | | | (123.5124) | (84.7112) | (87.0887) | (123.5769) |
| | | | | | | 0.6495 | 0.0060 | 0.8666 | 0.5179 |
| Advertising | | | | | | | 5.7573** | 4.6140** | 2.7589*** |
| | | | | | | | (1.8238) | (1.6696) | (0.6407) |
| | | | | | | | 0.0016 | 0.0059 | 0.0000 |
| R&D | | | | | | | | 1.0008 | 2.6628*** |
| | | | | | | | | (0.8289) | (0.6759) |
| | | | | | | | | 0.2276 | 0.0001 |
| Observations | 12,877 | 12,877 | 12,824 | 12,824 | 12,770 | 12,699 | 5,626 | 3,358 | 12,699 |
| Number of firms | 2,940 | 2,940 | 2,933 | 2,933 | 2,922 | 2,893 | 1,289 | 780 | 2,893 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 70: Fixed effects regression estimates of the effect of Environment CSR on Environment SIC. Standard errors are clustered by firm.

| VARIABLES | (1) Environment SIC | (2) Environment SIC | (3) Environment SIC | (4) Environment SIC | (5) Environment SIC | (6) Environment SIC | (7) Environment SIC | (8) Environment SIC | (9) Environment SIC |
|---|---|---|---|---|---|---|---|---|---|
| Environment CSR | 0.0079*** | 0.0070*** | 0.0069*** | 0.0069*** | 0.0068*** | 0.0068*** | 0.0070*** | 0.0081*** | 0.0068*** |
| | (0.0008) | (0.0009) | (0.0009) | (0.0009) | (0.0009) | (0.0009) | (0.0014) | (0.0020) | (0.0009) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Long-term debt | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000* | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.3236 | 0.4287 | 0.4236 | 0.4234 | 0.1446 | 0.0375 | 0.4430 |
| Assets | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000 | -0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.7058 | 0.6728 | 0.6730 | 0.8981 | 0.8600 | 0.8054 |
| Employees | | | | | -0.0009 | -0.0009 | 0.0009 | 0.0008 | -0.0019 |
| | | | | | (0.0017) | (0.0017) | (0.0018) | (0.0021) | (0.0020) |
| | | | | | 0.6136 | 0.6103 | 0.6271 | 0.7211 | 0.3369 |
| Age | | | | | | 0.1622*** | 0.1387*** | 0.1583*** | 0.1602*** |
| | | | | | | (0.0093) | (0.0137) | (0.0188) | (0.0092) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0003 | 0.0003 | 0.0001 |
| | | | | | | | (0.0002) | (0.0003) | (0.0002) |
| | | | | | | | 0.0872 | 0.2744 | 0.5142 |
| R&D | | | | | | | | 0.0001 | 0.0002** |
| | | | | | | | | (0.0001) | (0.0001) |
| | | | | | | | | 0.5122 | 0.0091 |
| Observations | 12,857 | 12,857 | 12,804 | 12,804 | 12,751 | 12,680 | 5,617 | 3,355 | 12,680 |
| Number of firms | 2,939 | 2,939 | 2,932 | 2,932 | 2,921 | 2,892 | 1,289 | 780 | 2,892 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 71: Fixed effects regression estimates of the mediation test. Standard errors are clustered by firm.

| VARIABLES | (1) Revenue | (2) Revenue | (3) Revenue | (4) Revenue | (5) Revenue | (6) Revenue | (7) Revenue | (8) Revenue | (9) Revenue |
|---|---|---|---|---|---|---|---|---|---|
| Environment SIC | -133.1155 | -471.7757 | -517.8374 | -525.3315 | -494.1820 | -494.9587 | 477.2310* | 247.4962 | -561.8177 |
| | (333.0057) | (347.2342) | (344.3741) | (344.0970) | (325.5643) | (325.9644) | (227.1487) | (254.8147) | (325.3208) |
| | 0.6894 | 0.1744 | 0.1328 | 0.1269 | 0.1291 | 0.1290 | 0.0358 | 0.3317 | 0.0843 |
| Environment CSR | 14.3945** | 1.1098 | -0.6478 | -0.7528 | 3.6035 | 3.5992 | -5.7596 | -7.2906 | 4.4612 |
| | (4.9282) | (8.1661) | (7.9405) | (7.8439) | (7.0589) | (7.0692) | (8.2494) | (11.5509) | (7.0534) |
| | 0.0035 | 0.8919 | 0.9350 | 0.9235 | 0.6097 | 0.6107 | 0.4852 | 0.5281 | 0.5271 |
| Long-term debt | | | 0.2037** | 0.0912 | 0.0694 | 0.0694 | 0.1420 | -0.1964 | 0.0555 |
| | | | (0.0673) | (0.0594) | (0.0685) | (0.0686) | (0.1247) | (0.1788) | (0.0754) |
| | | | 0.0025 | 0.1246 | 0.3115 | 0.3117 | 0.2549 | 0.2723 | 0.4617 |
| Assets | | | | 0.0593* | 0.0481* | 0.0481* | 0.0025 | 0.2992** | 0.0455* |
| | | | | (0.0268) | (0.0231) | (0.0231) | (0.0176) | (0.0907) | (0.0227) |
| | | | | 0.0270 | 0.0376 | 0.0376 | 0.8863 | 0.0010 | 0.0454 |
| Employees | | | | | 183.0272*** | 183.0173*** | 132.3531** | 109.1403* | 168.6591*** |
| | | | | | (46.3751) | (46.3770) | (47.1367) | (49.0786) | (45.7801) |
| | | | | | 0.0001 | 0.0001 | 0.0051 | 0.0264 | 0.0002 |
| Age | | | | | | 24.0567 | 166.7230* | -24.5562 | 10.0121 |
| | | | | | | (86.6364) | (73.7941) | (78.1111) | (86.3667) |
| | | | | | | 0.7813 | 0.0240 | 0.7533 | 0.9077 |
| Advertising | | | | | | | 5.5949** | 4.5433** | 2.8214*** |
| | | | | | | | (1.8010) | (1.7044) | (0.6913) |
| | | | | | | | 0.0019 | 0.0078 | 0.0000 |
| R&D | | | | | | | | 0.9828 | 2.7965*** |
| | | | | | | | | (0.8349) | (0.6894) |
| | | | | | | | | 0.2395 | 0.0001 |
| Observations | 12,854 | 12,854 | 12,802 | 12,802 | 12,749 | 12,678 | 5,617 | 3,355 | 12,678 |
| Number of firms | 2,939 | 2,939 | 2,932 | 2,932 | 2,921 | 2,892 | 1,289 | 780 | 2,892 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Longitudinal regression: transformed DV to reduce outlier influence

Table 72: Fixed effects regression estimates of the effect of Environment CSR on performance. The performance measure is transformed to control for the influence of outliers, using the inverse hyperbolic sine transformation. Standard errors are clustered by firm.

| VARIABLES | (1) IHS Revenue | (2) IHS Revenue | (3) IHS Revenue | (4) IHS Revenue | (5) IHS Revenue | (6) IHS Revenue | (7) IHS Revenue | (8) IHS Revenue | (9) IHS Revenue |
|---|---|---|---|---|---|---|---|---|---|
| Environment CSR | 0.0010* | -0.0015* | -0.0015* | -0.0015* | -0.0014* | -0.0014* | -0.0015** | -0.0011 | -0.0014* |
| | (0.0005) | (0.0006) | (0.0006) | (0.0006) | (0.0006) | (0.0006) | (0.0005) | (0.0007) | (0.0006) |
| | 0.0446 | 0.0126 | 0.0125 | 0.0124 | 0.0207 | 0.0215 | 0.0040 | 0.1404 | 0.0220 |
| Long-term debt | | | 0.0000* | 0.0000 | 0.0000 | 0.0000 | -0.0000 | -0.0000** | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0113 | 0.0740 | 0.2739 | 0.2827 | 0.7264 | 0.0081 | 0.5869 |
| Assets | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000* | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.1121 | 0.2002 | 0.2013 | 0.8085 | 0.0467 | 0.2518 |
| Employees | | | | | 0.0060*** | 0.0059*** | 0.0036*** | 0.0029** | 0.0055*** |
| | | | | | (0.0012) | (0.0012) | (0.0009) | (0.0010) | (0.0012) |
| | | | | | 0.0000 | 0.0000 | 0.0001 | 0.0046 | 0.0000 |
| Age | | | | | | 0.0293*** | 0.0341*** | 0.0376*** | 0.0285*** |
| | | | | | | (0.0069) | (0.0032) | (0.0038) | (0.0069) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0003*** | 0.0002* | 0.0001 |
| | | | | | | | (0.0001) | (0.0001) | (0.0000) |
| | | | | | | | 0.0000 | 0.0120 | 0.1093 |
| R&D | | | | | | | | 0.0000 | 0.0001* |
| | | | | | | | | (0.0000) | (0.0000) |
| | | | | | | | | 0.3484 | 0.0317 |
| Observations | 12,877 | 12,877 | 12,824 | 12,824 | 12,770 | 12,699 | 5,626 | 3,358 | 12,699 |
| Number of firms | 2,940 | 2,940 | 2,933 | 2,933 | 2,922 | 2,893 | 1,289 | 780 | 2,893 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 73: Fixed effects regression estimates of effect of Environment CSR on Environment SIC. Standard errors are clustered by firm.

| VARIABLES | (1) Environment SIC | (2) Environment SIC | (3) Environment SIC | (4) Environment SIC | (5) Environment SIC | (6) Environment SIC | (7) Environment SIC | (8) Environment SIC | (9) Environment SIC |
|---|---|---|---|---|---|---|---|---|---|
| Environment CSR | 0.0079*** | 0.0070*** | 0.0069*** | 0.0069*** | 0.0068*** | 0.0068*** | 0.0070*** | 0.0081*** | 0.0068*** |
| | (0.0008) | (0.0009) | (0.0009) | (0.0009) | (0.0009) | (0.0009) | (0.0014) | (0.0020) | (0.0009) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Long-term debt | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000* | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.3236 | 0.4287 | 0.4236 | 0.4234 | 0.1446 | 0.0375 | 0.4430 |
| Assets | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000 | -0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.7058 | 0.6728 | 0.6730 | 0.8981 | 0.8600 | 0.8054 |
| Employees | | | | | -0.0009 | -0.0009 | 0.0009 | 0.0008 | -0.0019 |
| | | | | | (0.0017) | (0.0017) | (0.0018) | (0.0021) | (0.0020) |
| | | | | | 0.6136 | 0.6103 | 0.6271 | 0.7211 | 0.3369 |
| Age | | | | | | 0.1622*** | 0.1387*** | 0.1583*** | 0.1602*** |
| | | | | | | (0.0093) | (0.0137) | (0.0188) | (0.0092) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0003 | 0.0003 | 0.0001 |
| | | | | | | | (0.0002) | (0.0003) | (0.0002) |
| | | | | | | | 0.0872 | 0.2744 | 0.5142 |
| R&D | | | | | | | | 0.0001 | 0.0002** |
| | | | | | | | | (0.0001) | (0.0001) |
| | | | | | | | | 0.5122 | 0.0091 |
| Observations | 12,857 | 12,857 | 12,804 | 12,804 | 12,751 | 12,680 | 5,617 | 3,355 | 12,680 |
| Number of firms | 2,939 | 2,939 | 2,932 | 2,932 | 2,921 | 2,892 | 1,289 | 780 | 2,892 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05

Table 74: Fixed effects regression estimates of the mediation test. The performance measure is transformed to control for the influence of outliers, using the inverse hyperbolic sine transformation. Standard errors are clustered by firm.

| VARIABLES | (1) IHS Revenue | (2) IHS Revenue | (3) IHS Revenue | (4) IHS Revenue | (5) IHS Revenue | (6) IHS Revenue | (7) IHS Revenue | (8) IHS Revenue | (9) IHS Revenue |
|---|---|---|---|---|---|---|---|---|---|
| Environment SIC | 0.0077 | -0.0337*** | -0.0345*** | -0.0346*** | -0.0338*** | -0.0338*** | -0.0212** | -0.0325*** | -0.0362*** |
| | (0.0065) | (0.0076) | (0.0076) | (0.0076) | (0.0074) | (0.0074) | (0.0072) | (0.0088) | (0.0075) |
| | 0.2338 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0031 | 0.0002 | 0.0000 |
| Environment CSR | 0.0010 | -0.0012* | -0.0012* | -0.0013* | -0.0011 | -0.0011 | -0.0014* | -0.0008 | -0.0011 |
| | (0.0005) | (0.0006) | (0.0006) | (0.0006) | (0.0006) | (0.0006) | (0.0005) | (0.0007) | (0.0006) |
| | 0.0592 | 0.0433 | 0.0436 | 0.0433 | 0.0630 | 0.0647 | 0.0107 | 0.2645 | 0.0701 |
| Long-term debt | | | 0.0000* | 0.0000 | 0.0000 | 0.0000 | -0.0000 | -0.0000* | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0112 | 0.0644 | 0.1768 | 0.1828 | 0.9075 | 0.0146 | 0.4595 |
| Assets | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000* | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.0978 | 0.1790 | 0.1799 | 0.8016 | 0.0417 | 0.2301 |
| Employees | | | | | 0.0059*** | 0.0059*** | 0.0036*** | 0.0029** | 0.0054*** |
| | | | | | (0.0012) | (0.0012) | (0.0009) | (0.0010) | (0.0011) |
| | | | | | 0.0000 | 0.0000 | 0.0001 | 0.0031 | 0.0000 |
| Age | | | | | | 0.0348*** | 0.0370*** | 0.0427*** | 0.0343*** |
| | | | | | | (0.0072) | (0.0035) | (0.0043) | (0.0072) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Advertising | | | | | | | 0.0003*** | 0.0002** | 0.0001 |
| | | | | | | | (0.0001) | (0.0001) | (0.0001) |
| | | | | | | | 0.0000 | 0.0084 | 0.1198 |
| R&D | | | | | | | | 0.0000 | 0.0001* |
| | | | | | | | | (0.0000) | (0.0000) |
| | | | | | | | | 0.3321 | 0.0198 |
| Observations | 12,854 | 12,854 | 12,802 | 12,802 | 12,749 | 12,678 | 5,617 | 3,355 | 12,678 |
| Number of firms | 2,939 | 2,939 | 2,932 | 2,932 | 2,921 | 2,892 | 1,289 | 780 | 2,892 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

### *Time dynamics*

The Baron and Kenny mediation approach assumes correctly specified causal relationships. This section presents the results of an exploration of whether analysis results change based on assumptions about the temporal relationships between independent, outcome, and mediator variables. Mediation relationships imply the passage of time. If *M* mediates the relationship between *X* and *Y*, *M* must occur after *X* but before *Y*. However, the exact timing of occurrence and lag between variables is uncertain. Examining temporal dynamics assesses the possibility of "alternative causal flows" in the mediation relationship (Aguinis et al., 2017, p. 677).

Pooled regression

Table 75: Pooled regression estimates of the effect of Environment CSR on performance using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| Environment $CSR_{t-1}$ | 150.1236*** | 285.1870*** | 221.0993*** | 227.3666*** | 92.1642** | 83.3023* | 50.5617 | 21.7899 | 27.9691 |
| | (44.5464) | (68.2936) | (56.8451) | (57.8654) | (35.3703) | (33.0149) | (28.3330) | (26.4229) | (29.5929) |
| | 0.0008 | 0.0000 | 0.0001 | 0.0001 | 0.0092 | 0.0117 | 0.0747 | 0.4099 | 0.3447 |
| Long-term $debt_{t-1}$ | | | 0.6204*** | 0.4372* | 0.1408 | 0.1258 | 0.9632*** | -0.3748 | 0.0644 |
| | | | (0.1241) | (0.1980) | (0.1354) | (0.1367) | (0.2232) | (0.5568) | (0.1350) |
| | | | 0.0000 | 0.0273 | 0.2983 | 0.3574 | 0.0000 | 0.5012 | 0.6336 |
| $Assets_{t-1}$ | | | | 0.0327 | 0.0343 | 0.0347 | -0.0723*** | 0.6126** | 0.0371 |
| | | | | (0.0319) | (0.0268) | (0.0267) | (0.0215) | (0.2185) | (0.0265) |
| | | | | 0.3052 | 0.2005 | 0.1928 | 0.0008 | 0.0052 | 0.1621 |
| $Employees_{t-1}$ | | | | | 202.7354*** | 199.1762*** | 174.6541*** | 161.1820*** | 189.1609*** |
| | | | | | (10.6806) | (11.3794) | (18.6187) | (14.8128) | (15.2219) |
| | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Age_{t-1}$ | | | | | | 118.7658** | 34.8981 | 41.9473 | 86.8251* |
| | | | | | | (36.1192) | (36.6713) | (36.2313) | (35.3731) |
| | | | | | | 0.0010 | 0.3415 | 0.2475 | 0.0142 |
| $Advertising_{t-1}$ | | | | | | | 7.5604*** | -1.6267 | 3.9592* |
| | | | | | | | (2.0738) | (2.0420) | (1.9124) |
| | | | | | | | 0.0003 | 0.4260 | 0.0386 |
| $R\&D_{t-1}$ | | | | | | | | -1.4673 | 4.4671*** |
| | | | | | | | | (1.8496) | (1.0214) |
| | | | | | | | | 0.4280 | 0.0000 |
| Observations | 7,320 | 7,320 | 7,290 | 7,290 | 7,269 | 7,247 | 3,247 | 1,949 | 7,247 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 76: Pooled regression estimates of the effect of Environment CSR on Environment SIC using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) Environment $SIC_t$ | (2) Environment $SIC_t$ | (3) Environment $SIC_t$ | (4) Environment $SIC_t$ | (5) Environment $SIC_t$ | (6) Environment $SIC_t$ | (7) Environment $SIC_t$ | (8) Environment $SIC_t$ | (9) Environment $SIC_t$ |
|---|---|---|---|---|---|---|---|---|---|
| Environment $CSR_{t-1}$ | 0.0152*** | 0.0210*** | 0.0200*** | 0.0201*** | 0.0185*** | 0.0175*** | 0.0179*** | 0.0155*** | 0.0138*** |
| | (0.0014) | (0.0018) | (0.0018) | (0.0018) | (0.0017) | (0.0016) | (0.0022) | (0.0027) | (0.0014) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Long-term $debt_{t-1}$ | | | 0.0000** | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0012 | 0.2268 | 0.4891 | 0.6472 | 0.1315 | 0.2629 | 0.5754 |
| $Assets_{t-1}$ | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000 | -0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.3156 | 0.2663 | 0.2393 | 0.2722 | 0.2035 | 0.1128 |
| $Employees_{t-1}$ | | | | | 0.0022 | 0.0019 | 0.0004 | 0.0006 | 0.0011 |
| | | | | | (0.0013) | (0.0011) | (0.0005) | (0.0004) | (0.0008) |
| | | | | | 0.0819 | 0.0858 | 0.5199 | 0.1484 | 0.1466 |
| $Age_{t-1}$ | | | | | | 0.0100*** | 0.0137*** | 0.0142*** | 0.0080*** |
| | | | | | | (0.0014) | (0.0020) | (0.0027) | (0.0012) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0004*** | 0.0003** | 0.0003*** |
| | | | | | | | (0.0001) | (0.0001) | (0.0001) |
| | | | | | | | 0.0000 | 0.0014 | 0.0000 |
| $R\&D_{t-1}$ | | | | | | | | 0.0003*** | 0.0003*** |
| | | | | | | | | (0.0001) | (0.0000) |
| | | | | | | | | 0.0000 | 0.0000 |
| Observations | 9,716 | 9,716 | 9,675 | 9,675 | 9,643 | 9,602 | 4,306 | 2,579 | 9,602 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 77: Pooled regression estimates of the mediation test using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| Environment $SIC_t$ | 4,115.8657*** | 4,048.0562*** | 2,683.5803* | 2,599.8638* | -214.5390 | -587.4801 | 146.1473 | -502.1050 | -2,235.3079 |
| | (1,071.1663) | (1,119.6909) | (1,046.6056) | (1,078.3240) | (993.3397) | (1,083.8055) | (770.7797) | (720.7886) | (1,141.2048) |
| | 0.0001 | 0.0003 | 0.0104 | 0.0160 | 0.8290 | 0.5878 | 0.8497 | 0.4864 | 0.0503 |
| Environment $CSR_{t-1}$ | 102.9893* | 221.2391** | 180.9891** | 188.1807** | 95.1757* | 91.2408* | 48.6059 | 26.8901 | 48.8680 |
| | (43.4301) | (69.3472) | (61.2218) | (63.2483) | (45.3545) | (43.6357) | (32.2597) | (29.0845) | (38.1585) |
| | 0.0178 | 0.0014 | 0.0032 | 0.0030 | 0.0360 | 0.0367 | 0.1322 | 0.3556 | 0.2005 |
| Long-term $debt_{t-1}$ | | | 0.5978*** | 0.4251* | 0.1412 | 0.1261 | 0.9615*** | -0.3592 | 0.0566 |
| | | | (0.1193) | (0.1902) | (0.1341) | (0.1359) | (0.2271) | (0.5498) | (0.1351) |
| | | | 0.0000 | 0.0255 | 0.2926 | 0.3534 | 0.0000 | 0.5139 | 0.6753 |
| $Assets_{t-1}$ | | | | 0.0309 | 0.0345 | 0.0351 | -0.0722*** | 0.6064** | 0.0389 |
| | | | | (0.0316) | (0.0273) | (0.0272) | (0.0218) | (0.2179) | (0.0272) |
| | | | | 0.3276 | 0.2070 | 0.1972 | 0.0010 | 0.0056 | 0.1521 |
| $Employees_{t-1}$ | | | | | 203.1812*** | 200.2417*** | 174.6181*** | 161.5257*** | 191.4557*** |
| | | | | | (10.9442) | (11.2836) | (18.6898) | (14.5963) | (14.1353) |
| | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Age_{t-1}$ | | | | | | 123.9504** | 32.9146 | 48.6714 | 101.3378* |
| | | | | | | (43.4582) | (39.0392) | (35.4650) | (40.9852) |
| | | | | | | 0.0044 | 0.3994 | 0.1705 | 0.0135 |
| $Advertising_{t-1}$ | | | | | | | 7.4942*** | -1.4479 | 4.7346** |
| | | | | | | | (2.0325) | (2.1107) | (1.7084) |
| | | | | | | | 0.0002 | 0.4930 | 0.0056 |
| $R\&D_{t-1}$ | | | | | | | | -1.2981 | 5.0886*** |
| | | | | | | | | (1.9164) | (1.2409) |
| | | | | | | | | 0.4985 | 0.0000 |
| Observations | 7,314 | 7,314 | 7,284 | 7,284 | 7,263 | 7,241 | 3,247 | 1,949 | 7,241 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Pooled regression: transformed DV to reduce outlier influence

Table 78: Pooled regression estimates of the effect of Environment CSR on performance using a time-delayed specification and an inverse hyperbolic sine transformed performance variable to control for the influence of outliers. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| Environment $CSR_{t-1}$ | -0.0041 | 0.0080** | 0.0048 | 0.0051 | 0.0008 | -0.0013 | 0.0010 | -0.0037 | -0.0050* |
| | (0.0024) | (0.0030) | (0.0027) | (0.0027) | (0.0027) | (0.0024) | (0.0030) | (0.0036) | (0.0022) |
| | 0.0966 | 0.0070 | 0.0798 | 0.0630 | 0.7696 | 0.5845 | 0.7410 | 0.3070 | 0.0240 |
| Long-term $debt_{t-1}$ | | | 0.0000*** | 0.0000* | 0.0000 | 0.0000 | 0.0000** | 0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0000 | 0.0474 | 0.1341 | 0.2090 | 0.0043 | 0.5467 | 0.3818 |
| $Assets_{t-1}$ | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000* | 0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.3849 | 0.2837 | 0.2344 | 0.0321 | 0.2719 | 0.1663 |
| $Employees_{t-1}$ | | | | | 0.0062* | 0.0054* | 0.0028* | 0.0022* | 0.0046* |
| | | | | | (0.0028) | (0.0024) | (0.0014) | (0.0011) | (0.0021) |
| | | | | | 0.0296 | 0.0242 | 0.0395 | 0.0469 | 0.0279 |
| $Age_{t-1}$ | | | | | | 0.0273*** | 0.0260*** | 0.0271*** | 0.0251*** |
| | | | | | | (0.0020) | (0.0025) | (0.0028) | (0.0018) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0006** | 0.0001 | 0.0003** |
| | | | | | | | (0.0002) | (0.0001) | (0.0001) |
| | | | | | | | 0.0015 | 0.1888 | 0.0031 |
| $R\&D_{t-1}$ | | | | | | | | 0.0002* | 0.0003*** |
| | | | | | | | | (0.0001) | (0.0000) |
| | | | | | | | | 0.0122 | 0.0000 |
| Observations | 7,320 | 7,320 | 7,290 | 7,290 | 7,269 | 7,247 | 3,247 | 1,949 | 7,247 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 79: Pooled regression estimates of the effect of Environment CSR on Environment SIC using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) Environment $SIC_t$ | (2) Environment $SIC_t$ | (3) Environment $SIC_t$ | (4) Environment $SIC_t$ | (5) Environment $SIC_t$ | (6) Environment $SIC_t$ | (7) Environment $SIC_t$ | (8) Environment $SIC_t$ | (9) Environment $SIC_t$ |
|---|---|---|---|---|---|---|---|---|---|
| Environment $CSR_{t-1}$ | 0.0152*** | 0.0210*** | 0.0200*** | 0.0201*** | 0.0185*** | 0.0175*** | 0.0179*** | 0.0155*** | 0.0138*** |
| | (0.0014) | (0.0018) | (0.0018) | (0.0018) | (0.0017) | (0.0016) | (0.0022) | (0.0027) | (0.0014) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Long-term $debt_{t-1}$ | | | 0.0000** | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0012 | 0.2268 | 0.4891 | 0.6472 | 0.1315 | 0.2629 | 0.5754 |
| $Assets_{t-1}$ | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000 | -0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.3156 | 0.2663 | 0.2393 | 0.2722 | 0.2035 | 0.1128 |
| $Employees_{t-1}$ | | | | | 0.0022 | 0.0019 | 0.0004 | 0.0006 | 0.0011 |
| | | | | | (0.0013) | (0.0011) | (0.0005) | (0.0004) | (0.0008) |
| | | | | | 0.0819 | 0.0858 | 0.5199 | 0.1484 | 0.1466 |
| $Age_{t-1}$ | | | | | | 0.0100*** | 0.0137*** | 0.0142*** | 0.0080*** |
| | | | | | | (0.0014) | (0.0020) | (0.0027) | (0.0012) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0004*** | 0.0003** | 0.0003*** |
| | | | | | | | (0.0001) | (0.0001) | (0.0001) |
| | | | | | | | 0.0000 | 0.0014 | 0.0000 |
| $R\&D_{t-1}$ | | | | | | | | 0.0003*** | 0.0003*** |
| | | | | | | | | (0.0001) | (0.0000) |
| | | | | | | | | 0.0000 | 0.0000 |
| Observations | 9,716 | 9,716 | 9,675 | 9,675 | 9,643 | 9,602 | 4,306 | 2,579 | 9,602 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 80: Pooled regression estimates of the mediation test using a time-delayed specification and an inverse hyperbolic sine transformed performance variable to control for the influence of outliers. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| Environment $SIC_t$ | 0.5306*** | 0.5209*** | 0.4600*** | 0.4569*** | 0.3819*** | 0.3085*** | 0.3499*** | 0.2982*** | 0.2353*** |
| | (0.0400) | (0.0383) | (0.0375) | (0.0369) | (0.0455) | (0.0391) | (0.0393) | (0.0393) | (0.0350) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Environment $CSR_{t-1}$ | -0.0103*** | -0.0005 | -0.0023 | -0.0021 | -0.0047 | -0.0056* | -0.0037 | -0.0068 | -0.0074*** |
| | (0.0022) | (0.0027) | (0.0026) | (0.0025) | (0.0024) | (0.0023) | (0.0028) | (0.0035) | (0.0022) |
| | 0.0000 | 0.8580 | 0.3601 | 0.4162 | 0.0528 | 0.0142 | 0.1828 | 0.0554 | 0.0008 |
| Long-term $debt_{t-1}$ | | | 0.0000*** | 0.0000* | 0.0000 | 0.0000 | 0.0000** | 0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0000 | 0.0278 | 0.0872 | 0.1511 | 0.0017 | 0.6602 | 0.2777 |
| $Assets_{t-1}$ | | | | 0.0000 | 0.0000 | 0.0000 | -0.0000* | 0.0000 | 0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.4216 | 0.3169 | 0.2584 | 0.0186 | 0.0606 | 0.1934 |
| $Employees_{t-1}$ | | | | | 0.0054* | 0.0048* | 0.0027* | 0.0020* | 0.0044* |
| | | | | | (0.0024) | (0.0021) | (0.0012) | (0.0010) | (0.0019) |
| | | | | | 0.0259 | 0.0204 | 0.0200 | 0.0482 | 0.0233 |
| $Age_{t-1}$ | | | | | | 0.0246*** | 0.0213*** | 0.0231*** | 0.0235*** |
| | | | | | | (0.0019) | (0.0024) | (0.0026) | (0.0018) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0004** | 0.0000 | 0.0002* |
| | | | | | | | (0.0002) | (0.0001) | (0.0001) |
| | | | | | | | 0.0069 | 0.7179 | 0.0122 |
| $R\&D_{t-1}$ | | | | | | | | 0.0001 | 0.0002*** |
| | | | | | | | | (0.0001) | (0.0000) |
| | | | | | | | | 0.3910 | 0.0000 |
| Observations | 7,314 | 7,314 | 7,284 | 7,284 | 7,263 | 7,241 | 3,247 | 1,949 | 7,241 |
| Firm FEs | No | No | No | No | No | No | No | No | No |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Longitudinal regression

Table 81: Fixed effects regression estimates of the effect of Environment CSR on performance using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| Environment $CSR_{t-1}$ | 9.8769 | 20.6893 | 22.3818 | 22.0282 | 26.0386 | 26.0782 | 3.1753 | 13.8815 | 26.5680 |
| | (5.0911) | (13.9178) | (13.9937) | (13.6515) | (13.7818) | (13.8362) | (11.0449) | (17.1052) | (13.9571) |
| | 0.0525 | 0.1373 | 0.1099 | 0.1068 | 0.0590 | 0.0596 | 0.7738 | 0.4174 | 0.0571 |
| Long-term $debt_{t-1}$ | | | 0.1751* | 0.2033** | 0.1680* | 0.1680* | 0.1334 | 0.2318 | 0.1672* |
| | | | (0.0771) | (0.0773) | (0.0761) | (0.0761) | (0.0780) | (0.5840) | (0.0768) |
| | | | 0.0233 | 0.0086 | 0.0275 | 0.0275 | 0.0873 | 0.6917 | 0.0295 |
| $Assets_{t-1}$ | | | | -0.0194 | -0.0273 | -0.0273 | -0.0093 | 0.0261 | -0.0281 |
| | | | | (0.0270) | (0.0278) | (0.0278) | (0.0163) | (0.2502) | (0.0281) |
| | | | | 0.4723 | 0.3269 | 0.3268 | 0.5667 | 0.9170 | 0.3186 |
| $Employees_{t-1}$ | | | | | 159.3771*** | 159.3732*** | 94.7293* | 89.5819 | 156.7021** |
| | | | | | (48.1127) | (48.1149) | (42.8246) | (47.0472) | (48.5755) |
| | | | | | 0.0009 | 0.0009 | 0.0272 | 0.0574 | 0.0013 |
| $Age_{t-1}$ | | | | | | 189.5337 | 297.6152* | 147.9667 | 181.4599 |
| | | | | | | (131.5520) | (135.9342) | (179.4578) | (132.4839) |
| | | | | | | 0.1498 | 0.0288 | 0.4100 | 0.1709 |
| $Advertising_{t-1}$ | | | | | | | 0.8588 | 0.6000 | 0.3815 |
| | | | | | | | (1.8659) | (2.4577) | (1.2769) |
| | | | | | | | 0.6454 | 0.8072 | 0.7652 |
| $R\&D_{t-1}$ | | | | | | | | 0.8709 | 0.9282 |
| | | | | | | | | (1.6908) | (0.6498) |
| | | | | | | | | 0.6067 | 0.1533 |
| Observations | 7,320 | 7,320 | 7,290 | 7,290 | 7,269 | 7,247 | 3,247 | 1,949 | 7,247 |
| Number of firms | 1,933 | 1,933 | 1,928 | 1,928 | 1,922 | 1,912 | 879 | 527 | 1,912 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 82: Fixed effects regression estimates of the effect of Environment CSR on Environment SIC using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) Environment $SIC_t$ | (2) Environment $SIC_t$ | (3) Environment $SIC_t$ | (4) Environment $SIC_t$ | (5) Environment $SIC_t$ | (6) Environment $SIC_t$ | (7) Environment $SIC_t$ | (8) Environment $SIC_t$ | (9) Environment $SIC_t$ |
|---|---|---|---|---|---|---|---|---|---|
| Environment $CSR_{t-1}$ | 0.0036*** | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | -0.0001 | -0.0017 | 0.0002 |
| | (0.0008) | (0.0010) | (0.0010) | (0.0010) | (0.0010) | (0.0010) | (0.0015) | (0.0019) | (0.0010) |
| | 0.0000 | 0.9463 | 0.9531 | 0.9551 | 0.9552 | 0.9609 | 0.9649 | 0.3930 | 0.8584 |
| Long-term $debt_{t-1}$ | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.2445 | 0.2409 | 0.2434 | 0.2444 | 0.1115 | 0.3617 | 0.2313 |
| $Assets_{t-1}$ | | | | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.8189 | 0.8207 | 0.8210 | 0.5559 | 0.9245 | 0.6587 |
| $Employees_{t-1}$ | | | | | -0.0000 | -0.0000 | 0.0030 | 0.0036 | -0.0009 |
| | | | | | (0.0026) | (0.0026) | (0.0028) | (0.0031) | (0.0027) |
| | | | | | 0.9953 | 0.9959 | 0.2901 | 0.2396 | 0.7305 |
| $Age_{t-1}$ | | | | | | 0.1965*** | 0.1707*** | 0.1975*** | 0.1942*** |
| | | | | | | (0.0113) | (0.0171) | (0.0238) | (0.0113) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0007** | 0.0008** | 0.0003 |
| | | | | | | | (0.0003) | (0.0003) | (0.0002) |
| | | | | | | | 0.0079 | 0.0055 | 0.1505 |
| $R\&D_{t-1}$ | | | | | | | | 0.0001 | 0.0002* |
| | | | | | | | | (0.0001) | (0.0001) |
| | | | | | | | | 0.2253 | 0.0419 |
| Observations | 9,716 | 9,716 | 9,675 | 9,675 | 9,643 | 9,602 | 4,306 | 2,579 | 9,602 |
| Number of firms | 2,383 | 2,383 | 2,375 | 2,375 | 2,368 | 2,349 | 1,088 | 658 | 2,349 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 83: Fixed effects regression estimates of the mediation test using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| Environment $SIC_t$ | -176.4512 | -422.1780 | -452.5099 | -454.0624 | -471.8139 | -472.2557 | 114.4310 | -48.5614 | -499.3873 |
| | (262.6364) | (276.3178) | (278.4971) | (278.7929) | (274.2804) | (274.4423) | (318.5632) | (428.0955) | (283.9163) |
| | 0.5018 | 0.1267 | 0.1044 | 0.1035 | 0.0856 | 0.0855 | 0.7195 | 0.9097 | 0.0788 |
| Environment $CSR_{t-1}$ | 10.4198 | 19.5542 | 21.1951 | 20.8349 | 24.7989 | 24.8355 | 3.4384 | 13.6475 | 25.4013 |
| | (5.5223) | (13.2913) | (13.3661) | (13.0303) | (13.1691) | (13.2219) | (10.6053) | (15.9518) | (13.3725) |
| | 0.0593 | 0.1414 | 0.1130 | 0.1100 | 0.0598 | 0.0605 | 0.7459 | 0.3926 | 0.0576 |
| Long-term $debt_{t-1}$ | | | 0.1792* | 0.2075** | 0.1722* | 0.1723* | 0.1318 | 0.2326 | 0.1716* |
| | | | (0.0778) | (0.0789) | (0.0775) | (0.0775) | (0.0795) | (0.5898) | (0.0781) |
| | | | 0.0214 | 0.0086 | 0.0263 | 0.0263 | 0.0978 | 0.6935 | 0.0282 |
| $Assets_{t-1}$ | | | | -0.0195 | -0.0274 | -0.0274 | -0.0090 | 0.0265 | -0.0285 |
| | | | | (0.0270) | (0.0279) | (0.0279) | (0.0163) | (0.2483) | (0.0283) |
| | | | | 0.4699 | 0.3249 | 0.3248 | 0.5803 | 0.9151 | 0.3133 |
| $Employees_{t-1}$ | | | | | 159.8263*** | 159.8282*** | 94.3372* | 89.7213 | 156.4744** |
| | | | | | (48.0045) | (48.0082) | (42.6765) | (47.0682) | (48.3043) |
| | | | | | 0.0009 | 0.0009 | 0.0273 | 0.0572 | 0.0012 |
| $Age_{t-1}$ | | | | | | 293.9786* | 273.5565** | 159.7281 | 289.8846* |
| | | | | | | (115.4215) | (94.5756) | (118.6242) | (115.1916) |
| | | | | | | 0.0109 | 0.0039 | 0.1787 | 0.0119 |
| $Advertising_{t-1}$ | | | | | | | 0.7537 | 0.6510 | 0.7700 |
| | | | | | | | (1.9462) | (2.7101) | (1.3789) |
| | | | | | | | 0.6986 | 0.8103 | 0.5766 |
| $R\&D_{t-1}$ | | | | | | | | 0.8772 | 1.0580 |
| | | | | | | | | (1.7212) | (0.6626) |
| | | | | | | | | 0.6105 | 0.1104 |
| Observations | 7,314 | 7,314 | 7,284 | 7,284 | 7,263 | 7,241 | 3,247 | 1,949 | 7,241 |
| Number of firms | 1,930 | 1,930 | 1,925 | 1,925 | 1,919 | 1,909 | 879 | 527 | 1,909 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Longitudinal regression: transformed DV to reduce outlier influence

Table 84: Fixed effects regression estimates of the effect of Environment CSR on performance using a time-delayed specification and an inverse hyperbolic sine transformed performance variable to control for the influence of outliers. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| Environment $CSR_{t-1}$ | 0.0026*** | 0.0020*** | 0.0020*** | 0.0020*** | 0.0021*** | 0.0021*** | 0.0010 | 0.0016 | 0.0021*** |
| | (0.0004) | (0.0004) | (0.0004) | (0.0004) | (0.0004) | (0.0004) | (0.0005) | (0.0008) | (0.0004) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0660 | 0.0501 | 0.0000 |
| Long-term $debt_{t-1}$ | | | 0.0000* | 0.0000* | 0.0000 | 0.0000 | 0.0000 | -0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0151 | 0.0110 | 0.0523 | 0.0517 | 0.3423 | 0.8622 | 0.0581 |
| $Assets_{t-1}$ | | | | -0.0000 | -0.0000 | -0.0000 | -0.0000* | -0.0000 | -0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.5598 | 0.1992 | 0.1949 | 0.0427 | 0.6036 | 0.1352 |
| $Employees_{t-1}$ | | | | | 0.0039** | 0.0039** | 0.0021 | 0.0021 | 0.0037** |
| | | | | | (0.0012) | (0.0012) | (0.0014) | (0.0016) | (0.0012) |
| | | | | | 0.0015 | 0.0015 | 0.1201 | 0.1955 | 0.0022 |
| $Age_{t-1}$ | | | | | | 0.0222*** | 0.0322*** | 0.0298*** | 0.0218*** |
| | | | | | | (0.0037) | (0.0043) | (0.0054) | (0.0037) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0001 | 0.0001 | 0.0000 |
| | | | | | | | (0.0001) | (0.0001) | (0.0000) |
| | | | | | | | 0.0907 | 0.2591 | 0.2991 |
| $R\&D_{t-1}$ | | | | | | | | 0.0001 | 0.0000 |
| | | | | | | | | (0.0000) | (0.0000) |
| | | | | | | | | 0.2189 | 0.1583 |
| Observations | 7,320 | 7,320 | 7,290 | 7,290 | 7,269 | 7,247 | 3,247 | 1,949 | 7,247 |
| Number of firms | 1,933 | 1,933 | 1,928 | 1,928 | 1,922 | 1,912 | 879 | 527 | 1,912 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 85: Fixed effects regression estimates of the effect of Environment CSR on Environment SIC using a time-delayed specification. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) Environment $SIC_t$ | (2) Environment $SIC_t$ | (3) Environment $SIC_t$ | (4) Environment $SIC_t$ | (5) Environment $SIC_t$ | (6) Environment $SIC_t$ | (7) Environment $SIC_t$ | (8) Environment $SIC_t$ | (9) Environment $SIC_t$ |
|---|---|---|---|---|---|---|---|---|---|
| Environment $CSR_{t-1}$ | 0.0036*** | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | -0.0001 | -0.0017 | 0.0002 |
| | (0.0008) | (0.0010) | (0.0010) | (0.0010) | (0.0010) | (0.0010) | (0.0015) | (0.0019) | (0.0010) |
| | 0.0000 | 0.9463 | 0.9531 | 0.9551 | 0.9552 | 0.9609 | 0.9649 | 0.3930 | 0.8584 |
| Long-term $debt_{t-1}$ | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.2445 | 0.2409 | 0.2434 | 0.2444 | 0.1115 | 0.3617 | 0.2313 |
| $Assets_{t-1}$ | | | | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 | -0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.8189 | 0.8207 | 0.8210 | 0.5559 | 0.9245 | 0.6587 |
| $Employees_{t-1}$ | | | | | -0.0000 | -0.0000 | 0.0030 | 0.0036 | -0.0009 |
| | | | | | (0.0026) | (0.0026) | (0.0028) | (0.0031) | (0.0027) |
| | | | | | 0.9953 | 0.9959 | 0.2901 | 0.2396 | 0.7305 |
| $Age_{t-1}$ | | | | | | 0.1965*** | 0.1707*** | 0.1975*** | 0.1942*** |
| | | | | | | (0.0113) | (0.0171) | (0.0238) | (0.0113) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0007** | 0.0008** | 0.0003 |
| | | | | | | | (0.0003) | (0.0003) | (0.0002) |
| | | | | | | | 0.0079 | 0.0055 | 0.1505 |
| $R\&D_{t-1}$ | | | | | | | | 0.0001 | 0.0002* |
| | | | | | | | | (0.0001) | (0.0001) |
| | | | | | | | | 0.2253 | 0.0419 |
| Observations | 9,716 | 9,716 | 9,675 | 9,675 | 9,643 | 9,602 | 4,306 | 2,579 | 9,602 |
| Number of firms | 2,383 | 2,383 | 2,375 | 2,375 | 2,368 | 2,349 | 1,088 | 658 | 2,349 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Table 86: Fixed effects regression estimates of the mediation test using a time-delayed specification and an inverse hyperbolic sine transformed performance variable to control for the influence of outliers. Subscript *t* indicates year. Standard errors are clustered by firm.

| VARIABLES | (1) $Revenue_{t+1}$ | (2) $Revenue_{t+1}$ | (3) $Revenue_{t+1}$ | (4) $Revenue_{t+1}$ | (5) $Revenue_{t+1}$ | (6) $Revenue_{t+1}$ | (7) $Revenue_{t+1}$ | (8) $Revenue_{t+1}$ | (9) $Revenue_{t+1}$ |
|---|---|---|---|---|---|---|---|---|---|
| Environment $SIC_t$ | 0.0020 | -0.0099 | -0.0105 | -0.0105 | -0.0109 | -0.0109 | -0.0121 | -0.0212* | -0.0124* |
| | (0.0054) | (0.0062) | (0.0062) | (0.0062) | (0.0061) | (0.0061) | (0.0068) | (0.0084) | (0.0063) |
| | 0.7095 | 0.1078 | 0.0900 | 0.0894 | 0.0738 | 0.0719 | 0.0744 | 0.0122 | 0.0479 |
| Environment $CSR_{t-1}$ | 0.0026*** | 0.0019*** | 0.0020*** | 0.0020*** | 0.0021*** | 0.0020*** | 0.0009 | 0.0015 | 0.0021*** |
| | (0.0004) | (0.0004) | (0.0004) | (0.0004) | (0.0004) | (0.0004) | (0.0005) | (0.0008) | (0.0004) |
| | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0717 | 0.0614 | 0.0000 |
| Long-term $debt_{t-1}$ | | | 0.0000* | 0.0000** | 0.0000* | 0.0000* | 0.0000 | -0.0000 | 0.0000* |
| | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | 0.0136 | 0.0095 | 0.0442 | 0.0437 | 0.2690 | 0.9052 | 0.0477 |
| $Assets_{t-1}$ | | | | -0.0000 | -0.0000 | -0.0000 | -0.0000* | -0.0000 | -0.0000 |
| | | | | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| | | | | 0.5558 | 0.1983 | 0.1940 | 0.0384 | 0.6398 | 0.1284 |
| $Employees_{t-1}$ | | | | | 0.0039** | 0.0039** | 0.0022 | 0.0021 | 0.0037** |
| | | | | | (0.0012) | (0.0012) | (0.0013) | (0.0016) | (0.0012) |
| | | | | | 0.0014 | 0.0014 | 0.1080 | 0.1739 | 0.0020 |
| $Age_{t-1}$ | | | | | | 0.0246*** | 0.0347*** | 0.0349*** | 0.0245*** |
| | | | | | | (0.0038) | (0.0045) | (0.0056) | (0.0038) |
| | | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $Advertising_{t-1}$ | | | | | | | 0.0001 | 0.0001 | 0.0001 |
| | | | | | | | (0.0001) | (0.0001) | (0.0000) |
| | | | | | | | 0.0574 | 0.1388 | 0.2179 |
| $R\&D_{t-1}$ | | | | | | | | 0.0001 | 0.0000 |
| | | | | | | | | (0.0000) | (0.0000) |
| | | | | | | | | 0.1974 | 0.1279 |
| Observations | 7,314 | 7,314 | 7,284 | 7,284 | 7,263 | 7,241 | 3,247 | 1,949 | 7,241 |
| Number of firms | 1,930 | 1,930 | 1,925 | 1,925 | 1,919 | 1,909 | 879 | 527 | 1,909 |
| Firm FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FEs | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Robust standard errors in parentheses. *** p<0.001, ** p<0.01, * p<0.05