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Collective Reputations and Business Sustainability

A dissertation submitted in partial satisfaction of the

requirements for the degree

Doctor of Philosophy

in

Environmental Science and Management

by

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Collective Reputations and Business Sustainability

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by

Seonghoon Kim

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Abstract

Collective Reputations and Business Sustainability

by

Seonghoon Kim

Environmental and social issues involving firms often arise due to difficulties in observing their environmental and social performance. Firms' greenhouse gas emissions, toxic releases, accounting scandals, insider trading, and child labor abuse are all such cases where stakeholders face challenges in detecting and addressing them beforehand. Therefore, it is often helpful for stakeholders of firms (such as customers, government, investors, etc.) to have reliable and observable information available in normal times to accurately assess firms' unobservable qualities.

When reliable and direct information about a firm's unobservable qualities is unavailable, stakeholders might turn to a collective reputation of firms to evaluate difficult-to-observe qualities. A collective reputation refers to stakeholders' beliefs about which firms belong to a specific group and the stereotype of the qualities and characteristics common to that group. By utilizing a collective reputation, stakeholders associate a firm with a broader group through a common observable trait, and then use their stereotype about that group to infer the firm's other, more difficult-to-observe qualities.

In my dissertation, I propose that a collective reputation is a combination of three attributes: group membership, group stereotype, and salience. Each of these attributes is the

subject of my three dissertation studies, where I investigate how changes in each of them affect stakeholders' evaluation of firms. The first study examines how changes in a firm's group membership affect its financial performance, using the case of South Korea's business group firms, known as *Chaebol*. The second study investigates how changes in stakeholders' stereotypes about the group influence their investment in a new venture start-up within the context of entrepreneurship. The third study examines how changes in the salience of a collective reputation due to information disclosure affect the financial performance of firms, utilizing the case of the US EPA's TRI (Toxic Release Inventory) program.

Changes in a collective reputation can significantly impact firms' financial performance, and thus it is crucial for business practitioners to clearly understand the mechanism of how a collective reputation works and how stakeholders utilize it to evaluate firms' unobservable qualities. Throughout my dissertation and each chapter, I provide business and policy implications on how practitioners can better use a collective reputation to enhance business sustainability and financial performance.

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Chapter 1

Introduction

1.1. Research Theme

People make evaluations of other people and organizations by assessing their quality on multiple dimensions (Bromley 2000). Some of these dimensions are directly observable, such as a person's height or the number of employees that work for an organization. For other dimensions, people must make inferences about quality because they cannot directly observe the dimensions' quality. People sometimes make inferences about such difficult-to-observe quality dimensions based on indicators they can directly observe (Ashforth and Humphrey 1997; Ferguson, Deephouse, and Ferguson 2000; Jonsson, Greve, and Fujiwara-Greve 2009).

One way people make inferences about difficult-to-observe quality dimensions is through a collective reputation (Tirole 1996). A collective reputation exists in the minds of an evaluator as a mental schema about the observable and unobservable quality attributes that characterize a group. When using a collective reputation, an evaluator associates an individual with a broader group through a common observable trait, and then uses his or her stereotype about that group to infer the individual's other, more difficult-to-observe qualities (Frick and Simmons 2013; King, Lenox, and Barnett 2002).

Evaluators place greater weights on collective reputation when the unobserved dimensions are important to their decisions and they lack other reliable sources of information to make those decisions (Jonsson et al. 2009; Porac, Thomas, and Baden-Fuller 2011; Vergne and Wry 2014). When collective reputation is salient, evaluators evaluate individuals more homogeneously, applying a stereotypical expectation across all group members. Evaluators reward individuals when the collective reputation leads the evaluators to make more favorable evaluations about individuals than they would otherwise have made.

Conversely, evaluators punish individuals when the collective reputation leads them to make unfavorable evaluations about the individuals.

In the dissertation, I argue that a collective reputation is the combination of three attributes: group membership, group stereotype, and salience. Group membership is evaluators' beliefs about which individuals belong together. Evaluators link individuals into peer groups when they come to see that the group's observable characteristics signify common observable and unobservable quality dimensions of the group's members (Fiol and Romanelli 2012; Hsu and Hannan 2005). People group things together to make a complex world more cognitively manageable—"those birds all have the same feathers and are clearly flocking together." The more evaluators perceive group members as homogeneous on observable characteristics of individuals, the more they are likely to believe that group members are similar along difficult-to-observe quality dimensions. Conversely, the more evaluators perceive individuals as heterogeneous on observable characteristics, the more they will believe they are heterogeneous on difficult-to-observe dimensions.

A group stereotype refers to people's existing, generalized beliefs about the group (Carton and Rosette 2011; Hilton and Von Hippel 1996). As evaluators form a sense of the group, they also form mental images about the observable and unobservable qualities that are common to the group (Fiol and Romanelli 2012; Haslam and Ellemers 2005). The group stereotype, or the evaluators' pre-existing beliefs about the group then influences inferences about the group's other, multiple dimensions of difficult-to-observe quality. The group stereotype thus leads evaluators to make similar stereotypical judgments of those unobservable qualities across the group's members, resulting in similar rewards or punishments for those qualities.

The salience of a collective reputation is the weight evaluators place on the collective reputation in making a decision. Salience is stronger for qualities where evaluators have stronger demands and where evaluators have less observable information about what they are evaluating (Jonsson et al. 2009; Vergne and Wry 2014). For example, if a consumer places a high premium on a product's reliability, learning that the product belongs to a group with collective reputation known for enduring reliability can reassure her that she is making the right purchase. The reliability of a car may be particularly important to a consumer who fears a breakdown on his frequent long trips. The consumer may be more likely to purchase a car made by Japanese car companies due to their collective reputation for producing cars that seldom break down.

Collective reputations can change as people acquire new information about a group and its individual members. First, when people receive new information about who belongs in the peer group, they may change their perception of the members composing of the group. Individuals may use this attribute to (dis)associate them with (from) a group that they want to follow (or avoid) throughout changes in observable characteristics that signify a particular group membership (Aqueveque, Rodrigo, and Duran. 2018; Frynas 2005). As individuals adopt observable characteristics that are more (dis)similar to other group members, evaluators see them as more homogeneous (heterogeneous) on observable characteristics and believe them also to be homogeneous (heterogeneous) on other, difficult-to-observe dimensions.

Second, when people receive new information about an individuals' performance on a difficult-to-observe quality dimension, they may update their stereotype on that difficult-to-observe dimension. For example, if a group member commits a negative behavior,

stakeholders use that information to update their beliefs about group members collectively based on that negative new information about a group member (Crisp and Turner 2011; Fiske et al. 2002). An individual's violation of a law or a right is an example of such negative new information, which informs that an individual along a difficult-to-observe quality is more negative than the group stereotype.

Third, when people receive new information about a previously difficult-to-observe quality dimension, salience of a collective reputation declines as they become less reliant on the collective reputation in making evaluations. Therefore, if more precise information about the individuals—that unveils their difficult-to-observe quality dimensions—is provided, people may no longer rely on a collective reputation but instead use that new information to individually evaluate group members (Haslam and Ellemers 2005). The reward and punishment system will also change in a way that rewards (or penalties) are given to individuals based on their exact status or position within the group. In summary, salience of collective reputations is inversely related to the information asymmetry between individuals and evaluators. Salience declines as the information asymmetry becomes smaller and increases as the information asymmetry becomes larger.

My dissertation investigates collective reputations in business contexts. Stakeholders of a firm often lack complete information regarding various quality dimensions, such as sustainability or integrity. In such instances, a firm's collective reputation can serve as a valuable source of information for stakeholders to evaluate the firm's difficult-to-observe attributes (Barnett and King 2008).

Based on the discussion so far, collective reputations become an important source of information for a firm's stakeholders when three conditions are met: the firm clearly signals

its group membership; stakeholders hold a certain stereotype about the group; and stakeholders believe a collective reputation is salient for evaluating the firms' unobservable quality dimensions. When these conditions change, the influence of collective reputations on stakeholders' evaluations of firms can vary.

First, new information can change stakeholders' perceptions of which firms belong to a particular group. Firms have various observable characteristics signifying a group membership (e.g., nationality or industry) (Fiol and Romanelli 2012; Gioia, Schultz, and Corley 2000). For some cases, firms can influence stakeholders' perception about a group composition by simply changing some of their own observable characteristics. For example, firms in South Korea can signal membership in a family business group, *chaebol*, through family-related observable features, such as a family member CEO (and his or her dual role as the chairman) or high family ownership (Terlaak, Kim, and Roh 2018). Since the 2000s, when the reputation of *chaebol* for social responsibility (and business ethics) was extremely low due to their involvement in a series of social and political scandals, however, some of *chaebols* have removed family members from the frontline manager positions to improve their poor ethical reputation (Villalonga and Amit 2006; Westhead, Cowling, and Howorth 2001). For stakeholders, having family members in an important position in the firm signifies membership in *chaebol*, and conversely, removal of those family members from the position make them recognize the firms as non-*chaebol* or western style firms. This can further affect stakeholders' evaluation about the firms' social responsibility or business ethics.

Second, new information can change stakeholders' stereotype about the firms' difficult-to-observe dimension. Once signaled by a group membership, stakeholders hold mental images about the group's observable and unobservable qualities and apply it to

evaluate firm's difficult-to-observe quality dimensions (Winfrey and McCluskey 2005). For example, for the product quality of a car, stakeholders imagine reliability and sophistication when they see the car is produced by a German car manufacturer. Or for a firm's environmental responsibility, stakeholders think of petroleum extracting companies (or chemical companies) as "large polluters" (King et al. 2002). However, stereotypes can change when stakeholders receive new information about a group member's performance on a difficult-to-observe dimension. For instance, a disastrous oil spill in 2010 by British Petroleum (BP) in the northern Gulf of Mexico challenged stakeholders' perceptions of the social and environmental responsibilities of global chemical companies, most of which had regained consumer trust throughout participation in various social contribution programs. BP's oil spill encouraged stakeholders to extend their suspicion about poor environmental responsibility to other global petroleum companies, triggering numerous social movements calling for improvements in their environmental performance.

Lastly, new information can change the salience of a collective reputation in stakeholders' evaluation of the firm's unobservable quality dimensions. A collective reputation is less valuable once stakeholders have more complete and objective information about the firms' unobservable quality dimensions (resolving information asymmetries). For example, firms with strong brand identities may be able to reduce the salience of a collective reputation by providing stakeholders with an alternative source of product information. Also, product certifications likewise signal products' difficult-to-observe qualities (Jacoby, Olson, and Haddock 1971; Samiee 2010). Most notably, a collective reputation's salience can be reduced most significantly when information on the firms' exact individual performances is disclosed to the stakeholders (Hamilton 1995). Once new information is revealed,

stakeholders can easily identify every group member's position along the previously unobserved quality dimension. If stakeholders have proper reward or punishment system for that unobservable quality dimension, an information release might cause significant discrimination in the rewards (penalties) for high- and low-performers.

The primary objective of my dissertation is to investigate how a firm's stakeholders respond to changes in a collective reputation due to the aforementioned three conditions and explore the resulting consequences for the firm's financial performance, with a specific focus on business sustainability. As previously mentioned, a firm's ESG (environmental, social, and governance) qualities are exemplary cases of desirable yet difficult-to-observe attributes for its stakeholders, rendering them susceptible to the influence of collective reputation. Therefore, in the three chapters (Chapter 2, 3, and 4), I will address different ESG topics, such as environmental sustainability, corporate governance, and diversity, while examining their connection to the theory of collective reputation. Below, I will provide a brief overview of each chapter.

1.2. Dissertation Structure and Chapter Preview

My dissertation is composed of three studies, each discussing the features of the collective reputation—i.e., group membership, stereotype and salience—and how the changes in these features affect firms' (financial) performances and business strategies. In the first study (chapter 2), I study how new information can change stakeholders' perceptions of which firms are in a group. In this chapter, I use the case of *chaebol* firms, South Korea's business group firms. As explained above, *chaebol* firms have a poor reputation for business ethics (Terlaak et al. 2018). In this chapter, I expect that the stakeholders' negative stereotype

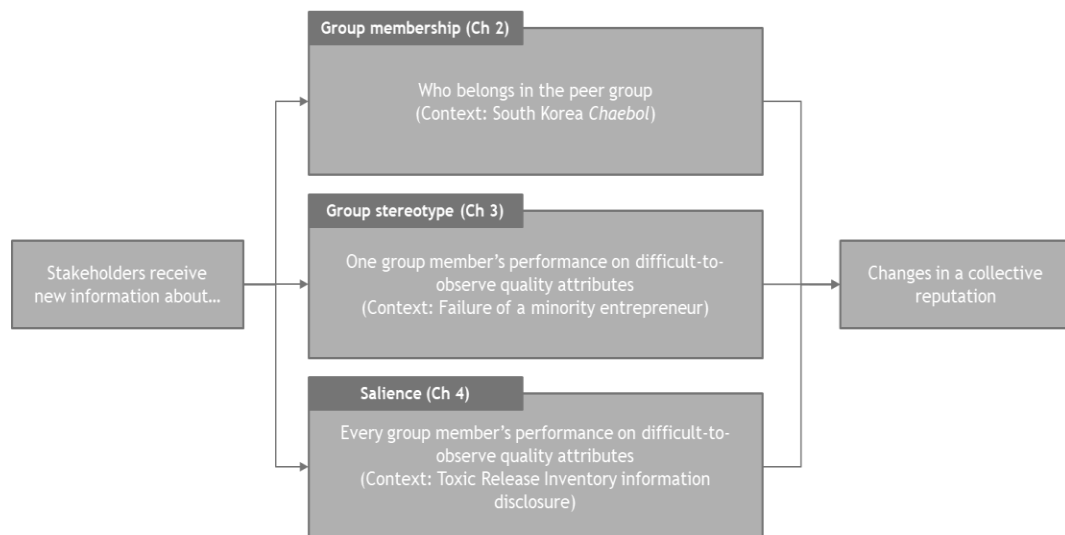
about the *chaebol* firms' business ethics will make them also negatively evaluate an integrity capacity embedded in the *chaebol* firms' environmental performance, leading the capital market to adjust downward the value of the *chaebol* firms' environmental performance. However, in the chapter, I expect that *chaebol* firms can overcome such negative market adjustments by removing common observable characteristics of *chaebol*, such as a family CEO or family ownership. In the paper, I find that improvements in firm environmental performance lead to smaller increases in market values for firms belonging to a *chaebol* compared to firms that are not *chaebol* members. This chapter has been published in *Business Strategy and the Environment*.

In the second study (chapter 3), I examine how negative new information about a group member's performance updates stakeholders' stereotype about the group. In this chapter, I focus on the diversity and equity issue in the entrepreneurship domain and examine how people update their existing stereotypes about minority entrepreneurs' managerial competence once they observe a business failure of a minority entrepreneur in the same field. I argue that human psychology tends to reinforce existing stereotypes in a way that is more negative or positive in response to new information; in the context of entrepreneurial failure, a business failure (e.g., bankruptcy) of a female and/or racial-minority entrepreneur would "worsen" people's already-negative stereotypes of all other female or racial-minority entrepreneurs in the same field. Throughout two consecutive studies with experimental vignette approaches, I find such a worsening "negative spillover effect" of a female (or Black female) entrepreneur's business failure on her peer group. This chapter is being prepared for submission to an academic peer-reviewed management journal.

In the third chapter, I examine how new information reduces the salience of a collective reputation and how it affects the firms' performances and business strategies. In this chapter, I analyze the case of the US EPA's TRI (Toxic Release Inventory) program, which made publicly available detailed information about emission performances of large-emitting manufacturing firms in the US. Because of this new program, stakeholders of the global manufacturing firms came to easily identify the firms' individual emission performances, which thus made them evaluate the firms' financial prospects more individually via this new information. In the chapter, I expect such individualized stakeholder evaluation is clearer for firms in strong collective reputations (e.g., chemical industry firms), where stakeholders' evaluations have been similar across the group based on their strong group stereotype. Using a multiplicative heteroskedasticity regression model, I find that firms in industries with strong collective reputation experienced significantly more heterogeneity in stakeholder evaluation after the TRI release compared to the pre-TRI period. This chapter is under review at the Journal of Management Studies.

Figure 1.1 illustrates the structure of my dissertation.

<Figure 1.1> Dissertation structure



1.3. Permissions and Attributions

The content of chapter 2 is the outcome of a collaboration with Ann Terlaak (University of Wisconsin, Madison) and Committee Chair, Matthew Potoski. This paper has been published in the *Business Strategy and the Environment* (Kim, Terlaak, and Potoski 2021). Wiley, the publisher, permits the authors the right to reuse the full text as part of dissertation.

The content of chapter 3 is the outcome of a collaboration with Jessica Santana and Matthew Potoski. The online survey was approved by UCSB's Office of Research for the use of human subjects in the research. Research funding for the project was provided by the Institute of Humane Studies.

The content of chapter 4 is the outcome of a collaboration with Matthew Potoski.

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Chapter 2

Corporate Sustainability and Financial Performance: Collective Reputation as Moderator of the Relationship between Environmental Performance and Firm Market Value

with Ann Terlaak and Matthew Potoski

Abstract

Markets value superior corporate sustainability performance in part because investors use a firm's environmental performance as a signal of desirable but difficult-to-observe attributes, such as the firm's integrity capacity. Yet a signaling conflict can arise when a firm belongs to an organizational form that has a collective reputation for being unethical. In such circumstances, the firm's environmental performance may no longer credibly signal its underlying integrity capacity, leading markets to adjust downward the value they would otherwise place on the firm's environmental performance. Using longitudinal data on South Korean firms, we find that improvements in firm environmental performance lead to smaller increases in market values for firms belonging to a poorly reputed organizational form. However, firms can partially recover lost value by adopting firm features that reduce the signaling conflict, thereby restoring the notion of corporate sustainability performance driving firm market values.

2.1. Introduction

Scholars and practitioners increasingly find better firm environmental performance to increase firm market value (Busch & Lewandowski, 2018; Chan & Walter, 2014; Hang, Geyer-Klingeborg, & Rathgeber, 2019). A positive relationship between environmental performance and firm value may come about because better environmental performance can reduce compliance costs and the risk of environmental lawsuits while increasing operational efficiencies, legitimacy, and access to pricing premia and market opportunities (Ambec & Lanoie, 2008; Bansal & Roth, 2000; Habib & Bhuiyan, 2017). Yet these direct benefits are but one of the drivers connecting environmental performance and firm market value. Another driver are indirect benefits that stem from capital markets using a firm's environmental performance as a signal of valuable underlying firm attributes such as the firm's general management capacity as well as integrity capacity, i.e., its higher ethical standards and ability to act on them (Chen, 2010; Delmas, Nairn-Birch, & Lim, 2015; Flammer, 2013; Hoffman, 2005; Russo & Fouts, 1997).

The notion that better environmental performance can increase a firm's market value by signaling its integrity capacity raises an intriguing question: what happens if this signal conflicts with other signals that, though unrelated to the firm's environmental performance, cast doubt on the firm's integrity? Do markets dismiss this signaling conflict or do they downward adjust the value they would otherwise place on the firm's environmental performance? What is more, if such downward adjustments take place, are firms able to recover by undertaking countervailing signaling actions?

In this paper, we investigate these questions by analyzing how environmental performance improvements differently affect market value when a firm belongs to an organizational form

that has a collective reputation for being unethical. Organizational forms are “classes of organizations that audiences understand to be similar in their core features and distinctive from other classes of organizations” (Fiol & Romanelli, 2012: 597). Over time, organizational forms develop collective reputations, with these group-level reputations shaping audience assessments of the individual firms belonging to a form (Barnett & Hoffman, 2008; King & Lenox, 2000). For our study, this suggests that if an organizational form is reputed to be unethical, then this reputation may influence how audiences assess the integrity capacity of the individual firms belonging to this form. A signaling conflict ensues if this assessment contradicts the integrity signals stemming from the firms’ environmental performance.

We use a 10-year panel dataset with 155 South Korean firms to examine how dynamics empirically. We first study whether the positive relationship between environmental performance and firm market value (as captured by Tobin’s q) is weaker for firms that belong to an organizational form reputed to be unethical. Second, we examine whether these firms can recover value by adopting organizational features that contradict the form’s negative stereotypical features, thereby disassociating themselves from this poorly reputed organizational form. The South Korean context allows sorting our sample firms into one of two organizational forms. The first captures firms with western style corporate governance structures; the other consists of firms affiliated with a business group, known in South Korea as a *chaebol*. *Chaebol* firms were key drivers of South Korea’s rapid economic development in the latter half of the 20th century but weak corporate governance structures that narrowly serve *chaebols*’ founding families have led to fraudulent behaviors and corporate scandals that have given this organizational form a collective reputation of being unethical (Albrecht et al., 2010; Kidwell, 2008). Leveraging this setting, we find that environmental performance

improvements in *chaebol* firms indeed lead to smaller increases in firm market values than equivalent improvements in non-*chaebol* firms. However, we also find that *chaebol* firms can recover some value by adopting organizational attributes that contradict what is stereotypical of *chaebols* as an organizational form.

Our study identifies when it may pay to be green and, as such, contributes to research on the conditionality of the relationship between firm environmental performance and market value (Dixon-Folwer et al., 2013; Wei et al., 2017). Thus far, this research has mostly focused on the direct benefits that drive the link between environmental and financial performance and, accordingly, has analyzed the conditionality of this relationship by identifying circumstances that shape the nature of these benefits. For example, seeing that environmental performance can improve financial performance through lowering regulatory risks, firms in more highly regulated settings may gain greater financial rewards for improving their environmental performance (Li et al., 2017; Zhu, Sarkis, & Lai, 2007). We depart from this prior research by calling attention to the indirect benefits that link environmental performance and firm market value. By emphasizing that environmental performance partly drives firm value because it serves as a signal of the firm's integrity capacity, we show how market rewards for environmental performance can be sensitive to circumstances that, though unrelated to the firm's environmental performance, differentially affect this signal's credibility.

Our study also contributes to the literature on collective reputation and organizational forms (Barnett & Hoffman, 2008; Ferguson, Deephouse, & Ferguson, 2000). Research suggests that negative audience perceptions of firms engulfed in scandals can spill over to non-culpable firms of that same organizational form (Jonsson, Greve, & Fujiwara-Greve, 2009). Our results confirm that the trappings of a collective reputation run deep while also showing

that a firm can loosen the grip of an unfavorable collective reputation by actively disassociating itself from its poorly reputed organizational form.

2.2. Theoretical Background and Hypotheses

2.2.1. Firm environmental performance and firm market value

A firm's environmental improvements can come at significant upfront expense, occasionally leading to a negative relationship between firm environmental performance and short-term accounting measures of financial performance such as ROA (Delmas et al., 2015; Hart, 1995). However, when using market-based financial performance measures that consider a firm's potential future cash flows and profitability (such as Tobin's q), scholars frequently find that better environmental performance increases firm value (Busch & Lewandowski, 2018; Chan & Walter, 2014; Delmas et al., 2015; Dowell et al., 2000). Better environmental performance can increase a firm's value by reducing its compliance costs, generating tax savings, lowering the risks of environmental lawsuits, and, more broadly, putting the firm into a better position to respond to tightening regulations (Ambec & Lanoie, 2008; Habib & Bhuiyan, 2017; Lanoie et al., 2011). Environmental performance can additionally increase a firm's market value by improving a firm's legitimacy, providing access to pricing premia and market opportunities, and creating operational efficiencies that result from reducing pollution and waste (e.g., Bansal & Roth, 2000; Hart, 1995).

A firm's environmental performance can also influence its market value through indirect drivers. Specifically, markets may view improvements in a firm's environmental performance as a signal of the firm's underlying management capacity and integrity capacity (Dowell et al., 2000; Flammer 2013; Russo & Fouts, 1997). Because improving environmental performance is a complex undertaking that requires leadership, efficient management, and adaptability,

markets may use a firm's superior environmental performance to infer that its management capacity is high (Hoffman, 2005; Hofmann, Theyel, & Wood, 2012). With this capacity enhancing a firm's performance beyond the environmental domain, environmental performance improvements can drive increases in firm market values (Busch & Hoffmann, 2011; Delmas et al., 2015).

Of particular interest for the purpose of this paper is that a firm's environmental performance may likewise signal its integrity capacity. Integrity capacity is a firm's "capability for repeated process alignment of moral awareness, deliberation, character and conduct that demonstrates balanced judgment, enhances sustained moral development and promotes supportive systems for moral decision making" (Petrick & Quinn, 2000, p. 4). Thus, high integrity capacity entails holding high ethical standards and the managerial capabilities to enact these standards (Litz, 1996; Richter & Arndt, 2018). As superior integrity capacity guides firms to "do the right thing" and, in turn, generates the stakeholder support that can lead to future profitability, better firm environmental performance can further increase firm market values (Bansal & Clelland, 2004; McWilliams & Siegel 2001).

The idea that a firm's environmental performance signals its integrity capacity stems from the notion that if a firm improves its environmental performance beyond regulatory requirements, it essentially contributes to a greater good where it bears the production cost without necessarily internalizing all benefits (McWilliams & Siegel, 2001; Russo & Fouts, 1997). To be sure, going beyond regulation does bring some private benefits, as detailed above. Yet environmental protection ultimately has public good characteristics, leading to expectations that firms that provide this good may have a higher sense of ethical obligation and a willingness to act on that sense. Prior studies align with the notion of stakeholders

viewing a firm's environmental performance as a signal of its underlying integrity capacity (Chen, 2010; Norheim-Hansen, 2015). Yoon, Jang, and Lee (2016), for instance, find that employees perceive their employer as more ethical when it takes more progressive environmental action. This signaling effect can even extend to consumer perceptions of product quality, with consumers believing that firms with better environmental performance make higher quality products (Chen, 2010).

Taken together, these arguments suggest that better firm environmental performance drives firm market value, leading us to follow prior studies when stating as our baseline hypothesis:

H1: Improvement in a firm's environmental performance increases the firm's market value.

2.2.2. Organizational forms and firm market value of environmental performance

Audiences draw cognitive boundaries around firms that share core features in their organizational blueprints, thereby classifying these firms into different organizational forms (Fiol & Romanelli, 2012; Jonsson et al., 2009; Patvardhan, Gioia, & Hamilton, 2015). An organizational forms can have a collective reputation for its members, similar to the way an individual firm can have its own individual reputation (e.g., Fombrun & Shanley, 1990; Jensen & Roy, 2008). While an organizational form's collective reputation is formed on a group-level, it essentially serves as a signal that guides how audiences view and respond to the individual firms that belong to this form (Barnett & Hoffman, 2008; Barnett & King, 2008; Ferguson et al., 2000; Winn, MacDonald, & Zietsma, 2008). Jonsson et al. (2009), for instance, find that audiences penalize non-culpable firms for deviant behaviors of other firms of the same organizational form. For our study, this raises the question of how markets respond to a firm's

environmental performance improvement—presumably, a signal of integrity capacity—when the firm belongs to an organizational form reputed to be unethical.

When audiences receive inconsistent signals or information about firm attributes, they tend to re-evaluate the credibility of one or both signals, or re-interpret them altogether (Barnett & Leih, 2018; Festinger, 1962; Godfrey, 2005). In extreme cases, such reinterpretation can go as far as reassessing attributes previously seen as positive to be negative. For example, when a firm’s philanthropic activities conflict with evidence that the firm otherwise engages in immoral practices, audiences may dismiss the philanthropy as “an ingratiating act of hypocrisy” (Godfrey, 2005). For firms that both improve their environmental performance and belong to an organizational form reputed as unethical, this suggests that the organizational form’s collective reputation may lead markets to question the extent to which superior environmental performance signals superior integrity capacity. As a result, markets may downward-adjust the financial value they would otherwise place on the firms’ environmental performance. To be sure, a number of direct drivers still connect the firms’ environmental performances with their market value such that better environmental performance will continue to increase market values. However, we expect this increase to be smaller than that experienced by firms that undertake equivalent performance improvements yet do not belong to the poorly reputed organizational form.

H2: The positive effect of a firm’s environmental performance improvement on its market value is smaller when the firm’s organizational form is reputed to be unethical.

Firms can weaken the influence of a collective reputation by highlighting their attributes that contradict the collective reputation’s negative stereotype. For example, some Silicon Valley start-ups disassociated themselves from their organizational form by stressing how their commitment-based employment models differed from Silicon Valley’s stereotypical

workforce models (Baron & Hannan, 2002). Conversely, during the emergence of the U.S. satellite radio market, satellite radio providers clarified their belonging to this organizational form by highlighting similarities in their product services (Navis & Glynn, 2010).

Because audiences classify organizations using an organizational form's core attributes, successful disassociation with an organizational form requires manipulation of core features, rather than peripheral ones (Hsu & Hannan, 2005). Studies exploring how a firm's favorable reputation interacts with stigmatizing events echo this idea (Godfrey, 2005; Rhee & Valdez, 2009). For example, a firm's favorable reputation can be a shield against a stigmatizing claim only if this reputation is relevant to the claim's domain (Mishina & Devers, 2012). Similarly, for firms to disassociate themselves from poorly perceived peers, they need to contradict the core elements of these peers' stereotype (Aqueveque, Rodrigo, & Duran, 2018). Oil companies that seek to disassociate themselves from their peers' misconduct, for instance, need to reduce the harm from petroleum extraction rather than donating schoolbooks or mosquito nets to local communities (Frynas, 2005).

For our study, these arguments suggest that firms from a poorly reputed organizational form can more fully capture the value of their environmental improvements by adopting firm attributes that contradict their organizational form's negative core stereotypical features. As this disassociation weakens the market's prior negative beliefs about members of this organizational form, the grip of its reputation loosens and the market becomes more willing to interpret the firms' environmental performances as signals of their underlying integrity capacity. This, in turn, increases the value the market places on these firms' environmental performance improvements. We expect:

H3: For firms of an organizational form reputed to be unethical, firm-level attributes that contradict the core stereotypical attributes of the organizational form strengthen the positive relationship between a firm's environmental performance improvement and its market value.

2.3. Empirical Analysis

2.3.1. Research Setting

We use data on South Korean corporations for empirical tests of our hypotheses. South Korea's economy is broadly composed of two distinct organizational forms, one containing corporations with western style governance structures and the other containing business group firms. Business group firms cluster into groups (called *chaebols*) whose members all share a family tie to the group's founder. These family ties tend to result in corporate governance structures that lack transparency and protect the founding families' influence, thereby enabling the families to enrich themselves in fraudulent ways (Albrecht et al., 2010; Kidwell, 2008; Morck, Wolfenzon, & Yeung, 2005). For example, SK Global and Daewoo, two of South Korea's largest *chaebols*, have had scandals in which members of the founding families manipulated accounting practices and options trading for their own benefit. Similarly, the families controlling Samsung and Hyundai were found guilty of using company slush funds for political purposes.

Scandals like these have given *chaebol* firms a collective reputation of being corrupt and unethical (Albrecht et al., 2010). A 2019 survey of South Korean citizens found that around 70% of respondents viewed *chaebols* as unethical or unscrupulous (Realmeter, 2019). In line with this, a 2015 survey conducted by a Hong Kong-based investment consultancy points to South Korea's *chaebol*-dominated business culture as the reason for South Korea ranking as the most corrupt business society among Asia's more highly developed economies (Political

and Economic Risk Consultancy Ltd., 2015). Notably, these perceptions are not a sudden trend nor targeted at a particular firm. Instead, they have persisted for more than half-century (Oh, Chang, & Martynov, 2011). For our study, this allows testing how the effects of environmental performance improvements on firm market values differ for western style corporations versus business group firms, as well as across business group firms that align, to varying degrees, with the core *chaebol* stereotypical features.

2.3.2. Sample and Data Collection

Our sample consists of publicly traded South Korean firms that report their annual greenhouse gas emissions to Korea's GHG General Information Center. The GHG data are publicly available, and reporting is mandatory for firms with GHG emissions exceeding a given government standard (Korea Ministry of Environment, 2016). This standard is in absolute values such that the database primarily captures large corporations, with 20% of firms listed on Korea's Stock Market reporting. Our initial sample captured all 161 firms contained in this registry. After excluding firms with incomplete data, our final sample consists of 155 firms that we track from 2007, the first year of Korea's GHG General Information Center, until 2016 (resulting in 1046 firm-year observations). 88% of our sample firms are from manufacturing industries; firms from other sectors such as health care services, telecommunications or commercial banking making up the remaining 12%.

Of our sample firms, 135 are business group firms, each belonging to one of 88 business groups (such as Samsung, Hyundai, Hanwha). This leaves 20 non-business group firms, i.e., firms with western-style governance structures. The dominance of business group firms in our sample reflects South Korea's business group dominated economy. As of 2006, 74% of South

Korean firms with total firm assets exceeding 100 billion won (around \$1 million) were business group firms (The Federation of Korean Industries, 2012). Our sample has a slightly higher percentage because of its focus on large firms, combined with *chaebol* firms being the most concentrated among South Korea's ultra large corporations (Baek, Kang, & Park, 2004).

We retrieve corporate financial data as well as corporate governance information from Korea Investor's Service KIS-VALUE database and we use TS2000, a database established by Korea Listed Companies Association, to fill in missing financial data. Annual business reports stored at Korea Financial Supervisory Service DART provide further information regarding corporate structures and a firm's affiliation to a business group. Publicly traded firms must submit annual reports that explicate ownership and governance structures with mother companies and group affiliates as well as ownership stakes and top management positions held by founding family members.

2.3.3. Measures

Dependent Variable. We use Tobin's q (*Tobin's q*) to measure a firm's market value. This choice aligns with prior studies that use Tobin's q to investigate how firm environmental performance affects market measures of firm financial performance (Delmas et al., 2015; Dowell et al., 2000; King & Lenox, 2002). Following Short et al. (2007) and Thomas & Waring (1999), we define Tobin's q as the ratio of a firm's market value of assets to the book value of total assets. We calculate firm i's Tobin's q in year t as:

$$Tobin's\ q_{it} = \frac{\text{aggregate value of listed stock (end term)}_{it} + \text{book value of total debt}_{it}}{\text{book value of total assets}_{it}}$$

Independent Variables. We measure a firm’s environmental performance improvement through its year-to-year greenhouse gas (GHG) emission-intensity changes (*Env Performance*) (Busch & Hoffmann, 2011; Fujii et al., 2013). While a firm’s emission performance is just one dimension of its environmental performance, GHG emissions are a primary driver of climate change, and with standardized accounting frameworks allowing for their measurement, corporate emissions are currently a key piece to any corporate environmental performance assessment (Dahlmann, Branicki, & Brammer, 2017). To account for the effect of a firm’s size on emissions, we measure a firm’s GHG emissions (tCO₂eq) per won (Korean currency) revenue. To capture changes in the firm’s emission intensity, we measure the percent change in standardized GHG emissions over a year and multiply this change by -1 such that a greater reduction in the firm’s emissions signifies a larger environmental performance improvement. Following Hartmann & Vachon (2018), we then specify firm *i*’s environmental performance improvement in year *t* as:

$$Env\ Performance_{it} = - \left(\frac{\frac{Emission_{it}}{Revenues_{it}} - \frac{Emission_{it-1}}{Revenues_{it-1}}}{\frac{Emission_{it}}{Revenues_{it}}} \right)$$

To analyze if the increase in market value for better environmental performance is smaller for firms of a poorly reputed organizational form (H2), we create a binary variable (*Chaebol Firm*) that takes on unity if a firm is a business group firm. We coded a firm as a *Chaebol Firm* if the founding family of the respective business group holds a non-zero ownership stake in the firm. (For all business group firms in our sample, founding family members hold ownership stakes larger than 5%). We crosschecked this coding by using firm annual reports to match each firm-business group relationship with descriptive explanations of each firm’s relationship

with its mother corporation. The resulting sample makeup aligns with the makeup of the underling population.

To test H3, we create two variables—*Non-Family CEO* and *Family Ownership*—that capture firm features that are stereotypical for business group firms and whose manipulation hence allows firms to disassociate themselves from this organizational form. Installing family members in top management positions and taking large ownership stakes are common ways for founding families to maintain their control over affiliates; as a result, markets have come to see these two features as core attributes of business group firms (Villalonga & Amit, 2006; Westhead, Cowling, & Howorth, 2001). *Non-Family CEO* is a binary variable that scores one for firms that do not have a member of the founding family installed as CEO, and zero otherwise. Of the 135 business group firms in our sample, 70% have a non-family CEO, a percentage in line with other studies in this setting (Yoo & Lee, 1987). *Family Ownership* captures the ownership stake of founding family members in a *chaebol* firm. Our sample mean of family ownership is 43%, consistent with government data showing that on average founding families hold a 40% ownership stake in their *chaebol* firms (Korea Fair Trade Commission, 2012). We update both variables annually.

Control Variables. Following prior studies examining the relationship between a firm's environmental performance and market value, we include control variables for firm age, leverage, size, capital intensity, growth, and energy intensity (Delmas et al. 2015; King & Lenox, 2002; McWilliams & Siegel, 2000). We measure firm age (*Age*) as the number of years that a firm has been in operation. Leverage (*Leverage*) is the ratio of the firm's total debt to total assets. We use the firm's annual sales to control for firm size (*Size*). To control for capital

intensity (*Cap Intensity*), we divide capital expenditures by total sales. To control for variations in production, we capture growth (*Growth*) by dividing annual changes in sales by total sales. To capture that a firm's inherent energy intensity might affect its Tobin's q (and thereby confound the effect of GHG emissions on Tobin's q), we create *Energy Intensity* by dividing a firm's total energy usage by total sales (Fan et al., 2017; Yagi & Managi, 2018). We additionally control for firm governance attributes that are of particular importance in Asian economies. *Foreign Ownership* is the percentage ownership held by foreign investors; *Outside Director* is the ratio of outside directors to firm inside directors on a firm's board; *Audit Committee* is a binary variable that takes on unity if a firm has an independent audit committee (Fama & Jensen, 1983; Oh et al., 2011). We update all control variables annually. Our variables for size, capital intensity, growth and energy intensity are log-transformed to reduce skewness. Lastly, industry and year dummies control for the influence of industry and year effects.

We report variable means, standard deviations and correlation coefficients in Table 2.1. In our analysis, explanatory and control variables that are in continuous form are mean-centered to facilitate interpretation of parameter estimates that include interaction terms (Enders & Tofghi, 2007). When using mean-centered variables, the mean variance inflation factor (VIF) is 2.04 and no individual VIF exceeds 10, suggesting that multicollinearity is not an issue in our estimations.

<Table 2.1> Descriptive statistics and correlations among variables (N=1046)

Variables	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) <i>Tobin's q</i>	1.004	0.389	1.000													
(2) <i>Age</i>	41.887	15.060	-0.261*	1.000												
(3) <i>Leverage</i>	0.463	0.200	0.098*	-0.095*	1.000											
(4) <i>Size^a</i>	27.822	1.686	0.255*	0.031	0.175*	1.000										
(5) <i>Cap Intensity^a</i>	0.249	0.483	-0.152*	0.117*	-0.088*	-0.218*	1.000									
(6) <i>Growth^a</i>	0.065	0.273	0.058	-0.065*	0.027	0.024	-0.114*	1.000								
(7) <i>Energy Intensity^a</i>	-19.132	1.306	-0.263*	0.005	-0.192*	-0.652*	0.284*	0.016	1.000							
(8) <i>Foreign Ownership</i>	13.954	15.598	0.180*	0.023	-0.148*	0.614*	0.050	-0.024	-0.425*	1.000						
(9) <i>Outside Director</i>	0.420	0.164	0.193*	-0.020	0.201*	0.698*	0.098*	-0.048	-0.483*	0.475*	1.000					
(10) <i>Audit Committee</i>	0.513	0.500	0.137*	-0.041	0.209*	0.663*	0.077*	-0.038	-0.444*	0.443*	0.814*	1.000				
(11) <i>Env Performance</i>	0.033	0.164	0.046	-0.035	0.012	-0.054	0.064*	0.020	0.104*	-0.012	0.011	-0.023	1.000			
(12) <i>Chaebol Firm</i>	0.884	0.320	-0.115*	0.196*	-0.044	-0.108*	0.082*	-0.031	0.010	-0.164*	-0.100*	-0.083*	0.003	1.000		
(13) <i>Non-Family CEO</i>	0.738	0.440	-0.054	0.019	0.037	0.139*	0.017	-0.017	0.069*	0.060	0.017	0.016	-0.027	-0.215*	1.000	
(14) <i>Family Ownership</i>	38.216	19.544	-0.215*	0.176*	-0.186*	-0.312*	0.025	0.019	0.174*	-0.335*	-0.343*	-0.315*	0.004	0.708*	-0.154*	1.000

^a log-transformed

All the variables, except for *Env Performance*, are one-year lagged. Values are shown before grand-mean centering.

* $p < 0.05$

2.3.4. Model Estimation

We use a multilevel modelling technique to control for any systematic variance among observations that results from a firm's affiliation with a particular group (Raudenbush & Bryk, 2002). More precisely, to capture that audiences may have different views about different *chaebols* (as opposed to perceptions about the individual firms that make up a *chaebol*), we assign random intercepts to each business group (and each non-business group firms' mother company); the coefficients of all our other variables are fixed on the firm-level. We specify our model as:

$$\begin{aligned}y_{ijt+1} &= \beta_{0j} + \beta_{1j}X_{ijt} + \varepsilon_{ijt} \\ \beta_{0j} &= \gamma_{00} + u_{0j} \\ \beta_{1j} &= \gamma_{10}\end{aligned}$$

where y_{ijt+1} and X_{ijt} represent the dependent (at $t+1$) and lagged (t) explanatory variables for firm i in group j , respectively. β_{0j} is the group specific intercept capturing the mean performance of firm i in group j . γ_{00} is the fixed effect of a business group (or a non-business group firm's mother company), and u_{0j} is the random intercept of each business group (or non-business group firm mother company). β_{1j} represents the group specific slope of the explanatory variable X_{ijt} and equals γ_{10} , the average slope for the effect of explanatory variable X_{ijt} across all business groups.

2.3.5. Results

We report results for our tests examining Hypotheses 1 and 2 in Table 2.2. In Model 1, we test H1 that a firm's environmental performance improvement increases the firm's market value. The coefficient estimate for *Env Performance* is statistically significant and indicates

that a 10% increase in a firm's *Env Performance* (10% decrease in its GHG emission-intensity) increases its Tobin's q by 1.3%. For a firm with the mean value of total assets (\$ 6.37 billion), this 10% increase in *Env Performance* increases the firm's market value by about \$80 million.

Turning to our control variables, greater energy intensity, a higher level of foreign ownership, and greater leverage all increase a firm's Tobin's Q . The positive effect of *Energy Intensity* is not surprising. As of 2015, the three prime sub-sectors of South Korea's manufacturing industry—electronics, transportation equipment and chemical—not only make up 55.4% of total value added of the entire manufacturing industry but also had the largest increase in share of added value between the early 2000s and 2015 (LG Economic Research Institute, 2016). The positive effect of *Leverage* is plausible when considering that during our data period, tax laws surrounding debt-financing changed such that Korean firms could benefit from tax advantages and lower capital costs by reducing their reliance on equity (Ko & Yoon, 2011). Capital intensity and firm age reduce Tobin's q , though the practical effect of the latter is small. Finally, being a business group firm does not have statistically significant implications for the firm's Tobin's q .

<Table 2.2> Regression results of the effects of *Environmental Performance* on *Tobin's q* (H1) and the moderating effects of *Chaebol Firm* (H2)

	Model 1	Model 2
<i>Env Performance (H1)</i>	0.130*** (2.69)	0.412*** (3.02)
<i>Env Performance</i> × <i>Chaebol Firm (H2)</i>		-0.316** (-2.21)
<i>Chaebol Firm</i>	-0.083 (-1.51)	-0.093* (-1.70)
<i>Age</i>	-0.003*** (-3.22)	-0.003*** (-3.26)
<i>Leverage</i>	0.256*** (3.39)	0.263*** (3.48)
<i>Size^a</i>	-0.010 (-0.62)	-0.011 (-0.67)
<i>Cap Intensity^a</i>	-0.322*** (-9.04)	-0.323*** (-9.08)
<i>Growth^a</i>	0.007 (0.19)	0.002 (0.06)
<i>Energy Intensity^a</i>	0.050*** (3.00)	0.049*** (2.98)
<i>Foreign Ownership</i>	0.004*** (3.32)	0.004*** (3.49)
<i>Outside Director</i>	0.149 (1.22)	0.138 (1.13)
<i>Audit Committee</i>	-0.011 (-0.26)	-0.009 (-0.22)
<i>Non-Family CEO</i>	-0.027 (-0.93)	-0.027 (-0.91)
<i>Family Ownership</i>	-0.001 (-0.97)	-0.001 (-0.90)
<i>Constant</i>	0.851*** (10.97)	0.859*** (11.07)
<i>Year dummies</i>	yes	Yes
<i>Industry dummies</i>	yes	Yes
N	1046	1046
chi2	223.25	229.43
ICC	0.52	0.53
Deviance	405.63	400.77

^a log-transformed.

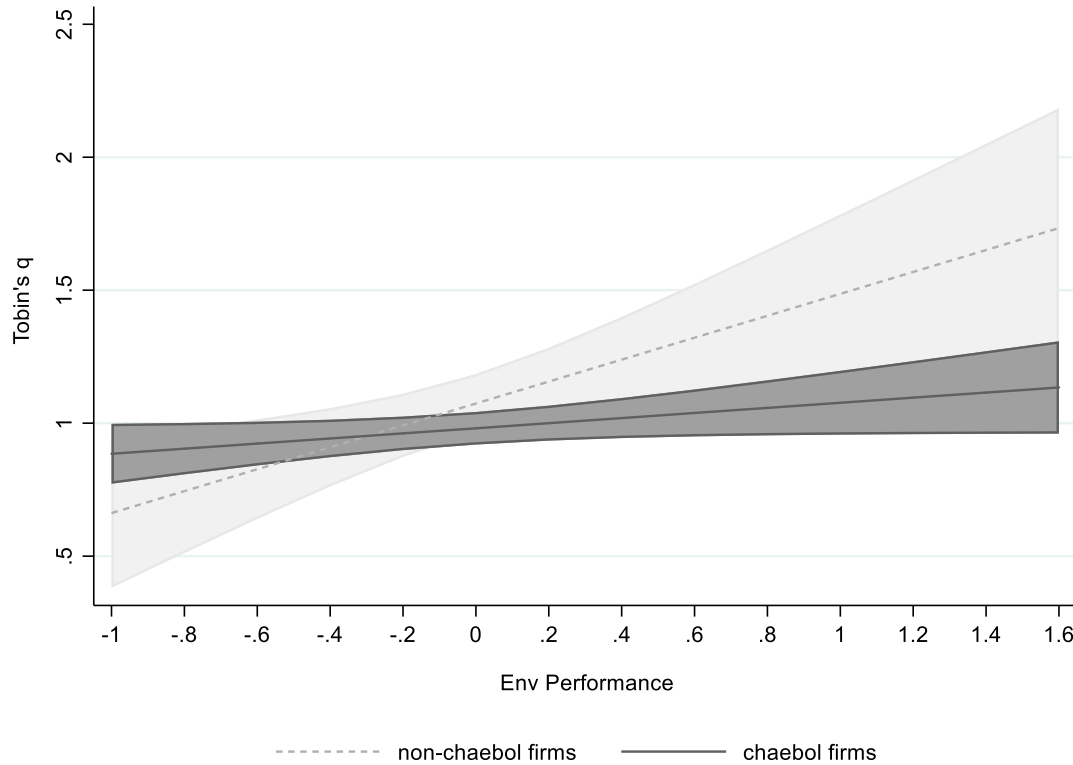
t statistics in parentheses. All the variables, except for *Env Performance*, are one-year lagged. All the continuous variables are grand-mean-centered. Multilevel model (with random-intercepts) is used. Entire firm samples, including both business group and non-business group firms are used for the test.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Model 2 includes the interaction between *Env Performance* and *Chaebol Firm* to test H2 that belonging to an organizational form reputed to be unethical reduces the positive effect of environmental performance improvement on firm market value. The interaction significantly improves model fit. Its coefficient is significant and indicates that for *Chaebol* firms, the increase in *Tobin's q* due to a 1% increase in *Env Performance* is 0.3% smaller than the increase in *Tobin's q* for non-business group firms. For an emission reduction at one standard deviation above the mean (20% of emission-intensity reduction over a year), the gap in *Tobin's q* for business group firms versus non-business group firms is 0.16. Put into dollar terms (and assuming mean total assets), for a 20% reduction in GHG emission intensity, the market value is \$1 billion greater for non-business group firms than business group firms. These results support H2 and indicate that a firm's membership in an organizational form reputed to be unethical importantly weakens the effect of the firm's environmental performance improvement on market value.

Figure 2.1 illustrates the moderating effect of business group affiliation on the relationship between firm environmental performance and *Tobin's q*. The slope relating emission reductions to *Tobin's q* is steeper for non-business group firms than business group firms, indicating that the effect of a unit change in environmental performance on *Tobin's q* is greater for the former group. Figure 1 also illustrates that this difference widens the better a firm's environmental performance.

<Figure 2.1> Moderating effects of *Chaebol Firm* on the relationship between *Environmental Performance* and *Tobin's q* (N=1046)



Note: Shaded areas indicate 95% confidence interval for each data point of *Env Performance*. The zero value on the x-axis indicates the uncentered mean of *Env Performance*, 0.033

Models 3 through 5, shown in Table 2.3, report results for our tests of H3. These models use the reduced sample of business group firms only (N=925). Model 3 is the base model. In Models 4 and Model 5, we consecutively add the interactions between *Env Performance* and the moderator variables (i.e., *Non-Family CEO* and *Family Ownership*). We use Model 5, our fully specified and best fitting model, for the interpretation of results.

<Table 2.3> Regression results of the moderating effects of *Non-Family CEO* and *Family Ownership* for business group firms (H3)

	Model 3	Model 4	Model 5
<i>Env Performance</i>		0.197**	0.215**
× <i>Non-Family CEO (H3)</i>		(2.04)	(2.18)
<i>Env Performance</i>			-0.003
× <i>Family Ownership (H3)</i>			(-0.94)
<i>Env Performance</i>	0.100**	-0.016	-0.025
	(2.00)	(-0.21)	(-0.32)
<i>Non-Family CEO</i>	-0.045	-0.041	-0.040
	(-1.58)	(-1.43)	(-1.40)
<i>Family Ownership</i>	-0.003***	-0.003***	-0.003***
	(-2.63)	(-2.71)	(-2.80)
<i>Age</i>	-0.004***	-0.004***	-0.004***
	(-3.54)	(-3.64)	(-3.65)
<i>Leverage</i>	0.270***	0.278***	0.281***
	(3.43)	(3.54)	(3.57)
<i>Size^a</i>	0.008	0.008	0.008
	(0.44)	(0.47)	(0.47)
<i>Cap Intensity^a</i>	-0.245***	-0.240***	-0.240***
	(-6.62)	(-6.50)	(-6.50)
<i>Growth^a</i>	0.031	0.025	0.021
	(0.72)	(0.57)	(0.48)
<i>Energy Intensity^a</i>	0.047***	0.046***	0.047***
	(2.66)	(2.66)	(2.68)
<i>Foreign Ownership</i>	0.004***	0.004***	0.004***
	(3.26)	(3.24)	(3.25)
<i>Outside Director</i>	0.247**	0.265**	0.262**
	(1.96)	(2.11)	(2.09)
<i>Audit Committee</i>	-0.068	-0.071	-0.071
	(-1.54)	(-1.61)	(-1.61)
<i>Constant</i>	0.826***	0.823***	0.820***
	(14.14)	(14.12)	(14.07)
<i>Year dummies</i>	Yes	yes	Yes
<i>Industry dummies</i>	Yes	yes	Yes
<i>N</i>	925	925	925
<i>chi2</i>	207.422	212.571	213.678
<i>ICC</i>	0.44	0.44	0.44
<i>Deviance</i>	290.24	286.08	285.17

^a log-transformed.

t statistics in parentheses. All the variables, except for *Env Performance*, are one-year lagged. All the continuous variables are grand-mean-centered. Multilevel model (with random-intercepts) is used. Only business group firm samples are used for the test.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

H3 states that for business group firms, attributes that disassociate a firm from its poorly reputed organizational form strengthen the effect of environmental performance improvements on market value. In line with this hypothesis, we find that the interaction between *Env Performance* and *Non-Family CEO* exerts a positive and statistically significant effect on Tobin's q.¹ As for effect sizes, the increase in Tobin's q due to a 1% additional decrease in emission-intensity is 0.22% greater for a business group firm with a non-family CEO than for a business group firm with a family CEO. This difference becomes larger the greater the improvements in the firm's environmental performance. At the maximum of *Env Performance* (150%) and assuming firms with mean total assets, the gap amounts to a \$1.59 billion difference in Tobin's q

The moderating effect size of *Family Ownership* is not statistically significant. It is possible that for outside audiences, the degree of family ownership is less visible than a (non)-family CEO, and therefore less influential in their assessment on how closely the firm aligns with the stereotypical features of business group firms as an organizational form.

Further Analysis and Robustness Checks

We further investigate our multilevel modelling technique by analyzing the Intraclass Correlation Coefficient (ICC) for each model estimation. ICC is a postestimation method that checks the proportion of the total variance in the dependent variable that is accounted for by a group. In organizational research, ICCs exceeding 0.15 are considered large (Hox et al., 2017). For all our estimations, ICCs are greater than 0.4, indicating that our higher-level group

¹ Note that one cannot interpret the influence of the main effect of *Env Performance* in Model 5 (or Model 4) by simply looking at its coefficient as shown in Table 3. This is because the actual influence of this main effect is conditional on its interaction terms which also are included in the model (Wooldridge, 2010).

accounts for a large part of the variance in our models, making our modelling technique appropriate.

We also ensure that the small number of non-business group firms in our sample does not bias results, and, further, that we are correct to attribute differences in market values for improved environmental performance to differences in the collective reputations of the firms' organizational forms. First, it is important to reiterate that our sample makeup of business group firms versus non-business group firm is representative of the underlying population. Second, our models control for important firm governance features in which business group firms versus non-business firms tend to vary (most notably, *Foreign Ownership*, *Outside Director*, and *Audit Committee*), thereby ensuring that these differences do not confound results. Third, t-tests assessing differences in the financial characteristics (such as assets, sales or capital intensity) of business group firms versus non-business firms suggest that these two groups do not statistically differ in these firm attributes.

2.4. Discussion

Our study suggests that while financial markets value superior firm environmental performance, they value it comparatively less if they do not believe that the firm's environmental performance credibly signals underlying desirable firm characteristics, such as integrity capacity. We find that the increase in market value for equivalent environmental performance improvements is smaller for firms of an organizational form reputed to be unethical than for firms that are not associated with this organizational form. We further find that firms belonging to the poorly reputed organizational form can lessen this penalty by adopting visible firm attributes that help disassociate the firm from its ill-reputed form.

Our findings contribute to two strands of research. First, our study extends research on the financial value of firm environmental performance. (Dixon-Folwer et al., 2013; Wei et al., 2017). Research has moved away from asking whether it pays to be green to investigate when it pays to be green. This shift has shed light on the conditionality of the relationship between firm environmental performance and market value (e.g., De Blas, 2020; Quan et al., 2018; Shahab et al., 2018). Studies have shown, for instance, that since environmental performance can drive market value via strengthening a firm's legitimacy, the relationship between environmental and financial performance may be stronger for "dirtier firms" that have a greater potential for organizational legitimacy gains (Berrone & Gomez-Mejia, 2009; Lucas & Noordewier, 2016). Similarly, with better environmental performance lowering regulatory risks, financial rewards for improving firm environmental performance can be larger for firms in more highly regulated settings (Li et al., 2017; Zhu et al., 2007). While these studies identify some important moderators affecting the relationship between environmental performance and firm market values, they have primarily focused on the direct drivers connecting environmental and financial performance and, accordingly, on how financial effects vary as the relevance of these drivers differs across firms.

We contribute to the research on the financial returns from sustainability by analyzing a yet under-examined conditionality that emerges from one of the indirect drivers linking firm environmental and financial performance. Our analyses build on the ideas that markets use a firm's environmental performance as a signal of underlying firm attributes, and that firm market values increase less when this signal's veracity is in doubt. We show that fully grasping the conditionality of the relationship between environmental and financial performance requires accounting for audiences' perceptions of how well environmental performance signals

broader firm characteristics. In our study, the collective reputation of a firm's organizational form (as related to that form's ethics rather than environmental impacts) moderated the effect of its environmental performance on firm value. Future research may explore if similar dynamics exist in other areas, such as a firm's general management capacity. To the extent that a firm's environmental performance also signals its management capacity, a firm that is associated with groups or organizational forms reputed for mismanagement may receive smaller financial rewards for environmental performance improvements than one that is not associated with such groups.

A second field to which we contribute is the study of collective reputations among firms (Barnett & Hoffman, 2008; Ferguson et al., 2000; Jonsson et al., 2009). An important line of research in this field addresses the challenges of managing the collective reputation of an organizational form. As some members undertake costly actions to improve the form's collective reputation, others may freeride and thereby damage this reputation (Tirole, 1996; Winfree & McCluskey, 2005). This freeriding dynamic has led to a number of studies exploring the structures and incentives needed for successful collective action (Barnett, 2006; Barnett & King, 2008; King, Lenox, & Barnett, 2002). We contribute to this field by shifting the focus: we show the costs born by firms that outperform their form's poor collective reputation. We find these costs to be significant, with the collective reputation of a firm's organizational form affecting how markets assess the value of improved environmental performance. Our analyses further indicate that firms have some capacity to loosen the grip of this collective reputation by adopting firm features that contradict what is stereotypical for its organizational form.

Our research offers important insights for practicing managers and policymakers. For managers, our research illuminates a challenge in forecasting the financial returns from environmental performance. Accurately assessing the financial returns from environmental performance requires recognition that unrelated external factors—such as the collective reputation of the firm’s organizational form—can condition market evaluations of firm behaviors. Equipped with an understanding of the moderating role that such circumstances can play, managers make better decisions to maximize financial returns from their environmental activities.

Managers can influence the financial rewards for improving their firm’s environmental performance by loosening the grip of an unfavorable collective reputation. *Chaebol* firms with non-family CEOs see larger financial returns for improving their environmental performance than *chaebol* firms with a family CEO. No equivalent effect exists for limiting family ownership. This suggests that for an individual firm to disassociate itself from its poorly reputed organizational form, managers need to adopt firm attributes that both contradict the form’s stereotypes and are clearly visible. Less visible attributes do not appear to effectively loosen the grip of collective reputations. Finally, maximizing financial returns for better environmental performance additionally requires that managers optimize the collective reputation of their organizational form. This could involve installing group-level systems that incentivize collective action, discourage free-riding, and more generally monitor and penalize members whose actions hurt the collective reputation. In our study, the poor collective reputation of *chaebols* is partly the result of a lack of such whistleblower and reporting systems that can single out and penalize unethical behaviors (Park, Rehg, & Lee, 2005).

These insights also have implications for policy makers. From an environmental perspective, the value of each “unit” of environmental improvement is independent of the firm that improves its performance. The environmental value of a ton of avoided greenhouse gas emissions, for instance, is the same across firms. Yet as we have shown here, from a market perspective, the financial value of environmental performance improvement varies across firms of different types and in different circumstances. Markets unevenly incentivize firm environmental performance improvements, with some firms reaping greater financial benefits than others that undertake similar improvements. With market incentives playing an increasingly central role in getting businesses to help mitigate a worsening environmental crisis, this suggests that policy makers may need to design supplementary mechanisms to ensure that incentives are more even and effective.

It is important to interpret our findings with the study’s limitations in mind. First, we do not directly measure the reputation of the organizational forms to which our sample firms belong. Instead, we leverage a pre-existing categorization that *chaebols*, as compared to firms with western-style corporate governance structures, have a comparably poor ethical reputation. While empirical evidence solidly supports this categorization, direct measures of the collective reputation of each firm’s organizational form could be useful to further develop and test our arguments. Second, our study is a single context study. While this calls for caution when generalizing our results, it also points to future research avenues using a variety of contexts to refine and identify the boundary conditions of our arguments. Lastly, we use GHG emissions reduction as a measure of firm environmental performance. This follows in the footsteps of prior studies in this field (Busch & Hoffman, 2011; Delmas et al., 2015), though future research

could explore the generalizability of our results across other measures of firm environmental performance.

2.5. Conclusion

This paper shows that markets value better firm environmental performance in part because they use this performance indicator as a signal about other underlying, desirable firm attributes such as a firm's integrity capacity. Consequently, capital markets value a firm's environmental performance improvement less if they have reason to doubt this signal's veracity. Such doubt may arise if a firm belongs to an organizational form reputed to be unethical. However, a firm can partially recover market rewards if it can visibly disassociate itself from its poorly reputed organizational form. We hope our study furthers our understanding of the underlying mechanisms and boundary conditions linking firm environmental and financial performance.

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Chapter 3

Negative Spillover Effect of Entrepreneurial Failure on Group Stereotype

with Jessica Santana and Matthew Potoski

Abstract

In this research, we argue that when people see a business failure of a certain female or minority entrepreneur, they negatively assess managerial competence of all other female or racial-minority entrepreneurs of the same field. At the core of our argument is the role of group stereotypes. In the entrepreneurial domain, differential assessments have existed about female vs. male (or Black vs. white) entrepreneurs, such that people assess female or racial-minority entrepreneurs as less competent than male or racial-majority entrepreneurs in managing their business. Under this circumstance, a female or racial-minority entrepreneur's business failure can reinforce people's existing negative stereotype of female or racial-minority entrepreneurs' managerial competence, further worsening their evaluations of the minority entrepreneurs' multiple, competence relevant managerial attributes, such as leadership, R&D knowledge and/or adaptability. Since these attributes are closely related to entrepreneurs' ability to raise financial capital, minority entrepreneurs' market performance can be significantly reduced. In this paper, we derive relevant hypotheses and test them through an experimental vignette study approach. Via the two consecutive experiments, we find that people come to more negative evaluate female and racial-minority entrepreneurs when they observe a business failure of an entrepreneur with the corresponding minority feature (Study 1). However, we also find that if people hold positive stereotypes of those minority entrepreneurs, they do not negatively evaluate the entrepreneurs even after a failure observation (Study 2).

3.1. Introduction

When investors see an entrepreneur fail, they may blame not just the individual entrepreneur but the stereotyped incompetence of a group to which the individual belongs (Shapiro and Neuberg, 2007; Ucbasaran *et al.*, 2013). For example, investors may blame the failure on an entrepreneur's educational background (Spruyt and Kuppens, 2015), ethnicity or regional background (Gilbert, 2007), or age (Cuddy, Norton, and Fiske, 2005). In this research, we argue that when investors likewise see a business failure (e.g., bankruptcy) of a certain "female" or "racial-minority" entrepreneur, they negatively assess the managerial competence of all other female or racial-minority entrepreneurs of the same field. Investors' negative assessments of managerial competence can discourage their further investment in other female or racial-minority group members' ventures.

At the core of our argument is the role of group stereotypes. A group stereotype refers to people's existing, generalized beliefs about a certain social group (Carton and Rosette, 2011; Hilton and Von Hippel, 1996). People form a group stereotype through "categorical thinking," a psychological process that simplifies their mental processes by categorizing a group of individuals based on common characteristics. Through a group stereotype, people infer an individual's unobservable qualities, such as competence or intelligence, resulting in similar stereotypical judgments of those unobservable qualities across the group's members (Macrae and Bodenhausen, 2000). Finally, based on the stereotypical judgments, people provide the individuals with similar rewards or punishments.

People might change a group stereotype, and thus their assessments of relevant unobservable qualities, when they receive new information about a group member's

performance on a stereotype-relevant attribute¹ (Rosette, Leonardelli, and Phillips, 2008; Rosette and Tost, 2010). A critical public event or a crisis for which an individual is assumed responsible are examples of events that can produce such new information. In this study, we claim that when people receive information that matches with their existing stereotypes of the group to which individuals' belong (what we shall call "stereotype-congruent" information) it reinforces their stereotype. For example, in a white-male dominant sector such as entrepreneurship, investors may attribute a Black or female entrepreneur's failure to their non-prototypical race or gender (Rosette *et al.*, 2008). In contrast, when a white male entrepreneur fails in the same sector, investors may ignore the role of race and assume that the failure is unrelated to the entrepreneur's (prototypical) race. This is because people are less likely to revise their group stereotype when presented new information that is incongruent with that stereotype due to the perceived lack of logical connection between the two elements (Carton and Rosette, 2011).

In the entrepreneurial context, investors tend to view a business failure of a female or a racial-minority entrepreneur as stereotype-congruent information that leads them to reinforce their already-negative stereotype about female or racial-minority entrepreneurs' managerial competence. Gender and race are the two most common cases of "diffuse status characteristics," or categorical distinctions attached to culturally rooted differential assessments that one category's (e.g., male or white person) status is greater than the other's (e.g., female or Black person) (Correll and Ridgeway, 2006; Thébaud, 2015). Unsurprisingly

¹A stereotype is a mental schema that people use to abstractly represent individuals' attributes or behaviors along a certain quality dimension, such as his or her competence. Within this quality dimension, an evaluatee might signal his or her group's quality in a particular context via a behavior or attribute relevant to his or her stereotype, such as start-up management skills in the entrepreneurship context, which we refer to as "stereotype-relevant attributes."

in the entrepreneurial domain, race and gender are significant status markers. Investors and other entrepreneurial stakeholders assess female or racial-minority entrepreneurs as less competent than male or racial-majority entrepreneurs in managing their business (Farh *et al.*, 2020; Kacperczyk and Younkin, 2022; Lee and Huang, 2018; McDonald, Keeves, and Westphal, 2018). Under this circumstance, a female or racial-minority entrepreneur's business failure can elicit investors' stereotypes, leading to the reinforcement of an already-negative stereotype.

Once investors reinforce a negative group stereotype, we expect that they also reinforce negative expectations of the entrepreneur's competence-relevant unobservable qualities, such as leadership, R&D knowledge and/or adaptability—attributes that are associated with accomplishing a business's profit-driven goal (Erikson, 2002). Because, these other attributes are closely related to entrepreneurs' financial rewards (Newbert, 2007; Obschonka *et al.*, 2017; Vorhies, Morgan, and Autry, 2009), negatively evaluating competence-relevant unobservable qualities can significantly reduce minority entrepreneurs' ability to raise financial capital.

In this paper, we derive relevant hypotheses and test them through an experimental vignette study approach. In Study 1, we find that investors evaluate minority entrepreneurs' competence and their firms' potential more negatively after observing an unrelated minority entrepreneur's business failure. We do not observe the same effect for a majority entrepreneur's failure. In Study 2, we further examine how investors with "positive stereotypes" of minority entrepreneurs update their stereotypes following a failure event and do not find negative spillover effects previously found in Study 1. Based on these findings,

we conclude that the negative spillover effects of a minority entrepreneur's business failure exist among people with negative stereotypes of a minority's managerial competence.

This paper makes both theoretical and practical contributions. Foremost, this study contributes to the entrepreneurial failure literature by broadening its scope to include social issues such as gender and race. While previous research has focused on the drivers (e.g., mismanagement) and outcomes (e.g., organizational learning) of failure from the perspective of the failed entrepreneur (Jenkins and McKelvie, 2016; Liu *et al.*, 2019; Yamakawa, Peng, and Deeds, 2015), our study examines how external evaluators interpret failure experiences, with a particular focus on the influence of gender and race. In doing so, we further contribute to the literature on failure tolerance (Simmons *et al.*, 2019; Zunino, Dushnitsky, and Van Praag, 2022), providing evidence that investors display less tolerance for failure among female or racial-minority entrepreneurs compared to their male or non-minority counterparts. Also, our research makes practical contributions to designing better policies for underrepresented entrepreneurs. In this regard, we argue that an already-existing negative group stereotype about female or racial-minority entrepreneurs' competence drags them into a vicious cycle of undervaluation and thus we highlight the need for relevant policy to reduce or eliminate such negative stereotypes.

In the following section, we first develop our theoretical arguments on the relationship between a group stereotype and one's evaluation of an individual's unobservable competence-related qualities. We then develop hypotheses, applying these theoretical arguments in the entrepreneurial failure context. Next, we describe the methodology and present the results of our experimental vignette studies. Finally, we conclude by discussing the implications and limitations of our findings.

3.2. Theory and Hypotheses

3.2.1. Group Stereotype, Stereotypical Evaluation, and New Information

When people assess the potential competence of a prospective new hire, investment, or other market exchange partner, they assess the prospect's observable and unobservable qualities (Ashforth and Humphrey, 1997; Ferguson, Deephouse, and Ferguson, 2000; Jonsson, Greve, and Fujiwara-Greve, 2009). However, because unobservable qualities are not directly observable, assessments are often biased. One heuristic that people use, consciously or otherwise, to make inferences about an individual's unobservable qualities is a group's stereotype (Frick and Simmons, 2013; King, Lenox, and Barnett, 2002). Group stereotypes are generalized beliefs about a social group (Hilton & Von Hippel, 1996; Lee et al., 2015). People form a group stereotype through "categorical thinking," a psychological process through which people mentally categorize a group of individuals by their common observable characteristics (e.g., ethnicity) and generalize their numerous individual attributes into a few prototypic attributes along some quality dimension (Macrae and Bodenhausen, 2000). Such categorical thinking is related to the psychological tendency to simplify perceptual processes and make surroundings more cognitively manageable (Bodenhausen, Kang, and Peery, 2012). Once people form a group stereotype, they use this generalized belief to make further stereotypical judgments about the individual's other, more difficult-to-observe qualities (Macrae and Bodenhausen, 2000; Shapiro and Neuberg, 2007).

People can have a positive or negative group stereotype along some quality dimension. Here, a positive or negative group stereotype indicates how much people assess the group members' generalized attributes as providing more (or less) social or economic value (Jonsson *et al.*, 2009; Porac, Thomas, and Baden-Fuller, 2011). For example, people

might have a positive (or negative) stereotype about a worker's communal traits or sociality based on the worker's occupation if the occupation is associated with collectivism or altruism (or, conversely, individualism or egoism) as its distinct vocational attribute (Barth *et al.*, 2015; Diekman *et al.*, 2010). People might perceive elementary school teachers as being more communal, for example, than a non-educational occupation such as banking due to the teachers' vocational role of caring and nurturing students (Koch *et al.*, 2020; Van Uden, Ritzen, and Pieters, 2014).

A group stereotype affects how people evaluate group members' stereotype-relevant but difficult-to-observe qualities. Thus, people's assessments of group members' unobservable qualities can also be positive or negative (Kim, Terlaak, and Potoski, 2021). Taking the example of a worker's communal attitudes, people may positively (or negatively) evaluate a worker's relevant unobservable qualities, such as his or her interpersonal skills, communication skills, and affinity with other team members as a job candidate based on their positive (or negative) group stereotype of the communal attributes of his or her job.

People's positive or negative stereotype of a group can affect the future rewards received by all group members. More specifically, based on their evaluations of unobservable qualities, people can determine how and to what extent they reward (or punish) group members. Especially for some qualities laden with significant economic or social value, people can reward (or punish) group members in more practical forms, such as giving them financial (dis)incentives (Jonsson *et al.*, 2009; Porac *et al.*, 2011).

Assessments (and associated rewards or punishments) of group members can change, however, when people update their current group stereotype. People's stereotype of a group can change when they receive new information about an individual's performance on a

stereotype-relevant attribute (Rothbart, 1981). A critical public event or a crisis for which an individual or organization is assumed responsible corresponds to such a case. For example, if a chemical firm causes a catastrophic oil spill, people may negatively update (i.e. reinforce) their already-existing stereotype of the chemical industry as “large polluters” or “environmental troublemakers” (Crisp and Turner, 2011; Fiske *et al.*, 2002).

Once people update their group stereotype, their assessments and valuation of group members can also be updated. This follows the logic of co-movement among the three elements—i.e., people’s group stereotype, assessments of individuals, and deserved rewards/punishments. Taking the example about a chemical firm experiencing a catastrophic oil spill, people might negatively evaluate the company’s environmental and social responsibility, and even its overall business ethics, which might lead them to further withdraw their ESG (Environment/Society/Governance) investment from all chemical companies more broadly (Kim *et al.*, 2021).

However, people do not randomly change their group stereotype (Rothbart, 1981; Weber and Crocker, 1983). Instead, we expect people to update their group stereotype only in a direction that reinforces their current group stereotype more positively or negatively. This can happen when people receive “stereotype-congruent” new information.

Just as people’s group stereotype is positive or negative for some attributes, new information can also be positive or negative for given attributes. For example, a person’s observation of a chemical firm’s environmentally-(un)friendly behavior corresponds to positive (negative) new information for a firm’s environmental responsibility. Or, people’s direct experience with a person’s altruistic (selfish) behavior is positive (negative) information for communal attitudes. Thus, “stereotype-congruent” new information refers to

the information that matches the valence of people’s existing group stereotype about individuals’ qualities (e.g., positive group stereotype and positive information).

One potential mechanism for such reinforcement is the psychological process of “matching” (Carton and Rosette, 2011). “Matching” stems from people’s tendency to avoid discrepancies and to confirm their existing beliefs about an individual when receiving new information about the individual (Lord and Maher, 2002); when facing an event, people tend to align their inference on the cause of an event with their existing stereotypes about an individual to confirm their existing beliefs. When matching occurs, people come to reinforce the current group stereotype and their inclination to focus on the stereotypical attributes of the individuals (Carton & Rosette, 2011). On the contrary, where a group stereotype and new information “mismatch” (e.g., negative group stereotype and positive information), people are less likely to update their group stereotype because of the lack of logical connection (or discrepancies) between the individual member’s performance outcome and their current group stereotype.²

This broadly aligns with the theory of “confirmation bias” in psychology, which describes the tendency for humans to unconsciously seek out and favor evidence that confirms their stereotypical expectations while disregarding evidence that contradicts them

² With respect to “mismatch,” some psychology theories have argued that incongruent new information can also alter a group stereotype. For example, according to the bookkeeping model of stereotype change, such mismatches can be resolved, and incongruent new information can “gradually” change a group stereotype when people are “steadily” provided with such disconfirming information (Paustian-Underdahl, Walker, and Woehr, 2014; Rothbart, 1981; Weber and Crocker, 1983). Also, there is a “conversion model,” predicting that stereotypes can change drastically in response to a few individuals’ dramatically-inconsistent instances (Weber and Crocker, 1983). However, we think neither of the theories can be applied to our theoretical context. In our theory, we do not assume such a steady provision of new information but just assume a people’s one-time experience with such new information. Also, we assume new information to be just one—not a few or many—individual’s inconsistent instance, which is set to be much less dramatical than what is presumed in the conversion model.

(Nickerson, 1998). Psychology scholars view this tendency to cling to stereotype-congruent information as the primary reason why stereotypes persist even as people acquire new information and knowledge (Cox, Xie, and Devine, 2022). To sum up, as shown in Table 3.1, we expect that people update a group stereotype only in a way to reinforce a positive or negative current group stereotype when they receive “stereotype-congruent” new information.

<Table 3.1> Relation of Group Stereotype, New Information, and People’s Stereotype Update

Current group stereotype	New information	Updated Stereotype
Negative	Positive	0 (no critical change in a current negative stereotype)
Negative	Negative	Negative+ (reinforcement of a current negative stereotype)
Positive	Positive	Positive+ (reinforcement of a current positive stereotype)
Positive	Negative	0 (no critical change in a current positive stereotype)

With an updated group stereotype, we expect people to assess the group members’ stereotype-relevant unobservable qualities more positively or negatively. Below, we apply this theoretical argument in an entrepreneurial failure context.

3.2.2. Entrepreneurial Failure and Updates of a Group Stereotype

An entrepreneur can fail³ for many reasons, including financial problems, lack of experience, or bad luck. In the absence of clear “external” causes (e.g., environmental uncertainty), investors⁴ tend to attribute an entrepreneurial failure to “internal” factors associated with the entrepreneur’s incompetence (Cardon, Stevens, and Potter, 2011; Kelley and Michela, 1980). Such internal attribution is based on a performative view highlighting a business’s goal of profit maximization and the entrepreneurs’ agentic role in achieving this profit-maximizing goal (Gimeno *et al.*, 1997; Jenkins and McKelvie, 2016). In this performative view, investors view the cause of a firm’s failure as residing within the firm. Namely, investors taking this performative view may blame the failure on the entrepreneur’s managerial incompetence, equating an entrepreneurial failure with the individual’s lack of managerial ability to lead the firm to profit (Wennberg *et al.*, 2010).

When an entrepreneur’s membership in a stereotyped group, such as women or a racial minority, is salient, investors may associate the entrepreneur’s failure with the group attribute. When the entrepreneur is a member of a *negatively* stereotyped group, the new negative information of the failure, based on our theoretical framework, should match with and reinforce the already negative group stereotype. In this research, we focus on female and racial-minority entrepreneurs, whose work-related competence has been negatively stereotyped (Berger and Fişek, 2006; Correll and Ridgeway, 2006; Naumovska, Wernicke, and Zajac, 2020) and thus are at a higher risk of being negatively assessed through their peer’s entrepreneurial failure.

³ In this research, an entrepreneurial failure is narrowly defined as a “negative exit,” or the termination of a business under financial distress (Wennberg *et al.* 2010).

⁴ In our research context, we view investors as a firm’s stakeholders interested in the firm’s financial success.

Women and Black entrepreneurs are negatively stereotyped in entrepreneurship (Alegria, 2020; Rosette *et al.*, 2008; Thébaud, 2015). Theoretically, gender and race are referred to as “diffuse status characteristics,” or categorical distinctions based on personal attributes or occupational positions that are attached to widely shared cultural beliefs that one category’s status is greater than the other (Correll and Ridgeway, 2006; Thébaud, 2015). In a general sense, people have made different status evaluations of men and women, with men being more highly esteemed, honored, and socially valued than women on many dimensions (Berger & Fişek, 2006). This is similar to the case of race, where people consider white people to be more socially valued than Black people on many activities (Alegria, 2020; Melaku and Beeman, 2022). Negative stereotypes of women and Black people extend to organizational and marketplace settings, where women and Black people are presumed to be inferior or incompetent in managing work or their own business properly and efficiently compared to their counterpart gender or race (Melaku and Beeman, 2022; Ryan *et al.*, 2011; Zou and Cheryan, 2017).

In the entrepreneurial context, investors can also have negative stereotypes about female or racial-minority entrepreneurs’ managerial competence, and consequently hold low-performance expectations for their management in a start-up business (Hekman *et al.*, 2010; Joshi and Knight, 2015; Naumovska *et al.*, 2020). Such a negative stereotype has been abundantly documented in the entrepreneurship literature (Gupta *et al.*, 2009; Sexton and Bowman-Upton, 1990; Shapiro and Neuberg, 2007; Shepherd and Patzelt, 2015). For example, Thébaud (2015) found that people have lower performance expectations regarding the competence of female entrepreneurs, which distorts the perceived viability of female entrepreneurs’ business plans. Also, Gligor *et al.* (2021) found that investors tend to respond

more negatively to a firm with a Black leader than to a firm having a white leader—or even Asian or Latino leaders—due to investors’ negative stereotypes regarding Black leaders’ managerial competence. Some scholars have documented that these negative stereotypes can be a threat to low-status entrepreneurs’ business opportunities (Gupta, Goktan, and Gunay, 2014; Shapiro and Neuberg, 2007). For example, Gupta *et al.* (2014) found that female entrepreneurs fear establishing a new business in a masculine entrepreneurial context, due to the stereotype that women are incompetent entrepreneurs.

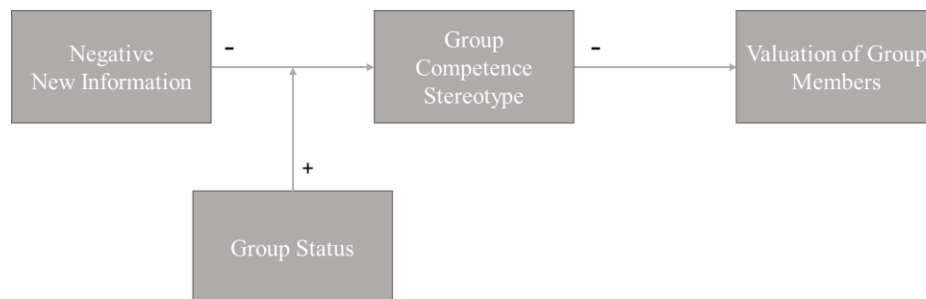
In the present research, we assume that investors on average hold a negative group stereotype against female or racial-minority entrepreneurs.⁵ Further, following the theoretical framework, we expect investors to reinforce their negative stereotype once a female or minority entrepreneur’s business fails. A reinforced negative stereotype will then influence how investors assess multiple competence-relevant attributes of all other female or racial-minority entrepreneurs who work in the same field or industry (e.g., IT industry). Those attributes include leadership, risk management abilities, adaptability, and/or R&D or technology knowledge (Du Gay, Salaman, and Rees, 1996; Man, Lau, and Chan, 2002; Sternberg, 2004)—any attribute that is based on one’s intellectual abilities, skills, or efficiencies and used to effectively accomplish an entrepreneur’s business goal for financial growth and/or survival (Erikson, 2002). Finally, since these attributes affect investors’ financial decisions (Newbert, 2007; Obschonka *et al.*, 2017; Vorhies *et al.*, 2009), we also

⁵ Although we do not formulate separate hypotheses for individuals with positive stereotypes about female or racial-minority entrepreneurs' competence, we acknowledge their existence and thus conduct an empirical examination later (Study 2) in this paper on how such individuals update their stereotypes following a failure experience.

expect that investors eventually financially punish—or reward less—the failed entrepreneur’s peer female or minority entrepreneurs.

Figure 3.1 summarizes our arguments in more general sense, depicting the effects of negative new information (e.g., entrepreneurial failure) on group competence stereotype and valuation of group members. By default, we expect negative new information to negatively affect people’s perception of the competence of the group to which the interested person belongs (signed with “-” on the figure). Further, we expect an updated group competence stereotype also negatively affects people’s valuation of group members (signed with “-” on the figure). Regarding the new information’s efficacy, we argue that group status plays a moderating role, with a positive moderating effect (signed with “+” on the figure) for high-status groups, which alleviates the influence of negative new information on the stereotype and valuations of the group members. Conversely, we expect low-status groups would have a negative moderating effect, which worsens the effects of negative new information on people’s stereotypes and valuations of the group members.

<Figure 3.1> Diagram of Theoretical Arguments



The hypotheses presented below are formulated in the context of entrepreneurial failure, replacing the theoretical constructs in Figure 3.1 (negative new information and group status) with the entrepreneur’s business failure and the entrepreneur’s race and gender, respectively. Based on our discussion so far, we hypothesize:

Hypothesis 1: An entrepreneurial failure negatively impacts group competence stereotypes and valuation of a group member’s competence for female or racial-minority entrepreneurs.

Hypothesis 2: An entrepreneurial failure has no impact on group competence stereotypes and valuation of a group member’s competence for male or racial-majority entrepreneurs.

3.3. Study 1

3.3.1. Sample and Design

To test our hypotheses, we conduct an experimental vignette study using Amazon Mechanical Turk (MTurk) as our platform. Participants are compensated \$1.5 for their participation in the study. Following best practices for collecting MTurk data, we select “high quality” participants (Landers and Behrend, 2015) by recruiting only “master workers” who had completed at least 100 tasks and had higher than 98% approval ratings.

Considering the different levels of stereotypes pertaining to various status characteristics, we vary two different status variables, gender and race. In experiment 1, we vary the gender (male vs. female) of the entrepreneur, and in experiment 2, we vary the race (white vs. black) of the entrepreneur. Each experiment employs a 2 x 2 between-subjects design, manipulating the entrepreneur’s gender (experiment 1: female vs. male) or race

(experiment 2: black vs. white) and performance (failure or neutral). Lastly, considering the intersection of the two status characteristics, we additionally conduct experiment 3, in which we manipulate *both* the entrepreneur’s gender and race. Thus, in experiment 3, we compare respondents’ perceptions of entrepreneurial performance (failure or neutral) of black-female vs. white-male.

For 12 conditions across the three experiments, we initially collected 276 respondents after excluding duplicate IP and/or worker IDs and those who failed to pass our attention checks.⁶ Of the 276 responses, we excluded 53 responses throughout another post-survey question (asking to describe our research purpose), which correctly guessed the purpose of the study that we are to investigate people’s perception/bias of gender or race (e.g., “I guess your study is on racial prejudice in high tech”). Mturk workers’ “hypothesis guessing” is critiqued by researchers—in addition to workers’ inattentive responses or spamming—in that it can distort the responses due to their provision of social- or researcher-desirable answers (Eberly *et al.*, 2017; Mason and Suri, 2012). To reduce such risks, we thus excluded those 53 responses, which resulted in the 223 final samples.

The number of respondents across the 12 groups vary, ranging from 16 (for white-neutral for experiment 2, white-male-neutral and black-female-success for experiment 3) to 24 (for female neutral in experiment 1). The largest portion (39% of all respondents) of the age group is 35-44 and the second largest group is 25-34 (30%). For race, around 73% of the

⁶ we implemented the attention checks strictly by checking out the following elements comprehensively: 1. Failed to answer an attention-filter question (e.g., where is the [name of the firm presented in the vignette] located?), 2. Not correctly identified the vignette character’s gender and/or race throughout a post-survey question (we clearly specify the character’s gender or race in the vignette by his/her picture/pronouns), 3. Submitted inconsistent demographic information, and 4. Total response time is too short (e.g., less than 100 seconds).

respondents are white (Caucasian), 18% is Asian, and 6% is black. For gender, 64% of the respondents are male and 34% is female. In all these demographics, we do not find any significant differences for the respondents between the control and treated groups (i.e., neutral vs. failure, at $p < 0.1$). Also, across the 12 conditions, we find age, gender, and race of respondents do not significantly affect results.

3.3.2. Procedures and Manipulations

When recruiting participants, we title our studies “Investment in a venture,” and describe the purpose of the study as being to examine how people make investment decisions for a tech-based start-up. We ask respondents to read a vignette in which a female or male (or black or white/black-female or white-male) entrepreneur who runs an IT (information technology) start-up firm has failed or is performing at the average level of his or her peers. All failure or neutral cases include a recent factual data sheet describing high tech start-up CEOs’ demographic statistics, indicating that only 11% and 1% of venture capital-backed tech start-up CEOs are women and black, respectively (Azevedo, 2019; Kunthara; 2021; Teare, 2020). Our intention throughout this data sheet is to prime respondents and reduce cognitive efforts in recalling existing stereotype regarding entrepreneurs’ gender/race. To prime them unconsciously, we provide this information along with various other demographic information, such as the average age or education level of CEOs (for more details, see Appendix 1). After reading one of the six versions of the vignettes, we ask the respondents to answer a set of survey questions.

Gender/race

We manipulate the gender or race of the entrepreneur by making the entrepreneur's name a common male, female, black person's, or white person's name.⁷ Also, to more clearly signal the treatment (gender/race), we also attach a picture of the entrepreneur at each vignette's side.⁸ When displaying a picture, in experiment 1 for gender, we set the entrepreneur's race at white (Caucasian). In experiment 2 for race, we set the entrepreneur's gender at male.

To control for the effects of other demographic information on respondents' perception, the entrepreneur's other race/gender-unrelated information is set at an "average" level for prototypical entrepreneurs. The entrepreneur is described as having an undergraduate degree from a large, upper-tier university, age in his or her early 30s, with five years of management experience in the IT industry of their start-up (Thébaud, 2015).

Failure

Failure and non-failure are depicted as bankruptcy and business as usual, respectively. To highlight each circumstance, the vignette also displays a graph noting the percentage change in revenue over the past 1 year. For the failure case, the graph displays a steady decrease in company revenue over a 1-year period. For the non-failure case, the graph shows a steady

⁷ For our three experiments, we used different sets of names for the entrepreneur's vignettes. In experiment 1 for gender, we use Matthew Grimes and Julie Grimes for the male and female entrepreneur's vignette, respectively. In experiment 2 for race, we use Matthew Grimes and Hakeem Robinson for the white and Black entrepreneur's vignette, respectively. Lastly, in experiment 3, we use Matthew Grimes and Shanice Robinson for the white male and Black female, respectively. We chose these specific names based on relevant literature (e.g., Einstein and Glick, 2017; Lieberman and Bell, 1992) and observational data that are commonly associated with the respective gender or race.

⁸ We had a post-survey question asking to evaluate the competence of the CEO depicted in each vignette (see Q16 in Appendix 1), and could not find significant differences in people's responses to that question between the majority and minority CEO's vignettes, which confirms there is no critical confounding factor due to using a picture.

increasing rate of revenue over a 1-year period, noting it is comparable with other rising early-stage IT start-ups.

3.3.3. Measures

After reading the vignette, respondents are given questions assessing how an entrepreneur's demographic features (e.g., age, education, etc.), including status characteristics (i.e., gender or race), influence their assessment and investment decision for a tech start-up. Before the questions, we ask the respondents to imagine that they are becoming venture investors. The major constructs and relevant questions are described below.

Competence

We ask respondents to assess the competence of female or male (or black or white, or white-male or Black-female) entrepreneurs on a Likert scale ranging from 1 (not at all) to 7 (very much). Based on a questionnaire from Fiske et al. (2002) asking about respondents' perception of one's competence, we prepare the question, "How much do you think [a given gender and/or race treated in the vignette—i.e., female (or male; in experiment 1)/Black (or white; in experiment 2)/Black-female (or white-male; in experiment 3)] entrepreneurs are competent (or capable or skillful) in managing their business as high-growth start-ups?" (see Q3 in Appendix 1). To reduce social desirability biases, we embed these questions among others asking participants to assess competence based on other, non-race or gender attributes.

Competence-relevant managerial attributes

Next, we ask respondents about specific competence-relevant managerial attributes of female or male (or black or white) entrepreneurs. The attributes used in the questionnaires are entrepreneurs' leadership, risk management, adaptability, R&D knowledge, and philanthropism (Du Gay *et al.*, 1996; Man *et al.*, 2002; Sternberg, 2004). We added

philanthropism to the list in order to prevent respondents' inattentive answers and to see if the respondents distinguish performative from non-performative attributes (e.g., warmth-relevant) as the entrepreneur's competence-relevant attributes.

For this question, we first ask the respondents to rank the five attributes in the order that they think are most relevant to an entrepreneur's competence (for more detail, please see Q7 in Appendix 1). And then, in the following question, we ask them to rate in a 7-point Likert scale how much they think male/female (or black/white or white-male/Black-female) entrepreneurs do well in terms of the first three top choices in the previous ranking question (See Q10 in Appendix 1) We chose this ranking-type question instead of asking repeated questions on each managerial attribute to reduce respondents' fatigue and draw respondents' more attentive responses.

A possible concern about the competence measures is that we directly ask respondents to assess a certain social group's competence, which might induce socially acceptable or desirable responses (Janus, 2010). However, as some political psychologists have argued (Dolan, 2010; Hayes, 2011; Sanbonmatsu, 2002), if a scholar chooses to indirectly ask people's stereotype to avoid such a social desirability bias, s/he might face a generalizability issue—difficulties in translating respondents' opinions in an adapted context into generalized constructs. So, instead of using indirect questions at the expense of a generalizability issue, we directly ask respondents' perception/assessments and later statistically check the (un)favorable responses' distribution between female and male (or Black and white) entrepreneurs. If the social desirability response bias exists, favorable responses' distribution would be similar or even skewed towards female/Black entrepreneurs (Dolan, 2010; Sanbonmatsu, 2002).

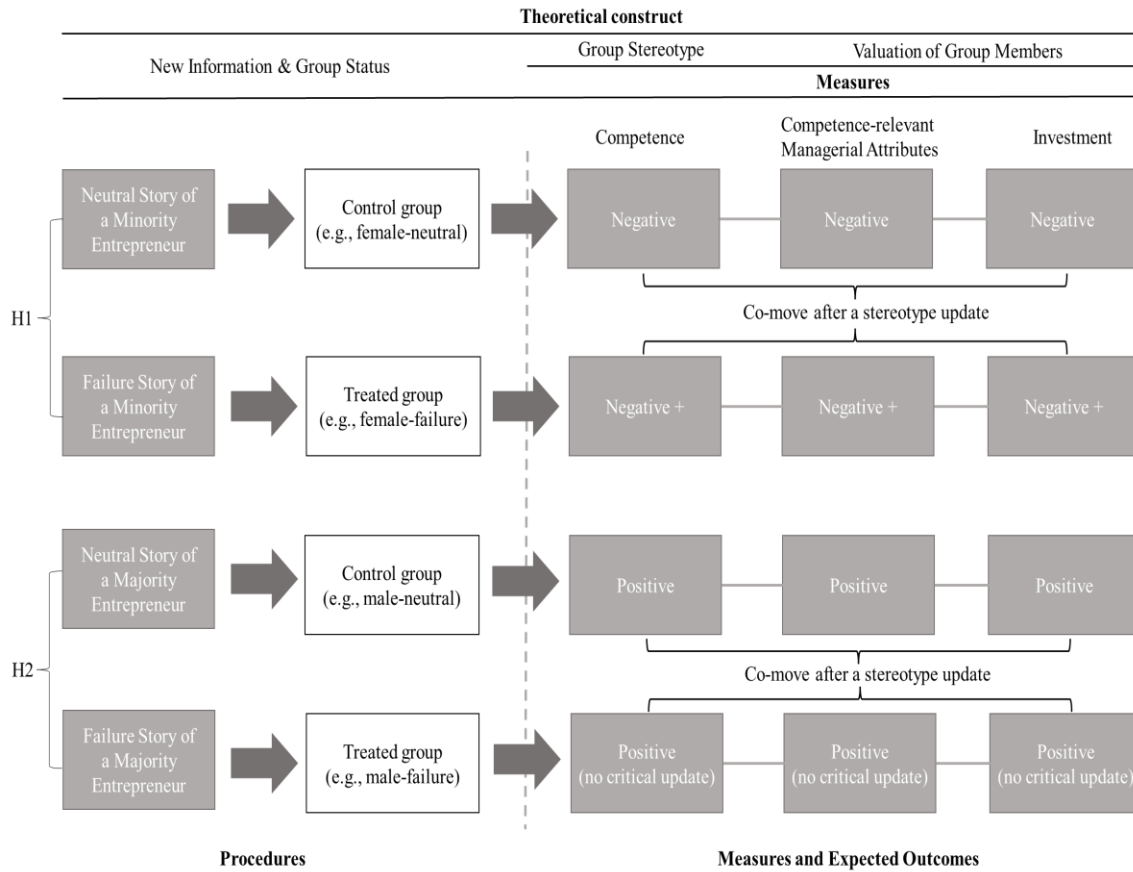
Investment

Lastly, we ask respondents about their willingness to invest in the women- or men-owned (or black-, white-, white-male- or black-female-owned) start-ups. To measure it, we ask respondents to type a specific dollar amount (e.g., +\$1,500 or -500) in each of five empty text boxes once they learn their prospective investee IT company “X” has the following five demographic attributes: 1. CEO’s highest education-Bachelor’s degree, 2. CEO’s age-33, 3. CEO’s gender and/or race (specific gender/race is given as the same as the character in the vignette; both information on gender and race is provided in experiment 3), 4. CEO’s prior IT industry experience-5 years, and 5. CEO’s location-San Jose, CA. So, for example, if respondents do not favor the CEO being female for their prospective investee company, they can insert negative numbers (e.g., \$-500) in a text box for the CEO’s gender. Likewise, we ask respondents to insert specific investment amounts in each five text box (for more detail, see Q12 in Appendix 1). For this question, we notified the respondents that the answers should be made based on \$10,000 pre-assigned investment budget for the firm X. So, we ask respondents to either “subtract” from or “add” to that \$10,000 for each attribute (0 can be inserted when respondents have no strong preference for a given attribute).

Even though the respondents input a specific number, we transform this number to -1, 0, and 1, only using the information on if they subtracted, maintained (\$0), or added any money.

Figure 3.2 below visualizes the research design of Study 1 with expected outcomes discussed so far.

<Figure 3.2> Research Design of Study 1



3.3.4. Analysis Strategy

To test H1, we compare the responses between “female-neutral” and “female-failure” for experiment 1 (in experiment 2, “black-neutral” vs. “black-failure,” and in experiment 3, “black-female-neutral” vs. “black-female-failure”) case groups and see if those responses are systematically *more negative* for the “failure” case than for the “neutral” case of particular gender and/or race. The same approach is used to test H2, between “male-neutral” and “male-failure” cases (in experiment 2, between “white-neutral” and “white-failure,” and in experiment 3, between “white-male-neutral” and “white-male-failure”). To test these, we use

multivariate analysis of variance (MANOVA) and/or ANOVA to compare the respondent groups.

3.3.5. Results

Before analysis, we check the correlation among the three primary measures—i.e., competence, competence-relevant attributes, and investment. For the two measures, competence and competence-relevant attributes, we use 7-Likert point scale measures; for investment, we use an ordinal variable (-1, 0, and 1), transforming from respondents’ dollar amount answers. As shown in Table 3.2, the pairwise correlation is positive and statistically significant across all respondents, implying that people’s perception of entrepreneurs’ competence, competence-relevant attributes, and willingness-to-investment co-move.

<Table 3.2> Correlation among the variables of interest>

Variables	(1)	(2)	(3)
(1) Competence	1.000		
(2) Competence-relevant attributes	0.537	1.000	
(3) Investment	0.326	0.213	1.000

N=223. Correlation greater than |0.213| are statistically significant at p<0.05

Before the hypothesis tests, we also analyze how the respondents rank the five managerial attributes (i.e., leadership, risk management, adaptability, R&D knowledge, and philanthropism) as relevant to an entrepreneur’s competence. Among the 223 total samples, we found that 195 respondents (for leadership; 87%), 118 (risk management; 52%), 184 (adaptability; 83%), and 160 (R&D knowledge; 72%) placed a given attribute as being included in their three top choices relevant to an entrepreneur’s competence. As expected,

211 respondents (95%) excluded philanthropy from their three top choices, which confirms our assumption that people consider “performative” attributes relevant to an entrepreneur’s competence.

To test the hypotheses, we perform both multivariate analysis of variance (MANOVA) and univariate ANOVA. First, for experiment 1 (gender study), we find significant multivariate main effects (Wilks’ $\Lambda=0.82$, $F(3, 43)=3.17$, $p=0.03$) on the people’s perception of competence, competence-relevant attributes, and willingness-to-investment for female-neutral vs. female-failure respondent groups. We do not find such significant differences in people’s perception/evaluation for male entrepreneur’s neutral vs. failure groups. Also, we decompose the result of the MANOVA for each dependent variable using univariate ANOVA. For each dependent variable, we find the female-neutral and -failure groups differ for people’s perception/evaluation across all variables, competence ($F=3.03$, $p=0.09$), competence-relevant attributes ($F=4.7$, $p=0.04$), and investment ($F=6.59$, $p=0.01$).

For experiment 2 (race study), though we find that a univariate ANOVA’s result is partially—and weakly—significant *only* for competence ($F=3.09$, $p=0.09$), we do not find significant multivariate main effects of a failure condition simultaneously on the three dependent variables for black (black-neutral vs. black-failure) respondent groups (Wilks’ $\Lambda=0.88$, $F(3, 33)=1.48$, $p=0.24$). Also, we do not find any significant difference in people’s perception/evaluation for white-neutral vs. white-failure cases.

For experiment 3 (intersection of gender & race), we find significant multivariate effects of a failure condition on the three dependent variables, Wilks’ $\Lambda=0.69$, $F(3, 30)=4.51$, $p=0.01$, indicating that the two groups (black-female-neutral and female-black-failure) differ significantly in terms of perception/evaluation of black-female entrepreneurs’ competence.

The results of univariate ANOVA are significant for all three dependent variables, showing statistics for competence ($F=3.04$, $p=0.09$), competence-relevant attributes ($F= 5.39$, $p=0.03$), and willingness-to-investment ($F=13.15$, $p=0.001$). Like the previous experiments, we do not find any significant differences in people's perceptions of the majority groups (white-male-neutral vs. white-male-failure).

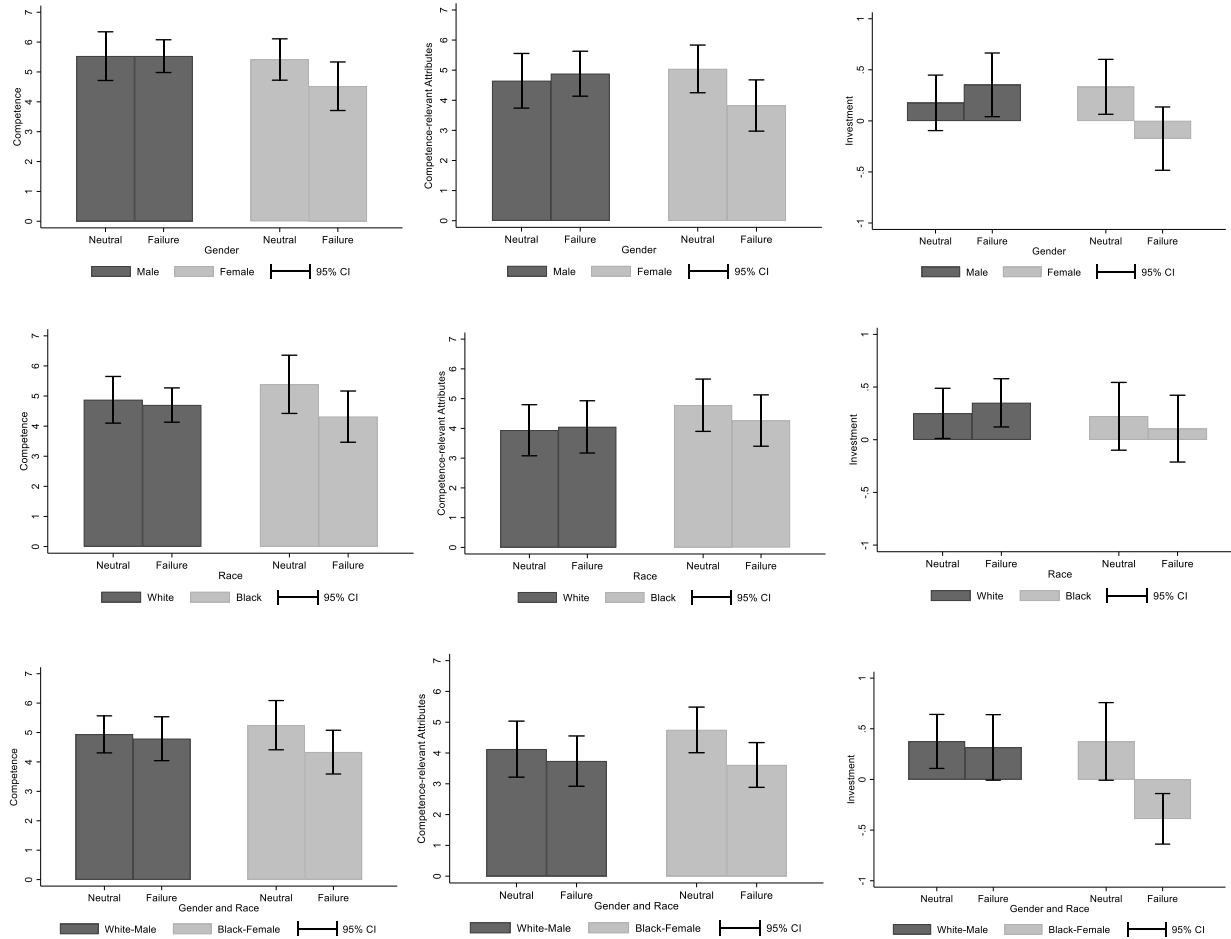
Our follow-up t-test confirms the results of MANOVA and ANOVA above. People's ratings on female entrepreneurs' competence, competence-relevant attributes, and willingness-to-investment are significantly lower for the female-failure case ($M=4.52$, 3.82 , -0.17 ; $SD=1.87$, 1.96 , 0.71 , respectively) than female-neutral case ($M=5.41$, 5.04 , 0.33 ; $SD=1.63$, 1.87 , 0.63 , respectively; $p=0.08$, 0.03 , 0.01). People's ratings on black-female entrepreneurs are also lower for the black-female-failure case ($M= 4.33$, 3.61 , -0.38 ; $SD=1.49$, 1.46 , 0.5 , respectively) than black-female-neutral case ($M=5.25$, 4.75 , 0.37 , $SD=1.57$, 1.39 , 0.71 , respectively; $p=0.09$, 0.02 , <0.01). We find people's perception of black entrepreneurs' competence is lower for black-failure case ($M=4.31$, $SD=1.76$) than black-neutral ($M=5.38$, $SD=1.94$, $p=0.08$), but we do not find such significant difference in the other two measures. Overall, we find the hypothesis 1 is supported *selectively* for specific minority characteristics, especially when the entrepreneurs are "female" (including "black-female"). Also, through the results of insignificant differences between the failure and neutral cases of all majority groups (male, white, and white-male), we find the hypothesis 2 is strongly supported. We report the mean, standard deviation, and paired t-test results in Table 3.3. We also visualize these results in Figure 3.3, comparing the means of all three measures for neutral vs. failure for the corresponding gender and race groups.

<Table 3.3> Mean, standard deviation, and T-test results for the difference between an entrepreneur’s failure and neutral cases

Spillover due to an entrepreneur’s business failure													
Competence						Competence-relevant attributes				Investment			
	N	M	SD	Diff (failure- neutral)	t test (<i>p</i>)	M	SD	Diff (failure- neutral)	t test (<i>p</i>)	M	SD	Diff (failure- neutral)	t test (<i>p</i>)
<i>Experiment 1 (Gender)</i>													
Male neutral	17	5.52	1.58	0	0.00	4.64	1.76	0.24	0.42	0.17	0.52	0.18	0.90
Male failure	17	5.52	1.06	(H2a)	(1)	4.88	1.45	(H2b)	(0.67)	0.35	0.60	(H2c)	(0.37)
Female neutral	24	5.41	1.63	-0.89	-1.74	5.04	1.87	-1.22	-2.17	0.33	0.63	-0.50	-2.57
Female failure	23	4.52	1.87	(H1a)	(0.08)	3.82	1.96	(H1b)	(0.03)	-0.17	0.71	(H1c)	(0.01)
<i>Experiment 2 (race)</i>													
White neutral	16	4.87	1.45	-0.17	-0.39	3.93	1.61	0.12	0.19	0.25	0.44	0.10	0.63
White failure	20	4.7	1.21	(H2a)	(.69)	4.05	1.78	(H2b)	(0.85)	0.35	0.48	(H2c)	(0.53)
Black neutral	18	5.38	1.94	-1.07	-1.76	4.77	1.76	-0.51	-0.88	0.22	0.64	-0.12	-0.54
Black failure	19	4.31	1.76	(H1a)	(0.08)	4.26	1.79	(H1b)	(0.38)	0.10	0.65	(H1c)	(0.58)
<i>Experiment 3 (Gender & race)</i>													
White-Male neutral	16	4.93	1.18	-0.15	-0.31	4.12	1.70	-0.39	-0.67	0.37	0.5	-0.06	-0.29
White-Male failure	19	4.78	1.54	(H2a)	(.75)	3.73	1.69	(H2b)	(0.50)	0.31	0.67	(H2c)	(0.77)
Black-female neutral	16	5.25	1.57	-0.92	-1.74	4.75	1.39	-1.14	-2.32	0.37	0.71	-0.76	-3.63
Black-female failure	18	4.33	1.49	(H1a)	(0.09)	3.61	1.46	(H1b)	(0.02)	-0.38	0.50	(H1c)	(0.00)

Note: The variables, “Competence,” and “Competence-relevant attributes” are 7-point Likert scale response, and the variable, “Investment” is likelihood (-1<*x*<1) of respondents subtracting, maintaining, or adding money from/to their \$10,000 pre-assigned budget for a hypothetical company in the survey. *P* values are in parentheses.

<Figure 3.3> Mean Comparisons of Competence, Competence-relevant Managerial Attributes, and Investment for Each Gender and Race Group



Note: From the first to the third row, the figure shows the results of experiment 1 (gender), experiment 2 (race), and experiment 3 (gender & race). Each bar represents the mean values of three measures: competence (1st column), competence-relevant attributes (2nd column), and investment (3rd column). The bars are color-coded, with dark grey indicating the responses of majority entrepreneurs' neutral and failure cases and light grey representing those of minority entrepreneurs. The error bars on each graph indicate the 95% confidence interval for each mean value.

3.3.6. Discussion for Study 1

The aim of Study 1 is to see if people reinforce their negative group competence stereotype of minority entrepreneurs when they receive negative new information about another minority entrepreneur. Even though we do not find any significant differences in respondents' "baseline" perception for majority vs. minority entrepreneurs in neutral cases⁹, we find that they come to less positively evaluate an entrepreneur's competence *only* in a minority entrepreneur's failure case. We could not find such critical decreases in the majority entrepreneur's failure cases. This supports our hypothesis that people tend to reinforce and make more negative evaluations only in the case of minority entrepreneurs' business failure.

We can most clearly find such a trend in willingness-to-invest, where participants' money is at stake. For example, participants' willingness-to-invest in Black-female entrepreneurs decreased by 0.76 (from 0.37 to -0.38, $p=0.00$) from neutral to failure case, whereas that for white-male entrepreneurs decreased only by 0.06 (from 0.37 to 0.31, $p=0.77$). Also, even though participants had a higher willingness-to-pay for female entrepreneurs than male entrepreneurs in the non-failure case, willingness-to-pay significantly decreased for a female entrepreneur and increased for a male entrepreneur following failure (from 0.33 to -0.17, $p=0.01$ vs. from 0.17 to 0.35, $p=0.37$). This suggests that while people may be more willing to invest in (Black-)female entrepreneurs all else equal, they tend to more severely penalize (Black-)female for failure.

In addition to willingness-to-pay, participants' ratings on entrepreneurs' competence

⁹ We conducted t-test for people's rating on competence, competence-relevant attributes and willingness-to-investment between Male and Female (experiment 1), White and Black (experiment 2), and White-male and Black-female (experiment 3) entrepreneur's "neutral cases" and could not find statistical significance across all three experiments.

and competence-relevant attributes decreased in the failure case. While the decrease was universal for all minority entrepreneurs' cases, it was more significant for "female" and "Black-female" entrepreneurs. More specifically, participants' ratings on female entrepreneurs' competence decreased by 1.74 (from 5.41 to 4.52, $p=0.08$) and 2.17 (from 5.04 to 3.82, $p=0.03$) for competence-relevant attributes. For Black-female entrepreneurs, ratings on competence decreased by 1.74 (from 5.25 to 4.33, $p=0.09$) and 2.32 (from 4.75 to 3.61, $p=0.02$) for competence-relevant attributes. Notably, this reduction was significant for female entrepreneurs, with more significant reduction for Black-female entrepreneurs' failure considering the effect sizes across all three dependent variables. This suggests that stereotypes of entrepreneurial competence (at least in technology industries) might be significant for gender (male vs. female), but these could be amplified when the race is additionally considered (i.e., Black-female).

One potential limitation of Study 1 is that it asks respondents directly about their perception of (in)competence by gender and/or race, which increases risks of social desirability bias. We identify such risks by identifying little differences in people's evaluation between majority vs. minority entrepreneurs for "neutral" cases (baseline cases). A second potential limitation is that, because it measures between-group rather than within-subject perceptions, this study design might not properly capture how the "same person" changes their stereotype perception after a failure event. Lastly, Study 1 assumes that people, on average, hold a negative group competence stereotype for minority entrepreneurs, without distinguishing between those who actually hold negative and positive stereotypes. To resolve these limitations, and to test if a negative spillover effect also takes place under people's positive stereotypes, we conduct an additional experiment (Study 2), which is described

below.

3.4. Study 2

We conduct an additional experiment for Study 2 on the Prolific platform. Through this study, we aim to see how a person’s positive stereotype changes after observing an entrepreneur’s failure. In this study, we do not directly ask the respondents’ opinions on gender or race. Instead, we ask the respondent to predict the “winning demographics” (including gender and race) in a simulated IT venture competition.

3.4.1. Sample and Design

The key advantage of the Prolific platform is that researchers can pre-screen participants based on more specific attributes than the Amazon Mechanical Turk platform (Palan and Schitter, 2018). Using a pre-screening filter of “investment experience,” we select a study population from Prolific of participants with prior entrepreneurial investment experience. Given that Study 1 finds significant effects for gender (female and Black-female), Study 2 manipulates only the failed entrepreneur’s gender.¹⁰

We pay \$2 in total per person (\$1 per response and two responses per person; pre- and post-survey).

Study 2 consists of pre- and post-surveys, each of which includes the same question on survey participants’ forecast about winning demographics of IT venture competition. As a result of the pre-survey, we collected 611 responses, which was reduced from the initial 760 throughout the filtering of 149 low-quality responses.¹¹

¹⁰ Another reason for only considering gender is that we could not collect significant amount of race-varying responses (too few responses predicting Black as the winner) in the pre-survey of Study 2, which is necessary to proceed with the post-survey in Study 2.

¹¹ We removed responses if they do not answer correctly our attention-check questions.

Using the 611 responses, we proceeded with the post-survey; in the post-survey, we first divided 611 responses into two groups by their gender choice of the pre-survey (as a result of pre-survey, male 471 vs. female 140), and next, randomly assigned them to three groups by the following three manipulations: 1. A male entrepreneur's failure, 2. A female entrepreneur's failure, and 3. No failure (where we just asked to finalize participants' choice once again; for more detail, see Appendix 2).

Of the 611 pre-survey responses, we received 577 initial responses (a 94% return rate) and excluded 116, who failed to correctly answer our attention check question in the post-survey.¹²

This left us with a final sample size of 461 for the analysis of Study 2. The six groups in Study 2 are thus based on these 461 final responses, with the following number of observations in each group: group a. Male chosen-male failure observed: 124, group b. Male chosen-female failure observed: 111, group c. Male chosen-no one failed: 127, group d. Female chosen-male failure observed: 31, group e. Female chosen-female failure observed: 33, and group f. Female chosen-no one failed: 35.

The demographics (e.g., race, gender, or age) of the respondents across the six groups are not significantly different, except for gender (at $p < 0.1$). The proportion of male respondents in the male-chosen groups (groups a, b, and c above) is on average 67%, while the proportion of female respondents is 33%. In contrast, the female-chosen groups (groups d, e, and f above) have a higher proportion of female respondents at 63% compared to 37% male respondents. Since the gender ratio of our initial sample (611 responses) in the pre-

¹² In the post-survey, we asked to answer the failed entrepreneur's gender, which is the key manipulation and clearly signaled in Study 2 by the figure's name in the vignette.

survey was 36% (female) vs. 64% (male), we interpret that there is a gender bias, especially for female-chosen groups. However, we do not further interpret such gender biases since our goal in Study 2 is to analyze respondents' individual preferences regardless of their gender or other personal backgrounds. Among all six groups' respondents, the largest race group was white (75%), followed by Asian (13%) and Black (8%). The largest age group was 25-34 (33%), followed by 35-44 (28%), and 44-54 (14%).

3.4.2. Procedures and Manipulations

When recruiting participants, we title our studies "venture competition" and state that we are hosting a venture competition outside Prolific. We add that through the competition only one prominent IT start-up company will be chosen as the winner (out of 15 candidates) based on its (or its CEO's) growth potential and competence. In terms of the purpose of survey, we explain that the participants' prediction of the venture competition's winner will be presented at the award ceremony to entertain the ceremony's audiences and inform them of how the general public had predicted the winning CEO's demographic features. For realism, in the survey, we add that we will give bonus cash to respondents who correctly identify all the demographics of the actual winner.

The survey consists of pre- and post-surveys, both of which include the same survey questions; in each survey, we ask respondents to predict specific demographic features (e.g., age, education level, race, gender, prior experience) of whom they think will win the competition. So, for example, for question 1, which asks respondents to forecast the competition winner's education-level, (Choice A. below undergraduate b. undergraduate degree c. master degree d. phd degree), if they think the winner would hold an undergraduate degree, they choose "b". Likewise, we continue asking respondents' predictions of

demographic features, including the competition winner's gender. When asking for their predictions, we do not give respondents any additional information other than the 15 candidates' common industry: artificial intelligence (AI) with telecommunication services and cloud computing.

One week following the "pre-survey," we ask the same respondents to complete a "follow-up survey," with the same set of questions, notifying them that one of the 15 competition candidates has dropped out of the competition and thus, we need the respondents' finalized answers considering this one drop-out (we do not show this condition for those assigned to "No failure" case but only to ask them to finalize their answers). For the reason of the drop-out, we note in the post-survey instruction that the drop-out failed to meet the competence thresholds of the competition's judges.¹³

The manipulation processes (what and how we manipulated) are described in more detail below.

Gender (male/female)

The manipulation of Study 2 is the *gender* of the entrepreneur that has dropped out of the competition, which is signaled by his/her name in an "apology statement" quoted in the follow-up (post-) survey ("I deeply regret that we are unable to complete the competition at this time. We hope to participate in the future." Sincerely, <addresser's name>). The addresser's name is a race-neutral male or female name: Daniel Scott or Eva Scott, respectively. Other than the failed entrepreneur's name, we do not provide any additional information about the drop-out (to see the full survey, see Appendix 2).

¹³ We explain the judges considered various factors, such as a company's financial solvency, business model and team/internal problems.

We randomly assign a respondent to one of the three gender-failure conditions (i.e., male-failure, female-failure, and no failure) in the post-survey. After the post-survey (follow-up survey), we debrief the true purpose of the study to the respondents.

3.4.3. Measures

Our primary dependent variable is the ratio of predicted gender composition for competition's winner between the pre- and post-surveys. To analyze such a change, we construct a dummy variable in each survey for the respondents' *predicted gender* of the final winner.

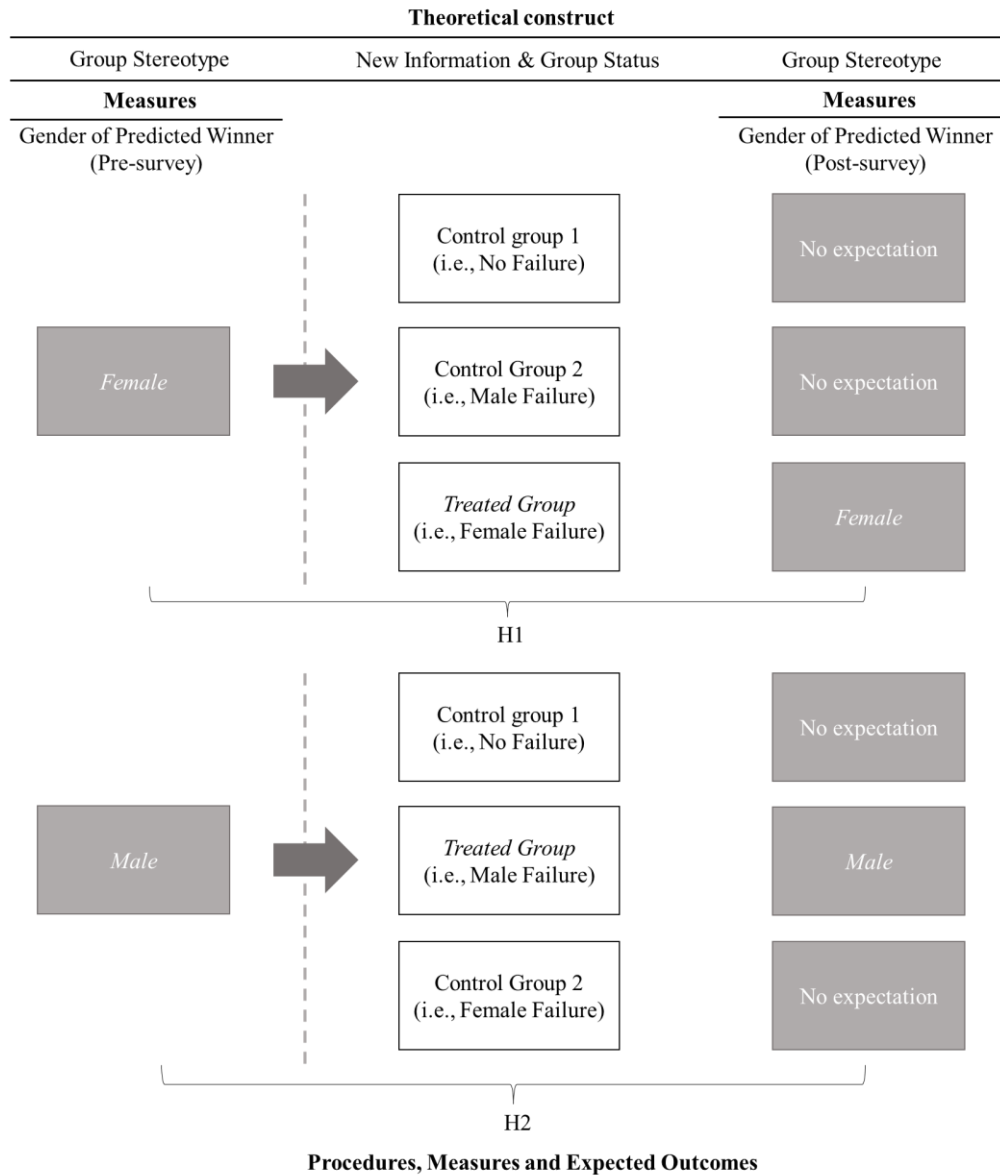
3.4.4. Analysis strategy and expected outcomes

In the analysis, we compare the *ratio* of respondents' choices of a specific gender of the predicted-winner between the pre- and post-survey. To analyze the differences in the ratio, we use the chi-square test.

Figure 3.4 below visualizes the research design of Study 2 discussed so far, along with its expected outcomes. Based on our theoretical framework of “matching” and “mismatching” in Table 1, we have specific predictions only for “mismatching” scenarios, where new negative information is combined with people's existing positive group competence stereotypes (i.e., respondents' winning gender prediction). Thus, for respondents who predicted female as the winning gender in the pre-survey, we only make predictions when they are exposed to the vignette featuring a female entrepreneur's failure (i.e., group e. “Female chosen-female failure observed”; treated group). We expect that they will mostly remain in their initial choice of female even after observing a female entrepreneur's failure. Similarly, for the male group, we have predictions for group a. “Male chosen-male failure observed” (Treated group for male-chosen group) and expect that they will remain in their

male choice from the pre-survey after observing a male entrepreneur’s failure in the post-survey.

<Figure 3.4> Research Design of Study 2



3.4.5. Results

Table 3.4 below shows the number of responses for male and female that the participants predicted as the IT competition winner’s gender in the pre- and post-survey, respectively.

<Table 3.4> Respondents group and the number of observations for each group for Study 2

Pre-survey	Manipulation	Post-survey	
Male- chosen	“Male” failure	Male-chosen	116
		Female-chosen	8
	“Female” failure	Male-chosen	102
		Female-chosen	9
	“No one” failed	Male-chosen	120
		Female-chosen	7
Female- chosen	“Male” failure	Male-chosen	11
		Female-chosen	20
	“Female” failure	Male-chosen	5
		Female-chosen	28
	“No one” failed	Male-chosen	15
		Female-chosen	20

To test if the failure experience has changed the people’s gender prediction, we conducted chi-square test. This test compares the observed proportions in each post-survey category to the expected gender proportions, which we set at 100% male or female (and 0% for the other gender) based on the group’s pre-survey choice. For example, for group d. Female chosen-male failure observed, we set the expected proportion (the null) at 100% female choice (or, $\frac{31}{31} \times 100\%$) and compared it to the actually-observed proportion of female choice ($\frac{20}{31} \times 100\%$).

The results are only significant ($p < 0.05$) for the group d. “Female chosen-Male

failure,” and f. “Female chosen-No one failed,” showing significant changes in the ratio of female vs. male choice compared to their pre-survey choices. For these two groups, around one-third and half of respondents (33% and 43% in group d and f, respectively) changed their choice from female to male from the pre-survey. However, such significant changes were not found in the other groups, including group e. “Female chosen-female failure,” which is the primary focus of Study 2. In group e, 85% ($\frac{28}{33} \times 100\%$) of female-chosen responses maintained the prediction in the post-survey after observing a female entrepreneur's failure. Respondents who selected male in the pre-survey also stayed with their choice, and with a higher ratio, after observing a male failure; 94% of respondents in group a. “Male chosen-male failure” maintained their choice in the post-survey. Also, 92% and 94% of respondents for group b. “Male chosen-female failure,” and group c. “Male chosen-No one failed,” maintained their male choices in the post-survey. This indicates that people who had a positive stereotype about an entrepreneur’s social background, whether male or female, were less likely to update their positive stereotype after receiving negative new information (e.g., entrepreneurial failure).

3.4.6. Discussion for Study 2

Via Study 2, we find that investors are less likely to update their positive stereotypes even after a business failure of a minority entrepreneur. This complements our findings in Study 1, suggesting that a negative spillover effect of a minority entrepreneur’s failure only occurs among people with negative stereotypes of minority entrepreneurs. This sets up an interesting discussion regarding psychological processes of “matching” that we theorized earlier in this paper. We will discuss it further in more detail in the following section.

In addition, our pre-survey results indicate a higher proportion of male choices (approximately 80% male vs. 20% female), which supports our initial assumption in Study 1 that people tend to hold more positive stereotypes of majority entrepreneurs and negative stereotypes of minority entrepreneurs. This reinforces the validity of our research design and the results of Study 1.

Although not the main focus of our research, it is also worth discussing the changes in the female-choice ratio for group d. “Female chosen-Male failure,” and f. “Female chosen-No one failed.” With this regard, we view neither case directly impacts respondents’ stereotype per se as they do not embed any information about female entrepreneurs; instead, we interpret the changes in their selection as people’s tendency of choosing a more conservative and safer choices in the situations of making a choice for seeking gains. According to prospect theory, people tend to be risk-averse when it comes to gains, but risk-seeking when it comes to losses (Kahneman and Tversky, 1979). For respondents in group d, when presented with information about a male entrepreneur’s failure, respondents may have shifted their reference point towards the “majority” male group, who probabilistically have higher chances of winning than the “minority” female group. This shift in reference point could lead respondents to choose the safer option of selecting a male entrepreneur, even if their initial choice was a female entrepreneur. Similarly, for group f (the control group), our repeated survey to finalize their predictions can change the views of respondents in the “gray area,” who may have a positive perception of female entrepreneurs but are concerned about their probability of winning. For such respondents, choosing a higher probability of winning (male entrepreneurs, the majority population in IT industry) in the post-survey might seem more appealing regardless of their initial choice of the pre-survey or their gender stereotypes.

This decision-making behavior is consistent with prospect theory's idea of people being risk-averse when it comes to gains, and preferring a safer option when there is a possibility of a loss.

In the following section, we will integrate and analyze the results of Study 1 and Study 2, providing both theoretical and practical implications.

3.5. General Discussion

Based on the results from Study 1 and Study 2, we can conclude that individuals with negative stereotypes about female and racial-minority entrepreneurs are more likely to update them negatively when they receive new negative information about a member with that minority feature. Conversely, individuals who hold positive stereotypes of either majority or minority entrepreneurs do not update their stereotypes negatively after observing a failure. These findings corroborate the psychological process of "matching," which we proposed earlier in the paper (See Table 1's 2nd and 4th rows). These findings are also consistent with extant psychology literature on leader prototype (Carton and Rosette, 2011; Lord and Maher, 1990, 2002; Rosette *et al.*, 2008), which asserts that people tend to be more receptive to stereotype-congruent information of leader prototypes and non-prototypes, reinforcing the existing stereotypes while rejecting or forgetting new stereotype-incongruent information.

Specifically in the context of entrepreneurship, the results indicate that negative stereotype-reinforcement (or negative matching) is primarily directed towards "female" entrepreneurs, including Black female entrepreneurs. For male entrepreneurs of any race, however, we could not identify equivalent changes in people's evaluations. Based on these

results, we argue that an entrepreneur's gender has the greatest impact on negative spillover effects on evaluations of minority entrepreneurs, compared to other factors such as race.

Our findings have implications for both scholars and practitioners. First, this study contributes to the entrepreneurial failure literature. Entrepreneurial failure research has focused on entrepreneurs' learning experiences from their previous failure and how it further shapes their engagement in next their entrepreneurship activity (Jenkins and McKelvie, 2016; Liu *et al.*, 2019; Yamakawa *et al.*, 2015). In our study, we extend this view to examine society and external audiences' perceptions of other entrepreneurs, with a particular focus on the failed entrepreneur's gender and race. We thereby contribute to studies on "failure tolerance" and/or "second-chancing" in the entrepreneurship domain (Simmons *et al.*, 2019; Zunino *et al.*, 2022). Failure tolerance and second-chancing, which refer to investors' willingness to tolerate failure and provide another chance to entrepreneurs, can motivate entrepreneurs with prior failures to re-enter the entrepreneurial field, thereby enhancing the innovativeness and entrepreneurship of society (Lee *et al.*, 2021). Equity and diversity are also critical considerations in these issues, as differential levels of social or investor failure tolerance can discourage certain groups of entrepreneurs from pursuing entrepreneurship, resulting in missed opportunities for society's entrepreneurial development (Simmons *et al.*, 2019). Our research highlights that investors exhibit differential levels of failure tolerance towards female and male entrepreneurs, and such inequities can have lasting effects due to negative competence stereotypes about female entrepreneurs that already exist.

Our research also contributes to the collective reputation literature. Collective reputation refers to people's evaluation of a group of individuals or organizations, often used for people to infer an individual's or organization's unobservable qualities (Tirole, 1996).

Scholars in this field have sought to understand how collective reputation affects individual group members and the mechanisms behind it. Known as being “tarred with the same brush,” collective reputation scholars have found that the performance of an individual or organization, such as a business failure, significantly affects other group members who are not directly responsible for it (Bachmann, Ehrlich, and Ruzic, 2018; Barnett and King, 2008). This phenomenon is relevant to our study of “negative (or positive) spillover effects” of an entrepreneurial failure, and our research adds to the literature by exploring the underlying psychological factors (e.g., stereotypes) that drive such spillover effects.

Lastly, our research makes practical contributions to designing better policies for underrepresented entrepreneurs. In this regard, we argue that an already-existing negative group stereotype about female (or racial-minority) entrepreneurs’ incompetence sets a negative tone that drags these entrepreneurs and their stakeholders into a vicious cycle of undervaluation. To address this issue, we urge policy makers to devise various policies or social campaigns to eliminate such negative stereotypes from the entrepreneurial domain. One “explicit” way to address these negative stereotypes is by highlighting the success stories of minority entrepreneurs. However, other approaches may require more “implicit” interventions, as negative stereotypes against minority entrepreneurs are deeply and unconsciously rooted in entrepreneurial environments (Eddleston *et al.*, 2016; Kanze *et al.*, 2018). For instance, Kanze *et al.* (2018) found that investors and the investment culture apply double standards to minority (e.g., female) and majority (e.g., male) entrepreneurs, resulting in different outcomes for attracting investment. In such cases, policy makers could intervene proactively in early-stage financing procedures by providing investors and venture

communities with unified guidelines/protocols, including gender/racial-neutral screening questions or checklists, to guide their investment decisions.

Our study also has limitations. First, we do not directly measure people's negative stereotypes but assume their existence. This limitation pertains to our research design, which aimed to measure the outcome of people's evaluation of minority vs. majority entrepreneurs while concealing the study's purpose. Although we attempted to elicit people's existing negative stereotypes via intended priming using a common table, we may not have captured people's pre-existing stereotypes adequately. In future research, scholars could consider different research designs to measure people's stereotypes and the process of their reinforcement more directly. Second, our study only focuses on the impact of new “negative” information since our research context is entrepreneurial failure. Future research could investigate the effects of positive information on entrepreneurs' social backgrounds and how it affects people's psychological process of match and mismatch (corresponding to Table 1's 1st and 3rd rows). Lastly, our research only focuses on stereotypes of IT industry, which we presume a white-male dominant industry. For generalizability of our empirical findings, future research can test our theoretical framework in different sectors or industries.

3.6. Conclusion

In conclusion, our study suggests that entrepreneurial failure has a negative spillover effect on people's assessment of other minority entrepreneurs, especially female entrepreneurs. We hope our study illuminates the stratification of failure recovery in entrepreneurship and helps make entrepreneurial environments more accessible for gender- and racial-minorities.

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Chapter 4

Pollution Information Disclosure and the Heterogeneity of Shareholder Evaluations of Firms' Financial Performance

with Matthew Potoski

Abstract

When stakeholders hold a collective reputation about a group of firms, they evaluate members' performance along difficult-to-observe attributes based on their stereotype about the entire group. New information about members' difficult-to-observe attributes reduces the salience of collective reputation, allowing stakeholders to make more individual evaluations. In 1989, the US EPA published the Toxic Release Inventory (TRI) which provided for the first time detailed information on the pollution emissions of large facilities in manufacturing industries. We apply multiplicative heteroskedastic linear regression models to data on 570 firms across 22 industries to examine how the TRI data release influenced shareholders' evaluations of firms across industries. The results show that TRI release increased the heterogeneity of shareholder evaluations of firms in industries with stronger collective reputations for members' pollution practices, but did not have similar effects for firms in other industries that had weaker collective reputations.

4.1. Introduction

When stakeholders lack full information about a firm, they often resort to the stereotypes they hold about a group to which the firm belongs (Durand and Vergne, 2015; Ferguson, Deephouse, and Ferguson, 2000). Consumers infer the taste of a particular bottle of wine based their beliefs about wine-making regions (Delmas and Grant, 2014) or product quality based on their beliefs about manufacturing practices in the producer's country of origin (Chao, 1998). Investors often use industry trends to evaluate a firm's growth potential (Winn, MacDonald, and Zietsma, 2008). When making these assessments, stakeholders are relying on a collective reputation (Fiol and Romanelli, 2012; Hsu and Hannan, 2005; Tirole, 1996).¹

A collective reputation is a stakeholder's beliefs about which firms belong together in a group and their stereotype about the qualities and characteristics common to the group (Barnett and King, 2008; Tirole, 1996). When many stakeholders believe the same collective reputation, their common stereotype means that they evaluate the group members more homogenously, even though they believe each group member's actual performance along the difficult-to-observe quality dimensions is heterogeneous (Jonsson, Greve, and Fujiwara-Greve, 2009).

Stakeholders create collective reputations when they receive information about a firm's difficult-to-observe attribute and its association with a group and use that information to inform their stereotype about the group as a whole (Durand and Paoletta, 2013;

¹ The theory of collective reputations was proposed by Tirole (1996). For applications, see King, Lenox, and Barnett (2002), Barnett and Hoffman (2008), Winn, MacDonald, and Zietsma (2008), Potoski and Prakash (2013), and Kim, Terlaak, and Potoski (2021).

Naumovska and Zajac, 2022). For decades German firms had established a collective reputation by touting their products' reliability and performance, and by the 2010s, many consumers believed in the collective reputation for "quality German engineering." In 2015, the German automaker Volkswagen was revealed to have been falsifying emissions testing data it submitted to the US Environmental Protection Agency (EPA). The scandal hurt the collective reputation of German automakers: car sales and stock prices among Volkswagen and other German auto manufacturers fell as consumers and investors used the scandal to downgrade their stereotype management quality and responsibility among the other German automakers (Bachmann, Ehrlich, and Ruzic, 2018; Bouzzine and Lueg, 2020).

How might stakeholders react when they receive information about each individual firms' performance along the difficult-to-observe attributes? A simple answer is that when stakeholders receive information about each group member, they come to know more about members' unique individual attributes, and their evaluations are likely to become more accurate. For instance, tasting many Napa Valley wines can reveal which ones have more attractive fruity notes, test driving German cars can shed light on how well each handles and how fast each accelerates, and field testing a bunch of Silicon Valley technology products can indicate the market appeal of each.

In this paper, we show that the impact of information disclosure on stakeholders' evaluation of firms depends on the strength of stakeholders' perception of the firm's collective reputation. Stakeholders come to hold a strong reputation when they receive information about a group that helps them create a stereotype through which they assess members as being similar along difficult-to-observe attributes (Naumovska and Zajac, 2022; Vergne, 2012). When stakeholders hold a strong collective reputation, information disclosure

reveals which firms are better and worse than the group stereotype, leading to more heterogeneous stakeholder evaluations compared to before the information disclosure. In the absence of a collective reputation, stakeholders do not initially hold the stereotype that group members are similar; while information disclosure shifts stakeholders' evaluations of particular firms, with some becoming more positive and some more negative, the overall distribution of evaluations remains the same.

We also propose an analytic approach to studying stakeholder evaluations of firms. Standard research approaches to measuring the effect of information disclosure on stakeholder evaluations require measurement and assumptions about stakeholders' preferences and the direction that their evaluations will change with new information. For example, Werner (2017) and Minefee, McDonnell, and Werner (2021) both studied situations where firms' campaign donations to Republican-affiliated political groups were suddenly and surprisingly disclosed to the public. Werner (2017) found that investors rated firms more positively when learning of firms' donations to the Republican Governors Association, while Minefee et al. (2021) found that investors rated firms more negatively when learning of their donations to American Legislative Exchange Council. Studies of the consequences of information disclosure are less frequent, perhaps because the analytic approach used to study them comes with considerable empirical hurdles, including measuring how diverse stakeholders will interpret information about different companies in different circumstances. These challenges are particularly difficult in circumstances defined by difficult-to-observe information, where negative and positive information can have different effects on stakeholders in different circumstances, with different mediating and moderating interactions (for example, Andrus, Callery, and Grandy, 2023).

This paper thus provides a combined theoretical and empirical framework for investigating how stakeholders evaluate firms as group members and how stakeholders react to information disclosure about individual group members. On the theoretical front, collective reputation provides a unifying framework for situations where stakeholders evaluate groups of companies and products, such as country of origin effects (Chao, 1998; Maheswaran, 1994), industry reputations (King and Lenox, 2000; Winn *et al.*, 2008), product certifications (Gao, Gopal, and Agarwal, 2010), eco-labels (Delmas and Grant, 2014; Gehman and Grimes, 2017), and information disclosure programs (Andrus *et al.*, 2023). Similarly, scholars have studied situations where managers evaluate themselves and their companies in the context of a broader group, such as the “strategic group identity” literature (Cattani, Porac, and Thomas, 2017; Ferguson *et al.*, 2000; Peteraf and Shanley, 1997). Finally, firms and organizations engage in strategic activities to manage collective reputations among groups of firms. Industry associations sometimes work to promote their members’ common reputation (King, Lenox, and Barnett, 2002), perhaps by building a brand image for the industry itself. Certification programs, like ISO 14001 and the US EPA’s Energy Star program, promote collective reputations that signal participants’ difficult-to-observe qualities, such as environmental performance and product quality (Potoski and Prakash, 2005).

A challenge within and across these literatures is that while they share common analytic features—stakeholders use stereotypes to infer difficult-to-observe attributes of the group—they lack an overarching theoretical framework to facilitate aggregating studies in diverse contexts into broader thematic insights. Collective reputation theory can thus serve as a “Rosetta Stone” within the management literature and between management and other

social science disciplines. Psychology studies how people form and use perceptions of groups and stereotypes (Durand and Paoella, 2013; Porac, Thomas, and Baden-Fuller, 2011). Economics investigates group evaluations under imperfect information (Castriota and Delmastro, 2015; Winfree and McCluskey, 2005). Business strategy investigates how firms look to improve their competitive position through managers' and consumers' perceptions of the groups to which they belong (McNamara, Luce, and Tompson, 2002; Sonenshein, Nault, and Obodaru, 2017).

On the empirical front, the paper demonstrates the relevance of conditional heteroskedasticity models in applied research with limited information about how people evaluate companies, such as firms' social and environmental performance (Flammer, 2013; Flammer, Toffel, and Viswanathan, 2021), political involvement (Werner, 2017), and corporate governance (He and Rui, 2016). Conditional heteroskedasticity empirical models can be useful in contexts that call for modeling both the mean and variance of a dependent variable as a function of independent variables. With these models, when scholars have information about stakeholder preferences or other contextual factors, they can analyze how information influences the direction of stakeholder evaluations, such as when information about firms' political donations raises or lowers stakeholder evaluations. When scholars do not have such information, they can analyze how information disclosure influences the variance of stakeholder evaluations.

Our empirical inquiry investigates how shareholders responded to the US EPA's Toxic Release Inventory (TRI) program, which on June 19, 1989 released firm-specific pollution data for the first time. We show that, prior to the TRI release, media coverage connecting firm pollution practices differed dramatically across industries. The chemical

industry in particular had strong collective reputation for pollution (King *et al.*, 2002), with over a decade of major disasters in Love Canal, Ohio; Seveso, Italy; Bhopal, India; Flixborough, UK; and Schweizerhalle, Switzerland. The food, petroleum refining, and printing industries also had extensive media coverage about member firms' pollution activities. Public opinion polls show that industries with more media coverage had stronger collective reputations as polluters.

We then analyze panel data on 570 TRI-listed firms across 22 industries firms before and after the TRI emissions disclosure. We measure shareholder evaluations using firms' cumulative abnormal returns (CAR) and use multiplicative heteroskedastic linear regression models (Harvey, 1976) to estimate the effects of information disclosure on both the mean and variance of firms' CAR. The results show that firms in industries with frequent media coverage of members' pollution practices had significantly higher heterogeneity in their CAR after the TRI release compared to the pre-TRI period. Firms in industries with low media coverage did not experience a change in CAR heterogeneity. Chemical industry firms, which had the most pollution coverage in the media, saw the highest increase in CAR heterogeneity.

In the following sections, we present the theory of collective reputations, focusing on how incomplete information increases the salience of a collective reputation, and develop hypotheses about how changes in the salience of a collective reputation via an information disclosure can affect stakeholders' evaluations of firms. Next, we summarize the TRI program case, describe the methodology, and present the empirical results. Finally, we conclude by discussing the implications and limitations of our analyses.

4.2. Theory and Hypotheses

Stakeholders evaluate a firm's quality on multiple dimensions. Some dimensions they can observe more directly, such as firm size, market share, and revenues (Chakravarthy, 1986). For other dimensions, stakeholders lack directly observable information. For example, it can be hard for stakeholders to assess a firm's environmental performance, its propensity for ethical behavior, or the behavior of vendors deep in its supply chain. Such qualities arise from sources hidden from stakeholders' view, such as the firms' moral code or culture, behaviors that take place inside the firm, or the actions of geographically distant actors (Rawwas, Arjoon, and Sidani, 2013). Stakeholders sometimes make inferences about unobservable quality dimensions by referencing what they are able to observe about the firm (Ashforth and Humphrey, 1997; Ferguson *et al.*, 2000; Jonsson *et al.*, 2009). For example, stakeholders may try to infer a firm's pollution emissions through its observable qualities, such as whether it has a recycling program or if its employees participate in company tree planting days. Even if such signals are only minimally reliable, stakeholders may still believe in them.

Another way stakeholders can make inferences about a firm's unobservable qualities is through a collective reputation (Tirole, 1996). A collective reputation is a stakeholder's belief about how a group's observable qualities signal the unobservable qualities common among its members. For example, a consumer can observe the nationality of major car manufacturers while having difficulty knowing the reliability of a particular car she is considering for purchase. A collective reputation helps consumers connect the observable characteristics—whether a car was made by a German company—with difficult-to-observe characteristics—a German-manufactured car is likely to be more reliable (Bachmann *et al.*, 2018; Kim, Terlaak, and Potoski, 2021).

A collective reputation thus consists of stakeholders' views about which firms belong together in a group through their shared observable traits (Haslam and Ellemers, 2005) and stakeholders' beliefs about the stereotypical qualities shared among group members (Fiol and Romanelli, 2012; Hsu and Hannan, 2005). Stakeholders make inferences about a firm's unobservable qualities by applying their stereotypes about the group to which it belongs. In the example above, identifying a car's country of origin as Germany through its automaker reminds stakeholders of "German engineering," which connects to their existing beliefs that German-made goods are of higher quality (Chao, 1998).

When stakeholders hold a collective reputation about a group of firms, their evaluation of individual group members tends to be more homogenous (Barnett and King, 2008). If the collective reputation is positive, then stakeholders positively evaluate all group members—German-made cars are generally perceived to be of higher quality—even if some firms have poorer performance than others. When stakeholders hold a negative collective reputation about a group, they are likely to evaluate each member more negatively. In the absence of a collective reputation's homogenizing pull, stakeholder evaluations of a group of firms tend towards heterogeneity, as stakeholders rely on other diverse information sources for their assessments.

An important condition for a collective reputation's influence on stakeholder evaluations is that stakeholders lack information about each firm's actual performance along the difficult-to-observe dimension and thus the collective reputation is "salient" in that particular situation (Winfrey and McCluskey, 2005). Stakeholders use the group stereotype to infer evaluations where they lack information. When stakeholders have more information about firms' difficult-to-observe attributes, their evaluation relies less on the collective

reputation stereotype. For example, investors often lack information about start-up ventures they are considering for investment and consequently may look to additional cues to inform their evaluations (Chondrakis, Serrano, and Ziedonis, 2021). Investors may perceive a start-up as belonging to a group based on its geographic location and use their stereotype about the group's profitability to infer an individual start-up's profitability. Indeed, research has shown that investors favor start-ups headquartered in Silicon Valley, due to the region's collective reputation for launching profitable firms (Hannan *et al.*, 2006). Conversely, investors rely less on collective reputation stereotypes like headquarters location when evaluating established firms with more plentiful information (Jonsson *et al.*, 2009; Porac *et al.*, 2011; Vergne and Wry, 2014).

Information disclosure can influence how stakeholders use collective reputations to evaluate firms. Information disclosure refers to the publication of information about individual firms along one or more quality dimensions (Miller, Fugate, and Golicic, 2017). For example, the CDP, formerly known as the Carbon Disclosure Project, provides a framework through which firms can voluntarily disclose information about their climate activities and performance (Andrus *et al.*, 2023; Callery and Perkins, 2021). The disclosed individual information may reveal which firms are better than others along the difficult-to-observe quality dimension.

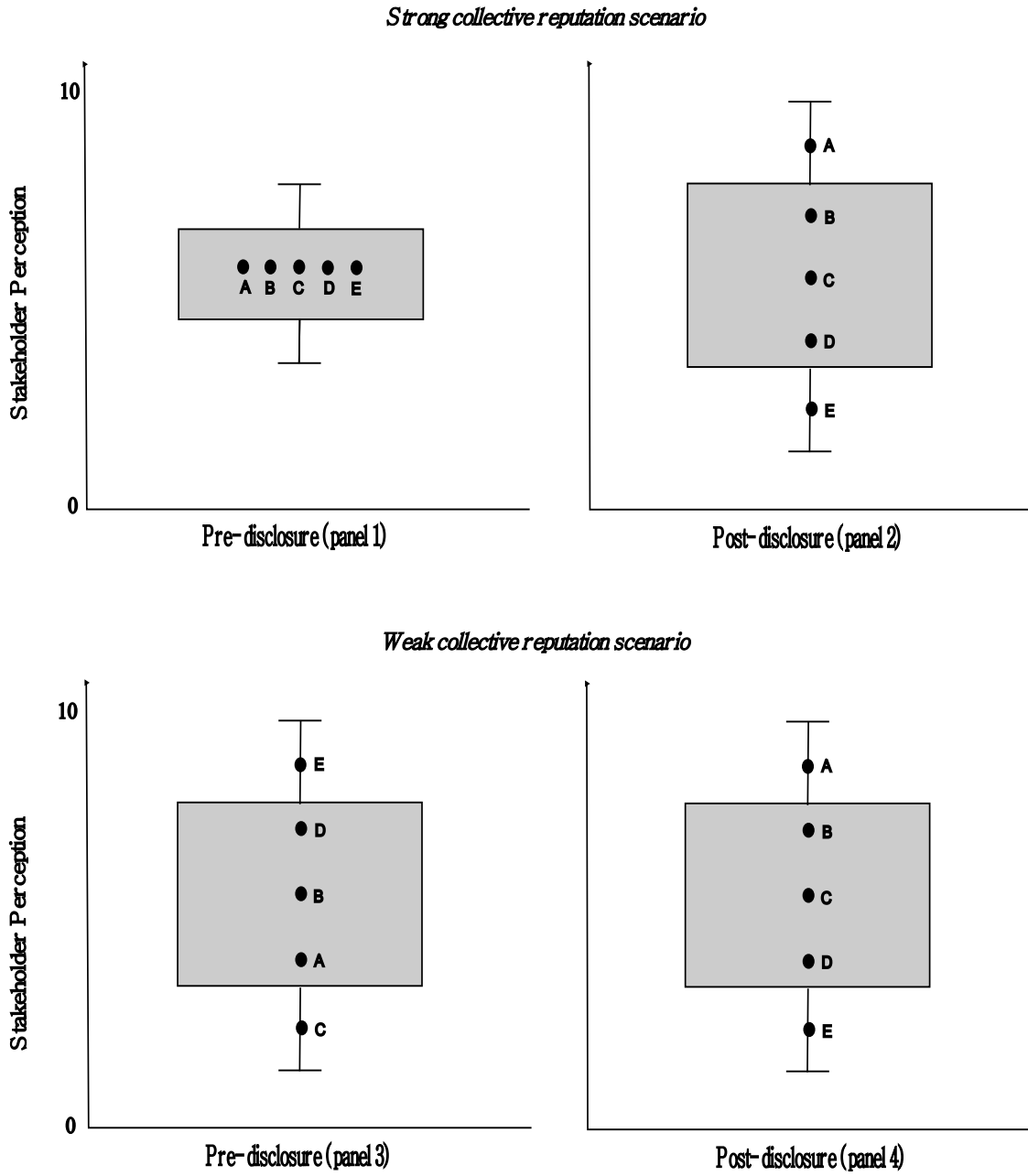
The effect of information disclosure on a stakeholder's evaluation of a firm depends on whether the stakeholder holds a collective reputation about a group to which the firm belongs. If the stakeholder holds a strong collective reputation, her evaluation of group members is more homogenous due to her group stereotype that group members are similar along the difficult-to-observe attribute (Naumovska and Zajac, 2022). Information disclosure

under a collective reputation arms the stakeholder with more accurate information about each firm in the group, showing which members are performing better than the group stereotype and which are performing worse and thereby increasing the heterogeneity of the stakeholder's evaluations.

In the absence of a collective reputation, information disclosure does not change the overall homogeneity of the stakeholder's evaluations. The reason for this is that, prior to information disclosure, the stakeholder does not assume that group members are similar along the difficult-to-observe dimension; there is no homogenizing pull from a collective reputation. Information disclosure reveals which firms are performing better and which are performing worse, allowing the stakeholder to accordingly adjust her evaluations. While evaluations of some firms become more positive and others more negative, these two movements offset each other and the overall distribution of evaluation remains the same.

Figure 4.1 depicts these scenarios graphically, with panels 1 and 2 showing respectively the strong collective reputation scenarios in pre- and post-information disclosure periods and panels 3 and 4 showing respectively stakeholders' perceptions of firms' performance in the no (or weak) collective reputation scenarios in pre- and post-information disclosure periods. The vertical axes show stakeholder perceptions of five firms, labeled A through E, with A being the strongest performer on the difficult-to-observe performance dimension and E the weakest. The gray bars and brackets show stakeholders' beliefs about the possible values firms of firm performance, with the lowest possible performance as zero and the highest as ten. The top and bottom brackets indicate stakeholders' beliefs about the highest and lowest possible performance and the gray boxes indicate stakeholders' beliefs about the performance levels of most firms in the group.

<Figure 4.1> The effects of information disclosure on stakeholder perceptions with strong and weak collective reputations



Panel 1 shows stakeholders' pre-disclosure perceptions when stakeholders hold a strong collective reputation. Stakeholders perceive the five firms as having similar performance levels and their evaluations of each firm are homogenous at their perception of the group stereotype, indicated by the narrow gray box. Panel 2 shows stakeholders' post-disclosure perceptions when stakeholders hold a collective reputation. Information disclosure reveals which firms are performing better and which are performing worse. Stakeholder perceptions become more accurate, and the heterogeneity of their evaluations increases relative to the pre-disclosure period; information disclosure weakens the stereotype's homogenizing pull.

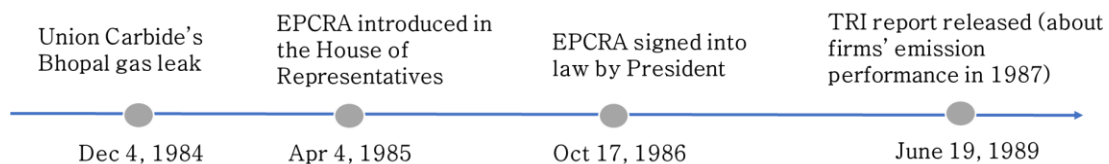
Panel 3 shows stakeholders' pre-disclosure perceptions when stakeholders do not hold a collective reputation. Stakeholders believe the five firms have heterogeneous performance levels, reflecting the fact that they believe the firms have different performance levels but they do not hold a stereotype that firms' performance similarly and they do not have information on which firms are actually performing better than others. Panel 4 shows stakeholders' post-disclosure perceptions when stakeholders do not hold a collective reputation. Information disclosure reveals which firms are performing better and which are performing worse. Stakeholder perceptions become more accurate while the heterogeneity of their evaluations remains similar to what it was in the pre-disclosure period. Based on this theoretical discussion, we propose the following hypothesis:

Hypothesis 1: When stakeholders hold a collective reputation about a group of firms, information disclosure increases the heterogeneity of stakeholder evaluations.

4.3. Research Context

To examine the effects of collective reputations and information disclosure on the heterogeneity of stakeholder evaluations, we draw on the case of the TRI program. The TRI program was part of the Emergency Planning and Community Right-to-Know Act (EPCRA), passed by the US Congress and signed by President Reagan into law in 1986. Under the TRI program, the US EPA collected and publicly disclosed pollution emissions on 300 chemicals for manufacturing facilities (defined by SIC codes 20-39) that had ten or more employees or handled large quantities of toxic substances (Doshi, Dowell, and Toffel, 2013). As shown below in Figure 4.2, the first TRI report was released on June 19, 1989 (Hamilton, 1995). We regard the TRI release as an “event” and examine how this event affects the stakeholders’ evaluation of firms before and after the event.

<Figure 4.2> Timeline of the TRI program



The TRI legislation was a response to growing public concern for the environment following a series of pollution disasters and deteriorating environmental conditions, including the Sevesto chemical release in Italy (1976), the Amoco Cadiz oil spill off the coast of France (1978), the Love Canal toxic waste dump in New York (1978), the Three Mile Island nuclear disaster in Pennsylvania (1979), the Union Carbide chemical plant gas leak in India (1984), and the Chernobyl nuclear accident in Ukraine (1986). In 1989, the Exxon

Valdez oil tanker spilled 11 million gallons of oil in Prince William Sound, Alaska, further heightening public concern for the environment. A series of public opinion polls conducted in the mid-1980s show that the percentage of Americans expressing concern about the environment rose from 58% in 1984 to 62% in 1985, 64% in 1986, and 66% in 1987 (Mark Clements Research, 1984, 1985, 1986, 1987).

Industrial pollution received significant media coverage in the years leading up to the TRI legislation. We queried the ProQuest media archive for newspaper stories covering industrial pollution between January 1984 and the TRI release in June 1989, using the keywords “pollution” and the names of the industries covered by the TRI. The query returned 5,480 stories.²

Table 4.1 reports the number of firms in the TRI and the number of pollution-focused newspapers collected from our ProQuest query.

² Our search term is “pollution AND [name of] industry.” For the “[name of]” part, we used variations of the formal SIC codes name, such as for SIC code 20, “Food and Kindred Products,” we broke down the words and combined them in the search with the conjunction “OR.” So, the actual search term is ““pollution” AND (“Food” industry) OR (“Food and kindred product” industry).” ProQuest’s Historical Newspapers service provides news archival data published in prominent newspapers, such as The New York Times, The Wall Street Journal, LA Times, The Chicago Tribune, etc.

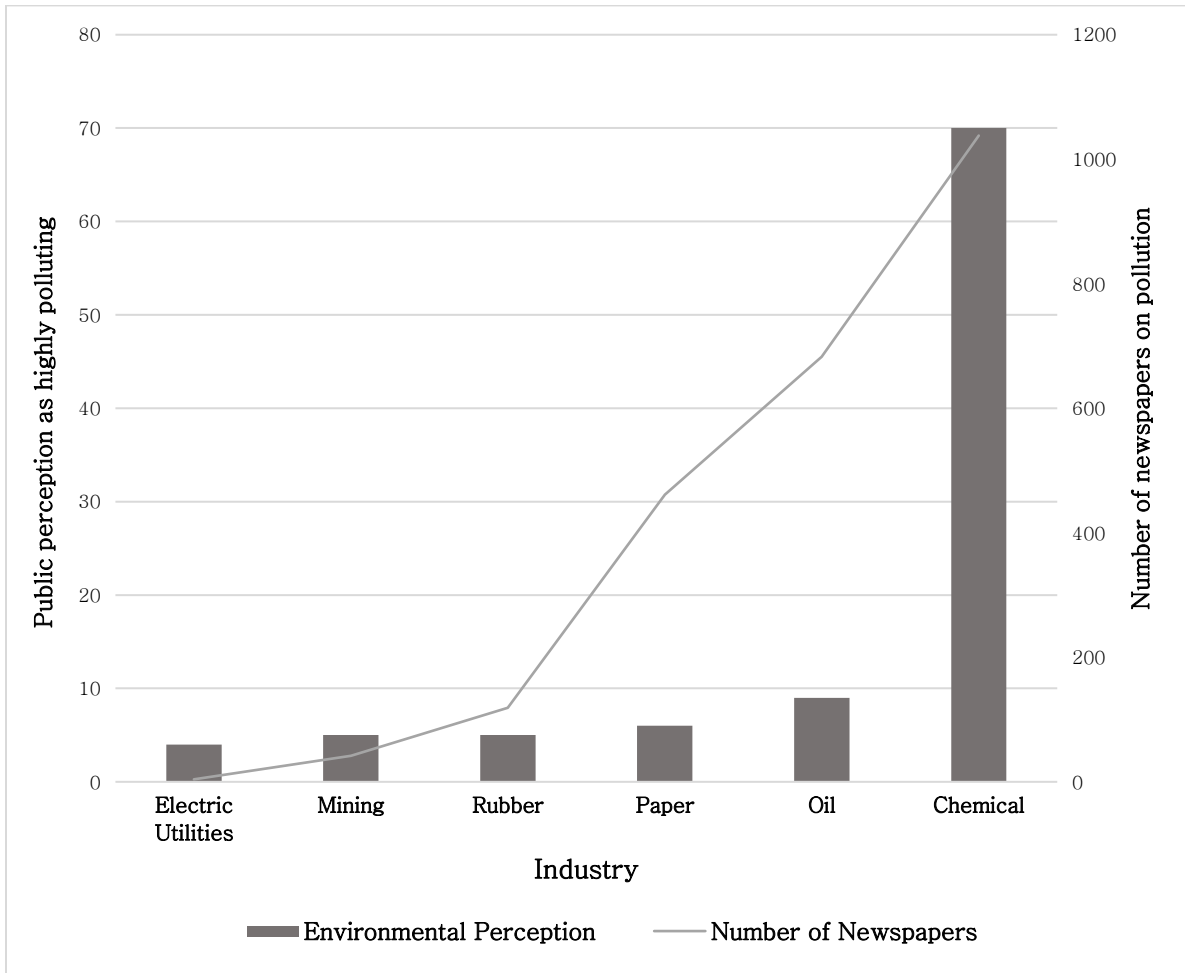
<Table 4.1> Number of firms and newspapers articles on pollution emissions by SIC code

SIC code and Name of Industry	Number of Firms	Number of Newspapers
10 - Metal Mining	4	1
12 - Coal Mining	1	41
13 - Oil and Gas Extraction	10	176
14 - Nonmetallic Minerals	5	0
16 - Heavy Construction	1	6
20 - Food and Kindred Products	34	663
22 - Textile Mill Products	17	53
23 - Apparel and other Finished Products Made from Fabrics	4	44
24 - Lumber and Wood Products	6	62
25 - Furniture and Fixtures	17	120
26 - Paper and Allied Products	31	461
27 - Printing, Publishing, and Allied Industries	14	731
28 - Chemicals and Allied Products	85	1,038
29 - Petroleum Refining and Related Industries	10	507
30 - Rubber and Miscellaneous Plastics Products	13	119
31 - Leather and Leather Products	5	32
32 - Stone, Clay, Glass, and Concrete Products	12	371
33 - Primary Metal Industries	33	1
34 - Fabricated Metal Products	31	0
35 - Industrial and Commercial Machinery and Computer Equipment	55	477
36 - Electronic and other Electrical Equipment and Components	69	173
37 - Transportation Equipment	58	10
38 - Measuring, Analyzing, and Controlling Instruments	33	86
39 - Miscellaneous Manufacturing Industries	12	1
40 - Railroad Transportation	1	1
42 - Motor Freight Transportation and Warehousing	1	5
46 - Pipelines	1	74
48 - Communications	3	62
49 - Electric, Gas and Sanitary Services	7	4
50 - Wholesale Trade-Durable Goods	10	6
51 - Wholesale Trade-Nondurable Goods	6	4
52 - Building Materials, hardware, Garden Supply & Mobile Home Dealers	2	89
54 - Food Stores	4	8
56 - Apparel and Accessory Stores	1	2
65 - Real Estate	3	14
70 - Hotels, Rooming Houses, Camps, and other Lodging Places	1	4
72 - Personal Services	1	0
73 - Business Services	7	0
76 - Miscellaneous Repair Services	1	1
78 - Motion Pictures	1	9
87 - Engineering, Accounting, Research, Management, and Related Services	1	24
99 - Nonclassifiable Establishments	5	0
Total	616	5,480

By the TRI release date in 1989, the industries in the TRI had different collective reputations for environmental performance, and public opinion polls showed that industries with more newspaper stories had stronger collective reputations. A 1986 public opinion poll asked respondents for their perceptions of the largest polluting industry in the United States (Cambridge Reports/Research International, 1986). Figure 4.3 reports the survey results along with the number of newspaper stories on pollution in each industry. Figure 4.3 shows that, in the public eyes, the top sources of air and water pollution were the electric utility, mining, rubber, paper, oil, and chemical industries. The chemical industry stands out, with 70 percent of the respondents seeing it as the largest source of air and water pollution. Importantly, industries' collective reputations are highly correlated with newspaper coverage; industries perceived as polluting received more media attention, with the chemical industry (1,038 stories), oil (683), paper (461), and rubber (119) industries receiving over half of all the newspaper stories.³ A similar survey from 1981 (Opinion Research Corporation, 1981) showed a similar pattern: industries with more newspaper stories about pollution were perceived by the public to be larger pollution sources. Newspaper stories about industry pollution activities provide a useful proxy for collective reputations in the large number of industries where public opinion data are unavailable.

³ Since the public opinion poll did not use the same name of the official SIC codes, we combined oil & gas (SIC 13) and petroleum refining industry (SIC 29) for the number of news articles for "oil industry" of the public opinion poll in Figure 3.

<Figure 4.3> Number of newspapers for TRI industries and public opinion poll on highly polluting industries



Note: The bars indicate how much of respondents in a 1986 US public opinion poll indicated the corresponding industry as the biggest cause of environmental pollution (“air” and “water” pollution polls are aggregated). The line indicates the number of news articles for the corresponding industry, which we draw from Table 1.

The TRI’s data disclosure provides fertile ground for evaluating the effects of collective reputations and information disclosure on the heterogeneity of stakeholder evaluations. The initial TRI data release provided stakeholders with precise information about individual firms’ pollution levels, allowing us to compare stakeholder evaluations under conditions with more and less information. The industries listed in the TRI also have different levels of collective reputations, as reported in public opinion surveys.

In the empirical analyses presented below, we analyze how shareholders' evaluations of firms' financial prospects changed with the TRI release and whether these changes were different in industries with and without collective reputations. Shareholders are an important stakeholder group and their evaluations of firms' financial prospects are consequential for firms' performance. When shareholders acquire new information about an individual firm's pollution emissions, they may change their evaluations of firms' financial prospects, leading them to bid up (or down) the firm's stock prices. However, we are unable to measure or make strong assumptions about the direction in which pollution influences shareholders' beliefs about firms' profits. The literature on this subject, most of which has been published after 1990, does not reveal a consensus about when or whether environmental performance enhances or harms firm profits (Hart and Ahuja, 1996; Stefan and Paul, 2008). In 1989, it is likely that shareholders may have believed that, for some firms, higher pollution emissions signal higher profits, perhaps believing that higher emissions indicate that firms are ramping up production to meet anticipated higher demand (Hart, 1995). For other firms, shareholders may have believed that lower emissions signal higher profits, perhaps believing that these firms have more efficient production processes (Ambec and Lanoie, 2008; Lanoie *et al.*, 2011).

Because we are unable to measure or make strong assumptions about how and when shareholders will interpret pollution information as a profit signal, we adopt a more flexible empirical approach that models how information disclosure influences both the mean and variance of firms' stock prices. In an analysis of the (conditional) mean of firms' stock prices, such as traditional OLS regression, a statistically significant independent variable would indicate, on average, that shareholders believe that the variable indicates higher or

lower firm profits. We model the variance in stock prices to evaluate shareholder reactions to the TRI release when shareholders hold and do not hold a collective reputation about the firms. When firms hold a collective reputation, their stereotype is that firms in the group have similar pollution levels (panel 1 in Figure 1); the TRI information pollution disclosure reveals which firms are polluting more, allowing shareholders to apply their own beliefs about whether the information signals higher or lower profits and bid up or down the firms' stock prices (panel 2 in Figure 1). If shareholders do not have a collective reputation, they do not hold a stereotype that firms in the group have similar pollution levels (panel 3 in Figure 1); the TRI information release may increase or decrease their profitability assessments for particular firms, but without necessarily changing the overall variance of their assessments across the group (panel 4 in Figure 1).

Our use of conditional heteroskedasticity modeling corresponds to how these models have been used in similar settings. For example, a considerable stream of research uses time series variants of these models (called "ARCH" or "GARCH" models) to investigate the causes of stock market volatility (Alberg, Shalit, and Yosef, 2008; Bali *et al.*, 2018). Scholars have identified how economic shocks can increase investor uncertainty, leading to a higher variance in stock prices, without assuming or measuring whether investors will respond positively or negatively in specific circumstances (Uddin *et al.*, 2021).

4.4. Methods

Our empirical analysis uses conditional heteroskedasticity models to evaluate how the TRI information disclosure influenced the mean and variance of stakeholder evaluations across firms with differing levels of collective reputations. Based on hypothesis 1, we expect that the TRI release increases the variance of shareholder evaluations of firms in industries

with stronger collective reputations. We use an event study research design, comparing stakeholder evaluations in 3 day windows before and after the TRI pollution information release on June 19, 1989. The design helps rule out alternative explanations which would need to occur over a longer time frame, such as firms' responding to the regulation or adopting new strategic competencies as a result of information disclosure.

We compiled data on TRI-listed firms' pollution emissions, financial performance, and other factors. We use data on newspaper coverage of firms' pollution activities, which we collected from ProQuest, to measure collective reputations across industries. We retrieved corporate financial data (e.g., sales and stock price) through Wharton Research Data Service (WRDS), which includes various corporate financial databases, including COMPUSTAT and Center for Research in Security Prices (CRSP). Data on the daily stock price of each TRI-listed firm comes from the CRSP, and data on basic financial information (sales, employees, etc., for the control variables) comes from COMPUSTAT.

TRI data are available on the EPA's website (<https://www.epa.gov/toxics-release-inventory-tri-program/tri-data-and-tools>). The TRI data provide emissions for each facility, which we transformed to firm-level data by aggregating emissions (total on-site release) by parent company names. Also, the EPA has continuously revised the TRI reports due to some firms' late reporting. We used the TRI data that appeared on June 19, 1989, reflecting information presented to shareholders in the relevant time period. The initial TRI sample consists of 1,375 publicly- or privately-traded firms that provide their parent company's information on the TRI reports, of which 616 are publicly traded companies with stock price information for the event (i.e., +/-3 days before and after June 19, 1989) and estimation window (-200 to -20 days before June 19, 1989) needed for the event study. Because we are

evaluating changes in variance across industries, we further restrict the analyses to industries with 5 or more firms, leaving our final sample at 570 firms.

4.4.1. Measures

Dependent variable. A firm's stock price represents stakeholders' evaluation of a firm's financial potential (Woolridge and Snow, 1990). Cumulative abnormal returns (CAR) is a measure of how much a stock price deviates from an expected value during an event window (Flammer, 2013). We measure each firm's CAR for equally sized windows for both the pre- and post-TRI disclosure periods. A positive (negative) value of CAR means that a firm has received higher (lower) stock return than normal times. To compute CAR, we first calculate daily abnormal stock return (AR). The AR is computed through the following equation:

$$AR_{it} = R_{it} - E(R_{it}),$$

where AR_{it} is the abnormal return on the stock price for firm i on day t , which equals the difference between R_{it} , the actual return for firm i on day t , and $E(R_{it})$, the expected normal return on the stock market on day t . The expected normal return, $E(R_{it})$ is defined as the expected return if the event of interest had not occurred during a given event window (Kang, 2008). $E(R_{it})$ is modeled through the equation below:

$$E(R_{it}) = \alpha_i + \beta_i \times R_{mt} + \varepsilon_{it},$$

where R_{mt} is the rate of return on a market portfolio (the Standard and Poor 500) on day t , β_i is the systematic risk of firm i , α_i is the intercept term, and ε_{it} is a stochastic error term that has an expected value of zero and is uncorrelated over time. The parameters in the above equation are estimated over a prescribed normal period, called as "estimation window" in event studies (Paruchuri, Han, and Prakash, 2020). The estimation window typically occurs prior to and does not overlap with the event window (McWilliams and Siegel, 1997).

Following other event studies (Flammer, 2013; Kalaignanam *et al.*, 2013), we set the estimation window at 200 to 20 days prior to the event date (i.e., June 19, 1989, the first TRI report released date). CAR is calculated through the summation of ARs for a firm i over a specified event window during $t1$ through $t2$.

$$CAR_{i(t1,t2)} = \sum_{t=t1}^{t2} AR_{it}$$

To evaluate our hypothesis, we use day -3 through -1 ($CAR_{i(-3,-1)}$) for the time duration of the pre-disclosure period, because on day -3 (June 14th, 1989), business news outlets forewarned the release of the first TRI report and thus amplified the public’s attention to the event (Freedman and Patten, 2004). We set the same duration—three days—for the post-disclosure period ($CAR_{i(0,2)}$).⁴

Independent variables. The variable *TRI* is a dummy variable distinguishing the pre- and post-disclosure periods. The second independent variable, *News*, is the number of newspaper articles pertaining to pollution emissions under each TRI-listed industry from January 1984 to June 1989, as described above. Given that *News* is correlated with public opinion polls reporting collective reputations for pollution among several US industries, we use *News* as a proxy for industries’ collective reputation. To measure changes in the effects of collective reputations before and after the TRI, the analyses include the interaction term $TRI \times News$.

⁴ We assigned the same time duration for pre- and post-disclosure periods to reduce risks of the variance being de/inflated by any potential statistical reasons (e.g., post-disclosure period’s variance can be inflated due to a random walk effect if we set it longer than the pre-disclosure period).

Control variables. Our analyses include a suite of control variables, following standard practice in the literature using similar event studies of firms' CAR (Flammer, 2013, 2021). *Firm size* is the logarithm of total assets; *profitability* is the return on assets (ROA), defined as the ratio of net income to total assets; *market-to-book ratio* is the ratio of the market value of equity to the book value of equity; *leverage* is the ratio of long-term debt to the book value of assets. *Emissions* is the natural logarithm of a firm's emission intensity, which is calculated by a firm's emission total (lbs.) divided by its annual sales (million \$).

Table 4.2 reports variable means, standard deviations, and correlations. The mean variance inflation factor (VIF) is 1.07, and no individual VIF exceeds 10, suggesting that less than problematic multicollinearity levels.

<Table 4.2> Descriptive statistics and correlations among variables

Variables	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) <i>CAR (-3, -1) & (0, 2)</i>	-0.004	0.035	1.000							
(2) <i>TRI</i>	0.500	0.500	-0.076*	1.000						
(3) <i>News</i>	337.445	365.800	0.027	0.000	1.000					
(4) <i>Emissions</i>	5.603	2.612	-0.009	0.000	0.061*	1.000				
(5) <i>Firm size</i>	6.323	1.899	0.053	0.000	0.108*	-0.162*	1.000			
(6) <i>Profitability</i>	0.060	0.088	-0.005	0.000	0.172*	-0.096*	0.110*	1.000		
(7) <i>Market-to-book</i>	1.721	2.167	0.002	0.000	0.128*	-0.050	-0.014	-0.015	1.000	
(8) <i>Leverage</i>	0.199	0.158	-0.021	0.000	-0.100*	0.053	0.011	-0.249*	-0.191*	1.000

N = 1,066. * Significant at p<0.05.

4.4.2. Empirical Model

Our model is based on linear regression with multiplicative conditional heteroskedasticity, estimated via maximum likelihood (Harvey, 1976). This approach estimates both the mean and variance of a dependent variable conditional on the independent variable and control variables, allowing us to identify how stakeholders' changed evaluations differ across firms between the pre- and post-disclosure periods. The estimation of the full model is based on the following regression:

$$CAR_{ij(k1,k2)} = \alpha + \beta_1 \times TRI_t + \beta_2 \times News_{ij} + \beta_3 \times TRI_t \times News_{ij} + \beta_4 \times X_{ijt} + \tau_{ijt} \quad (1),$$

where $CAR_{ij(k1,k2)}$ is the dependent variable measuring CAR of a firm i in j industry during $k1$ through $k2$ days during either the pre- or post-disclosure period (i.e., $k1=-3$ and $k2=-1$ for the pre-disclosure period and $k1=0$ and $k2=2$ for the post-disclosure period). TRI_t and $News_{ij}$ are the independent variables, indicating if a time period t is pre- or post-TRI disclosure and the number of news articles for firm i 's industry j , respectively. X_{ijt} is the vector of control variables. The coefficients α , β_1 , β_2 , and β_4 indicate respectively the constant and the effect of time period (i.e., pre- or post-TRI disclosure), the unit increase in $News_{ij}$, and our control variables on stakeholders' evaluations (i.e., CAR). The coefficient on the interaction term, β_3 , indicates the extent to which a unit increase in $News_{ij}$ differently affects CAR during the post-disclosure period compared to that of the pre-disclosure period. Lastly, τ_{ijt} is the error term, which takes the following form of equation:

$$Var(\tau_{ijt}) = e^{\vartheta + \gamma_1 \times TRI_t + \gamma_2 \times News_{ij} + \gamma_3 \times TRI_t \times News_{ij} + \varepsilon_{ijt}} \quad (2),$$

where TRI_t is, as denoted above, measures the pre- or post-disclosure period, and ϑ and γ_1 , γ_2 , and γ_3 represent the constant, coefficient for TRI , $News$, and the interaction of TRI and $News$, respectively. This specification, known as the multiplicative heteroskedasticity model, allows us to assess whether the variance in stakeholders' abnormal assessments (CAR) is greater during the post-disclosure period as firms are in a stronger collective reputation (higher number of $News$). Its relevant coefficient is γ_3 , whose positive (negative) value indicates a greater (or lesser) variance, or stakeholders' more individualized evaluations during the post-disclosure period for higher numbers in $News$.

4.4.3. Results

Table 4.3 reports the results of the main conditional heteroskedasticity analyses. Model 1 presents a simple baseline model, with the variables $News$, TRI and $News \times TRI$ in both the mean and variance equation and Model 2 adds the control variables to the mean equation. The $TRI \times News$ coefficient is most relevant for evaluating our hypothesis that information disclosure increases the heterogeneity of stakeholder evaluations of firms in industries with stronger collective reputation. The coefficient is statistically significant and positive (0.001, $p=0.002$ in Model 2), indicating that the post-TRI heterogeneity of stakeholder evaluations was larger in industries with more newspaper stories. To interpret the effect size, a one standard deviation increase in $News$, increases CAR by a factor of 1.44 ($=\exp(0.001 \times 365)$), holding constant the effects of other variables in the model. For both

Models 1 and 2, we conducted the postestimation of Likelihood-ratio test (LR test), with the null hypothesis of no heteroskedasticity and found that both models well capture heteroskedasticity ($\chi^2(3) = 45.4$ and $\chi^2(3) = 60.8$, $p=0.000$ for both models) with the specification of our variance equation.⁵

⁵ To see if our main model (Model 2 in Table 3) holds with varying lengths of event window, we also tested the model with the event window of +/-1, +/-2, +/-5, and +/-7, and found that the variance coefficient of $\text{TRI} \times \text{News}$ is positive and statistically significant at $p < 0.01$ from +/-2 days to +/-7 days of event window. Also, we tested the effects of log-transformed News, with all other control variables being also log-transformed. In this case, the variance coefficient of $\text{TRI} \times \text{News}$ is also positive and statistically significant at $p < 0.05$.

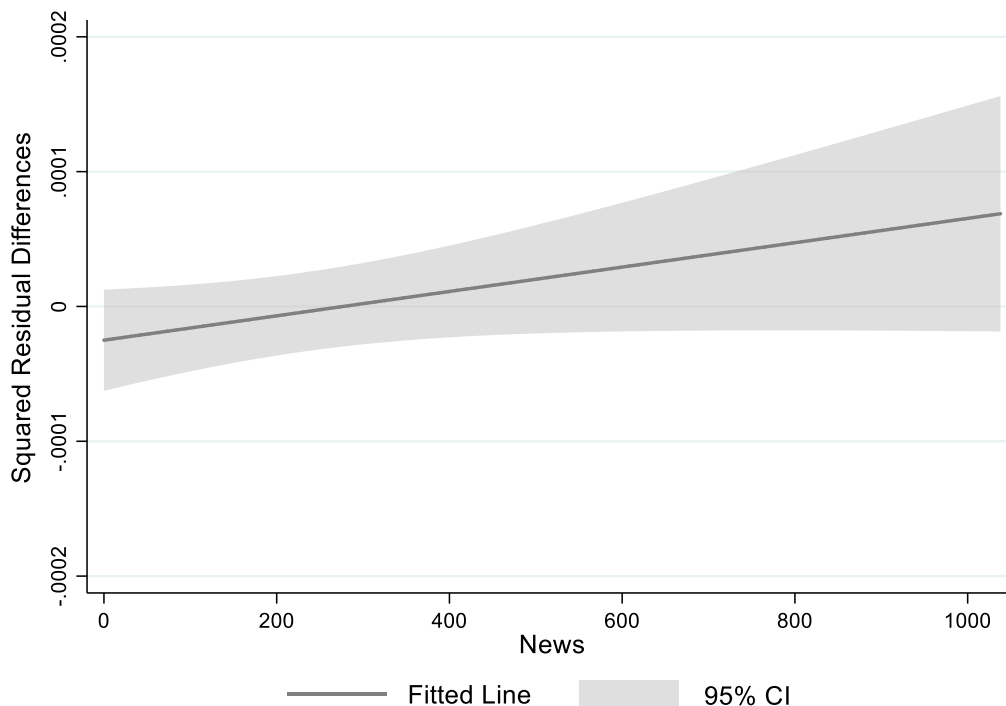
<Table 4.3> Multiplicative conditional heteroskedasticity analysis of TRI disclosure on CAR

	Model 1	Model 2
Mean coefficients		
<i>TRI</i>	-0.008*** (0.003) [0.005]	-0.010*** (0.003) [0.001]
<i>News</i>	0.000 (0.000) [0.799]	0.000 (0.000) [0.724]
<i>TRI × News</i>	0.000* (0.000) [0.063]	0.000*** (0.000) [0.009]
<i>Emissions</i>		-0.0001 (0.000) [0.876]
<i>Firm size</i>		0.001* (0.001) [0.057]
<i>Profitability</i>		-0.004 (0.014) [0.747]
<i>Market-to-book</i>		0.0001 (0.001) [0.868]
<i>Leverage</i>		-0.008 (0.007) [0.272]
Constant	-0.007 (0.011) [0.524]	-0.012 (0.012) [0.326]
Variance coefficients		
<i>TRI</i>	-0.215* (0.121) [0.077]	-0.261** (0.127) [0.040]
<i>News</i>	-0.001*** (0.000) [0.000]	-0.001*** (0.000) [0.000]
<i>TRI × News</i>	0.001** (0.000) [0.016]	0.001*** (0.000) [0.002]
Constant	-6.378*** (0.086) [0.000]	-6.305*** (0.089) [0.000]
Industry dummies	Yes	Yes
Observations	1,140	1,066
R-squared	0.017	0.024
LR test	45.400	60.800
P-value	0.000	0.000

Dependent variable: CAR during three days before and after the day (6/19/1989) of TRI disclosure. Standard errors (SE) are in parentheses and *p* values in brackets (*** *p*<0.01, ** *p*<0.05, * *p*<0.1). Observations reduce in Model 2 compared to Model 1 because some observations have zero onsite emission total, which thus cannot be log-transformed. Mean coefficients of *News* and *TRI × News* in Model 1 and Model 2 are 5.83e-06 and 9.19e-06, and 8.30e-06 and 1.3e-05, respectively.

We present two figures to provide a clearer sense of the effect of *News* and *TRI* on *CAR* variance. First, we regressed industry-level *CAR*s on the independent and control variables used in the mean equation of Model 2. We then calculated the differences in squared residuals of the regression results between when *TRI* equals 1 and 0. We plot these squared residuals in Figure 4.4: the y-axis indicates the differences in the squared *CAR* residuals (between *TRI*=1 and *TRI*=0) and the x-axis indicates the number of *News*. Figure 4 shows, as we also showed in Table 3, the variance in *CAR* increases as the number of *News* increases during the post-disclosure period.

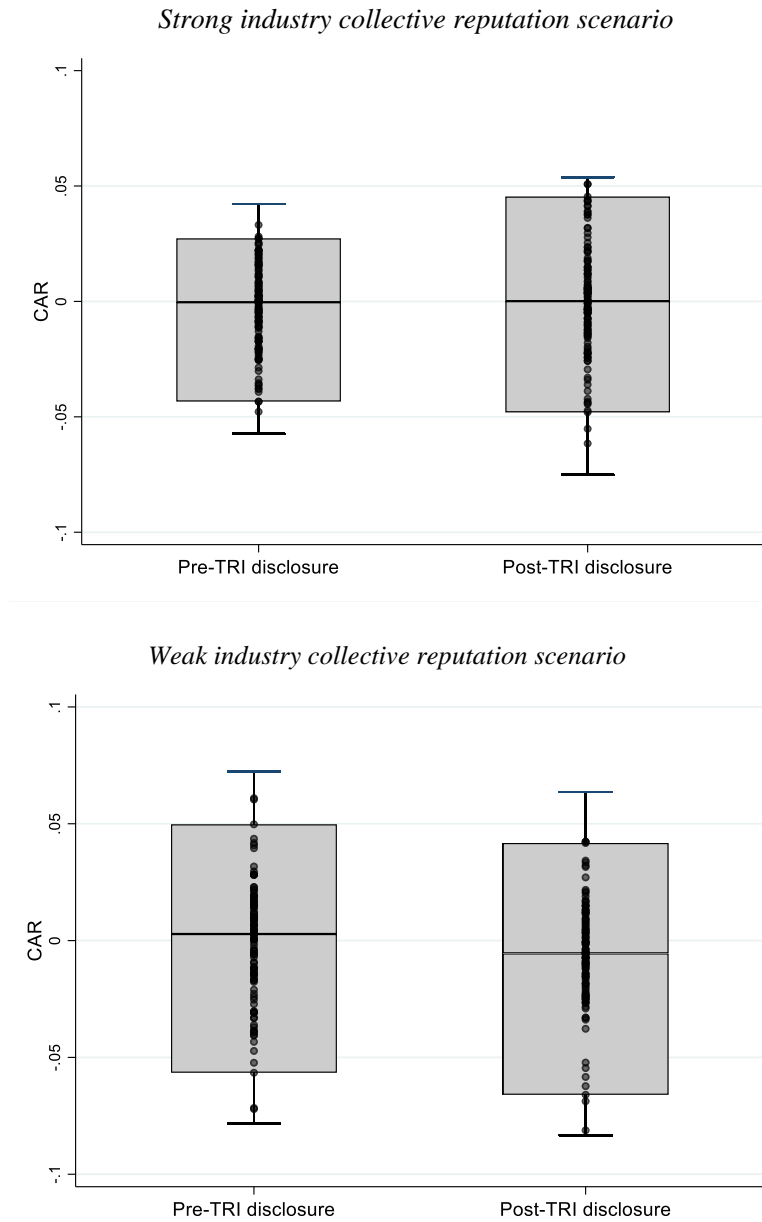
<Figure 4.4> Squared residual differences between pre- and post-disclosure periods by *News*



Note: The y-axis indicates the differences in squared residuals of the two linear regressions (when *TRI*=0 and *TRI*=1) of *CAR*s on the independent and control variables used in the mean equation of Model 2 in Table 3. The x-axis indicates *News*, the number of newspaper articles about pollution in the industry. The fitted line indicates predicted values of the regression of the squared residual differences on *News*, and the gray area indicates 95% confidence intervals.

Figure 4.5 shows box and whiskers plots of *CAR* for firms with strong (high *News*) and weak (low *News*) collective reputation. We compare firms in the top 20% of *News*, including SIC 28 (85 firms, *News* 1,038), SIC 27 (14 firms, *News* 731), and SIC 20 (34 firms, *News* 663) with the bottom 20% firms, including SIC 73 (7 firms, *News* 0), SIC 51 (6 firms, *News* 4), SIC 50 (10 firms, *News* 6), SIC 49 (7 firms, *News* 4), SIC 39 (12 firms, *News* 1), SIC 37 (58 firms, *News* 10), SIC 22 (17 firms, *News* 53), and SIC 24 (6 firms, *News* 62). Figure 5 shows that the *CAR* variance became wider during the post-TRI disclosure period among firms in industries with stronger collective reputations, as indicated by higher values of *News*. Among firms in industries with weak collective reputations, the variance of *CAR* did not change between the two periods.

<Figure 4.5> Variance of CAR in pre- and post-TRI disclosure periods for firms in industries with strong and weak collective reputations



Note: The y-axis indicates CAR and the x-axis indicates the pre- or post-disclosure period. Gray boxes and the top and bottom brackets cover 90% and 95% of observations, respectively. Black dots inside the box and brackets are CAR values for firms in the industries with strongest (top panel) and weakest collective reputations (bottom panel). Strong collective reputation industries are in the top 20 percent of *News* (SIC 28, SIC 27, SIC 20). Weak collective reputation industries are in the bottom 20 percent of *News* (SIC 73, SIC 51, SIC 50, SIC 49, SIC 39, SIC 37, SIC 24, and SIC 22).

While the mean equation coefficients are not directly the subject of this study, they merit some discussion. The results show that the coefficients for the *TRI* are statistically significant and negative in both models, indicating that TRI-listed firms experienced lower returns in the post-disclosure period. The *TRI* coefficient in Model 2 is -0.10, which is comparable to the coefficient in Hamilton's (1995) analysis of the TRI release on firms' CAR. Also, the coefficients for the interaction term, *TRI*×*News*, are significant and positive for Model 1 and 2, indicating that firms in industries with more newspaper coverage experienced larger CAR increases after the TRI release, holding constant the effects of other variables in the model.

Additional Analyses: TRI and SIC Codes Interactions

For additional analyses, we examine if such an increase in variance is explained by industry SIC codes. Thus, in this additional analysis, we include interaction terms between TRI and firm's SIC codes in both the mean and variance equations, reported in Table 4.4. We then examine whether firms that saw a larger increase CAR variance after the TRI disclosure were in industries with higher levels of *News*. Such a result would suggest that firms in industries with stronger collective reputations saw a bigger increase in CAR variance after the TRI disclosure.

<Table 4.4> Multiplicative conditional heteroskedasticity analysis adding interaction variables of TRI and SIC code industry dummies

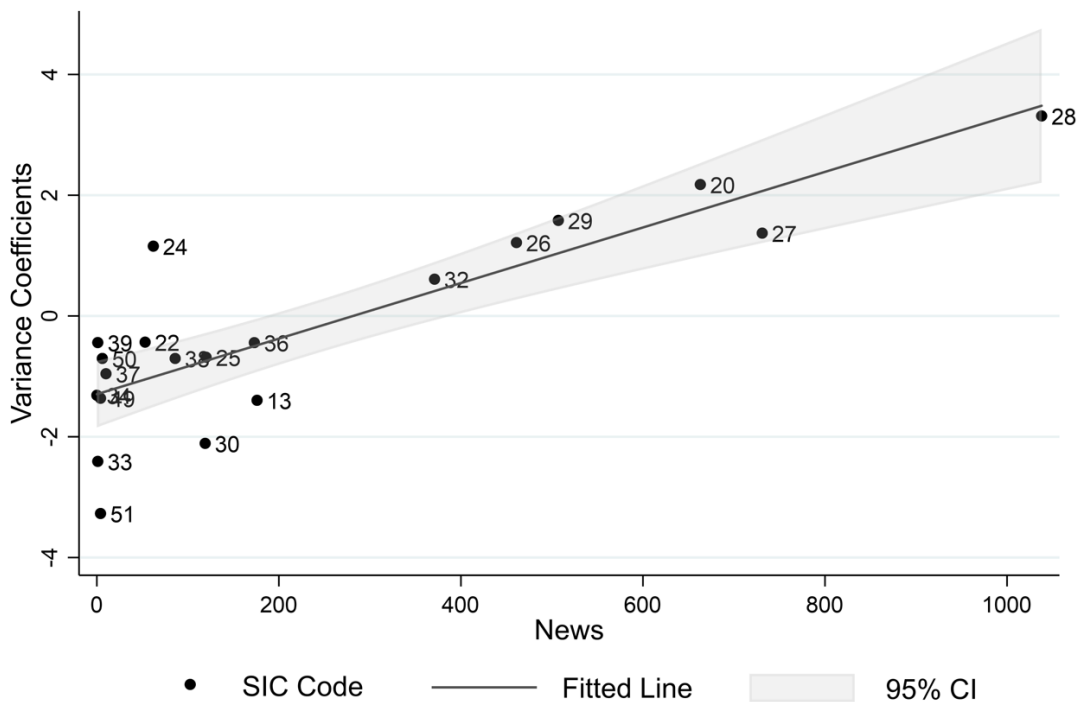
Model 4		
	Mean Coefficients	Variance Coefficients
<i>TRI</i>	-0.005 (0.014) [0.714]	0.955 (0.773) [0.216]
<i>News</i>	0.000 (0.000) [0.478]	0.002* (0.001) [0.059]
<i>TRI × News</i>	0.000 (0.000) [0.809]	-0.003** (0.002) [0.043]
<i>Emissions</i>	-0.000 (0.000) [0.304]	
<i>Firmsize</i>	0.001** (0.001) [0.033]	
<i>Profitability</i>	0.002 (0.011) [0.819]	
<i>Market-to-book</i>	0.000 (0.000) [0.612]	
<i>Leverage</i>	-0.007 (0.007) [0.298]	
<i>TRI × SIC 13</i>	-0.037* (0.019) [0.060]	-1.396* (0.802) [0.082]
<i>TRI × SIC 20</i>	0.006 (0.013) [0.625]	2.178*** (0.632) [0.001]
<i>TRI × SIC 22</i>	0.008 (0.018) [0.650]	-0.433 (0.875) [0.621]
<i>TRI × SIC 24</i>	-0.007 (0.018) [0.695]	1.157 (1.347) [0.390]
<i>TRI × SIC 25</i>	-0.004 (0.014) [0.772]	-0.683 (0.774) [0.377]
<i>TRI × SIC 26</i>	-0.013 (0.009) [0.147]	1.216*** (0.464) [0.009]
<i>TRI × SIC 27</i>	0.012 (0.017) [0.503]	1.372* (0.833) [0.099]
<i>TRI × SIC 28</i>	-0.000	3.313***

	(0.021)	(1.117)
	[0.985]	[0.003]
<i>TRI</i> × SIC 29	0.007	1.583**
	(0.009)	(0.703)
	[0.410]	[0.024]
<i>TRI</i> × SIC 30	-0.001	-2.109**
	(0.017)	(0.819)
	[0.935]	[0.010]
<i>TRI</i> × SIC 32	-0.015	0.610
	(0.016)	(0.666)
	[0.361]	[0.360]
<i>TRI</i> × SIC 33	0.002	-2.408***
	(0.015)	(0.840)
	[0.896]	[0.004]
<i>TRI</i> × SIC 34	0.001	-1.313
	(0.016)	(0.851)
	[0.947]	[0.123]
<i>TRI</i> × SIC 36	-0.009	-0.441
	(0.013)	(0.557)
	[0.499]	[0.429]
<i>TRI</i> × SIC 37	-0.008	-0.956
	(0.014)	(0.802)
	[0.575]	[0.233]
<i>TRI</i> × SIC 38	-0.009	-0.703
	(0.013)	(0.730)
	[0.501]	[0.336]
<i>TRI</i> × SIC 39	-0.015	-0.440
	(0.028)	(0.964)
	[0.590]	[0.648]
<i>TRI</i> × SIC 49	-0.004	-1.363
	(0.027)	(1.183)
	[0.874]	[0.249]
<i>TRI</i> × SIC 50	0.035**	-0.703
	(0.017)	(1.002)
	[0.039]	[0.483]
<i>TRI</i> × SIC 51	-0.003	-3.271***
	(0.021)	(1.183)
	[0.892]	[0.006]
Constant	-0.014*	-7.924***
	(0.009)	(0.547)
	[0.096]	[0.000]
Industry dummies	Yes	
Observations	1,066	
R-squared	0.061	
LR test	311.630	
<i>P</i> -value	0.000	

Dependent variable: CAR during three days before and after the day (6/19/1989) of TRI disclosure. Standard errors (SE) are in parentheses and *p* values in brackets (*** *p*<0.01, ** *p*<0.05, * *p*<0.1). Coefficient for SIC dummy (non-interaction terms) is not reported due to space limit. SIC 73 is omitted due to collinearity. The reference industry group is SIC 35 (Industrial and Commercial Machinery and Computer Equipment).

Table 4.4 shows that, as we expected, the variance in *CAR* changes significantly across industries, and the coefficient for $TRI \times News$ is statistically significant and negative, suggesting that the $TRI \times News$ variance effects reported in Table 4.3 are largely due to differences across industries. Figure 4.6 presents the SIC variance coefficients from Table 4.4 along with the number of newspaper stories for each industry. The results show a clear pattern—the more newspaper stories about an industry’s pollution practices, the more *CAR* variance increased among firms following TRI disclosure.

<Figure 4.6> Variance coefficients of SIC codes and News by industry

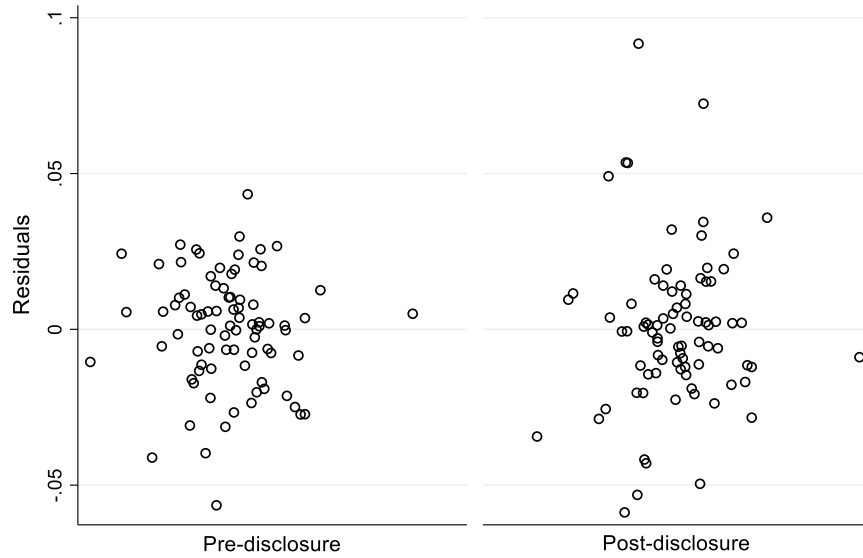


Note: The y-axis indicates the variance coefficients of interaction terms between TRI and SIC code industry dummies, reported in Table 4. The x-axis indicates *News*, the number of newspaper articles about pollution in the industry. The fitted line indicates the predicted variance coefficients by industry across *News*. The gray area indicates 95% confidence intervals.

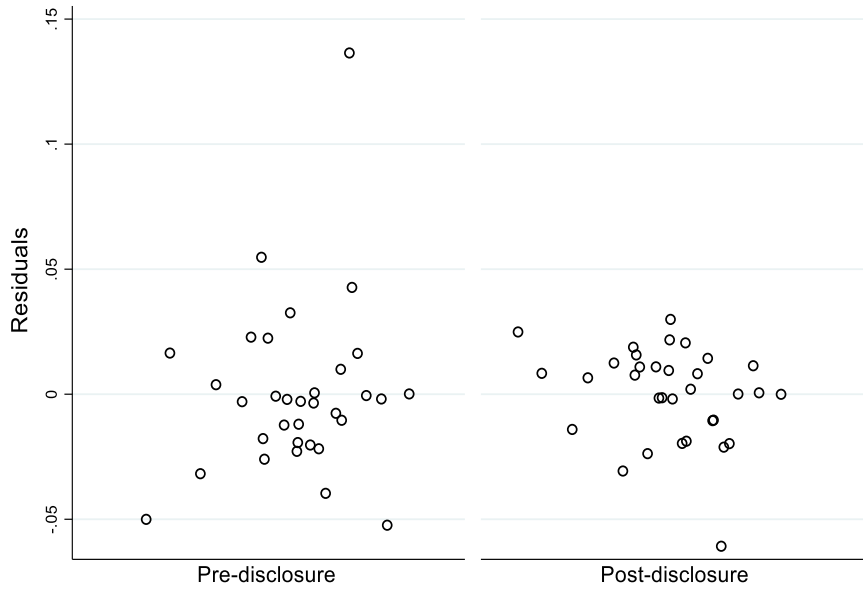
Finally, we present residual plots of firms in the chemical (SIC 28) and primary metals industries (SIC 33) to show how the TRI disclosure changes in the CAR variance among firms with the most and fewest newspaper stories. Residual plots are calculated from linear regression for the dependent variable *CAR* against the *TRI* and control variables using subsamples of 83 chemical and 33 primary metal industry firm samples. As shown in Figure 4.7, the chemical industry's residual plots are clearly wider in the post-disclosure than the pre-disclosure period, compared to the primary metal industry.

<Figure 4.7> Residuals of SIC 28 and SIC 33

SIC 28-Chemical Industry



SIC 33-Primary Metal Industry



Note: The y-axis indicates the residuals calculated from a linear regression of CAR on TRI and control variables using subsamples of chemical (top) and primary metal industry (bottom) firms. The x-axis indicates the fitted values of that regression when TRI=0 (pre-disclosure period) and TRI=1 (post-disclosure period).

4.5. Discussion and Conclusion

The TRI release provided shareholders with new information about individual firms' pollution emissions. Shareholders took note and, with their heterogeneous beliefs about the relationship between pollution emissions and financial performance, accordingly changed their assessments of individual firms' financial prospects. Our empirical analyses show that the TRI pollution disclosure leads to an increase in the variance of the CAR among industries with stronger collective reputations for pollution. For industries with a weaker or no collective reputation (e.g., Electrical Equipment), the TRI disclosure did not result in a change in CAR variance. The study provides insights into how external factors, such as information disclosure, can influence stakeholders' reliance on collective reputations when evaluating firms.

It is important to interpret these findings with the study's limitations in mind. First, our measure of collective reputations may not correspond to stakeholders' perceptions. Stakeholders' actual designation of firms into group may differ from what SIC codes indicate and newspaper stories may not measure their stereotypes. Likewise, our empirical test focuses on just one type of stakeholder groups—shareholders. Other stakeholders may have different views about the importance of firms' pollution emissions. Future research may consider more diverse stakeholder groups in their study—for instance, NGOs or government regulators—and devise appropriate measures to test for those groups' differing evaluations.

This paper offers contributions for scholars and business managers. Management research has studied a broad range of circumstances where stakeholders perceive a group of firms through their perceived commonalities, such as cultural, social, geographical, or industry traits (Groves, Vance, and Choi, 2011; Kim *et al.*, 2021; Naumovska, Wernicke, and

Zajac, 2020). Important research in these areas uses different terms for similar theoretical constructs, such as a country of origin effects (Chao, 1998; Maheswaran, 1994), industry reputations (King and Lenox, 2000; Winn *et al.*, 2008), and “strategic group identity” (Cattani *et al.*, 2017; Ferguson *et al.*, 2000; Peteraf and Shanley, 1997). Collective reputation offers an overarching theoretical framework for settings where stakeholders perceive firms to be part of groups and hold stereotypical beliefs about the group’s common observable and difficult-to-observe traits. The theory is particularly useful, given our research results, in contexts where stakeholders lack information but desire to assess unobservable qualities of a firm belonging to a particular group.

Our study also contributes to research information disclosure. A significant body of research examines how stakeholders react to information disclosure, including in areas such as environmental violations, political involvement, or insider stock trading (Flammer, 2013; Flammer *et al.*, 2021; He and Rui, 2016; Werner, 2017). Such research requires scholars to measure stakeholder preferences and make assumptions about how they will react to different types of information in different circumstances, which can be difficult in some circumstances. We show that conditional heteroskedasticity can allow scholars to evaluate stakeholder reactions when such measures and assumptions are practical (via estimates of the mean) and when they are not (via estimates of the variance). Conditional heteroskedasticity models have been used in other settings to model uncertainty. For example, they have been used to model how uncertainty in economic conditions induces stock market volatility. Likewise, when a government agency is granted more policy discretion, its decisions may be based more on the technical expertise of its staff, resulting in more heterogeneous policy

implementation than what would occur if it followed the directives of its political overseers (Anderson and Potoski, 2016).

Our findings have important implications for business practitioners. Being part of a collective reputation influences a firm's strategic environment; for better or worse, the firm becomes "tarred by the same brush" of the group's stereotype. Better performing firms may be harmed by a collective reputation, as the stereotype leads stakeholders to underestimate their true performance. Managers should track the two components of a collective reputation—group membership ("who their group peers are") and stereotype ("how stakeholders perceive the group members' shared attributes")—along with their own firm's performance relative to the stereotype.

Our study further suggests how business managers can evaluate opportunities for lobbying and other efforts to create information disclosure programs. Incentives for such efforts vary across group members; some firms might want to reveal their competitors' poor individual performances, while others might want to show their superiority relative to group peers (Mellahi *et al.*, 2016). One possible tactic would be lobbying. In the TRI case, too, some big chemical firms, such as Du Pont, lobbied for the passage of TRI's legislation.⁶ Political activities, however, should be approached with caution. As noted above, stakeholders' beliefs about the causes of firm performance can be heterogeneous, and thus

⁶ For these lobbying records, we analyzed the US Congress hearings data on Emergency Planning and Community Right-to-Know (EPCRA) throughout 1984 and 1985. As an example, in the congressional hearing for "Release of Poison Gases and Other Hazardous Air Pollutants from Chemical Plants," held on March 26, 1985, the three major chemical firms, Du Pont, Union Carbide, and American Cyanamid, publicly endorsed the TRI's public disclosure requirements, writing "We believe and the types of programs [listed in the EPCRA] are an important element of our safety, health and environmental effort." Also, these companies even signaled their willingness to go further than the Congressman's request, choosing to publicly disclose emissions for additional chemicals with a "combination of acute toxicity and physical properties that could pose a particular hazard if released in large volume."

the consequence of an information disclosure may be difficult to predict. Therefore, business managers should carefully calculate how their own stakeholders would respond to information disclosure.

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Chapter 5

Conclusion

This dissertation presents an overarching theoretical framework of collective reputation, providing significant benefits to scholars and practitioners. For scholars, by incorporating three crucial elements—group membership, stereotypes, and salience—into the framework, it provides a more analytical approach to understanding how individuals or organizations are evaluated within the broader context of their group.

In particular, this theoretical framework serves as a universal tool for management scholars studying research contexts where stakeholders perceive firms as part of groups and hold stereotypical beliefs about the group’s difficult-to-observe traits. Previous management research has examined similar situations but utilized different theoretical terms (e.g., country of origin or strategic group identity), resulting in academic confusion. By presenting a coherent theoretical framework, this dissertation contributes to clarifying terminology and concepts, thereby facilitating future management scholars in developing the theory based on this unified mechanism.

In addition to the theoretical contributions, this dissertation also presents practical strategies for business practitioners and policymakers to effectively manage collective reputation to achieve business sustainability. When discussing “business sustainability,” I not only emphasize firms’ contributions to public goods, but also emphasize the importance of the market’s fair assessment of these efforts, which motivates firms to further engage in social and environmental management practices.

In Chapter 2 on “group membership,” I emphasize the significance of firms employing appropriate signaling strategies to portray their ESG performance as socially responsible. I argue that through this approach, firms can enhance the financial evaluations of their social and environmental initiatives. The specific argument in this chapter is that firms

should highlight and signal organizational features that counteract any negative associations stemming from their membership in a group with an ethically compromised collective reputation, such as South Korea's *Chaebol*.

Chapter 3 focuses on “group stereotypes” and emphasizes the pressing need for public policies that eliminate deeply ingrained negative stereotypes against underrepresented entrepreneurs. The findings presented in this chapter reveal that these negative stereotypes worsen the social status of underrepresented entrepreneurs, particularly when combined with their peers' business failures. Recognizing the pivotal role of diversity and inclusiveness in fostering innovation and driving sustainable outcomes, the chapter recommends reassessing and effectively addressing the negative stereotypes surrounding underrepresented entrepreneurs to successfully attain these objectives.

Lastly, in Chapter 4, which focuses on “salience,” I demonstrate the necessity of stronger regulations that require firms to disclose their individual ESG performance to the public. Throughout the chapter, I highlight the risks associated with the pre-ESG information disclosure period, as it can lead stakeholders to make biased assessments of individual firms' ESG performances due to the strong influence of collective reputation. By mandating firms to disclose their individual ESG information, we can encourage stakeholders to apply their own beliefs regarding how a firm's ESG performance benefits both themselves and society.

Throughout the dissertation, I examined how each feature of collective reputation influences firms' financial performance and demonstrated how scholars and practitioners can utilize my research findings to promote business sustainability. In conclusion, this dissertation represents a significant advancement in our understanding of collective reputation. I hope that my theoretical framework will inspire future research to delve deeper

into the nature of collective reputation and explore its broader applications in organizational and business contexts.

Appendix

Appendix for Chapter 3

Appendix 1. the vignette and questions used for Study 1 (e.g., experiment 3 for gender & race; failure-Black female)

Below is the statistics showing demographic characteristics of business managers who led an IT venture and succeeded in raising venture capital investment in 2020. Percentage (%) in the table indicates how much money (out of \$150 billion of venture capital investment flowed in the US in total in 2020) was given to a provided group. After reading the table, continue to the next page of the survey to read an article on one IT start-up.

Please read the table carefully, as you will be asked questions about these statistics.

IT ventures' and/or their CEOs' characteristics who achieved venture capital investment in 2020					
CEO's education	Bachelor's degree or more 78%				
CEO's average age	31.7				
CEO's gender	Female 11%		Male 89%		
CEO's race	White 52%	Asian 29%	Hispanic 17%	Black 1%	
CEO's average years of prior experience in the IT industry	5 years				
Venture's operating location	California 39%	New York 33%	Washington 14%	Texas 9%	Others 6%

*This table is reorganized based on the data of Crunchbase, the largest tech venture-data platform, and academic literature and/or news media.

Below is a news article on a venture start-up, ScrewTurbo, and its CEO, Shanice Robinson, cited from an IT venture magazine, “IT weekly” (8/21/2021). Please read the article carefully, as you will be asked questions about details in the article.

“ScrewTurbo, a San Jose-based company, eventually filed bankruptcy on June 13th, 2021. ScrewTurbo embarked on the journey to make Data Science Pioneers a reality after seeing many misunderstandings that often exist between data scientists and executives or other parts of the business with a vision for what data science (and ultimately AI) should be and should look like. ScrewTurbo’s goal was to provide artificial intelligence (AI) platform for data analysts or tech-savvy developers to develop their own AI solutions and applications that uniquely suit their business. ...Before its failure, ScrewTurbo’s revenue had steadily gone down since 2019, and its enterprise clients, like General Electric or Unilever, ceased their transactions with ScrewTurbo in January 2020. Those clients pointed out ScrewTurbo’s degraded service quality—compared to its competitors, like CloudMachine or Highly-data.com—as their reason for ceasing transactions. After declining profits and financial difficulties, ScrewTurbo ceased its service on May 20th, 2021, and officially reported bankruptcy on June 13th, 2021.



...The CEO and the founder of ScrewTurbo, Shanice Robinson, 34, said in lament during the interview that her business went in a totally “unexpected” direction than her thoughts...She said the outside environment and technologies changed too quickly for her to catch up. She also added that the firm’s failure was due to a lack of resources—mostly the financial investment—to support the company’s research & development (R&D) abilities.

...ScrewTurbo’s failure might also be subject to Shanice Robinson herself, who failed to put the company’s financial difficulties back in place. One of her employees said to us in an anonymously conducted interview, “Shanice seemed to not know what the firm’s “real” problem was, and not seriously care about affairs inside the company. What we felt she really cares about was an “image” of how she and ScrewTurbo would be viewed by people outside the company... Even when the company reached insolvency and was even unable to pay the employees’ salaries,

she went to a media interview, laughing and chatting with SNS influencers, saying the company is perfectly fine...Looking back on the days I worked at [ScrewTurbo], I can confidently say that she was a woman who had absolutely no ability to run a tech company...”

	<p>Shanice Robinson CEO and the founder of ScrewTurbo. A graduate of Stanford University and a former data scientist/research associate at “Think- Universe,” an IT company located in San Francisco, CA.</p>
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The following questions aim to understand how people think an entrepreneur’s individual characteristics (or a firm’s characteristics) would affect the entrepreneur’s managerial competence and the firm’s success in the IT (or tech-based) industry. When answering questions, please assume that you are an investor of an IT start-up.

- Question

1.1. Please indicate below which would be the most appropriate education level for an entrepreneur to run a high-growth IT start-up competently.

	Less than high school diploma	High school degree or equivalent	Bachelor's degree	Master's degree	Doctorate degree or more
education/competence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. How much do you think an entrepreneur’s age would affect the entrepreneur’s competence (or capability or skillfulness) in managing a high-growth IT start-up?

	Very little (1)	2	3	Neither (4)	5	6	Very much (7)
age/competence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2.1. In what age range do you think an entrepreneur could be most competent (or capable or skillful) in managing a high-growth IT start-up?

	Less than 20	20-30	30-40	40-50	50 or more
age/competence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. How much do you think Black female entrepreneurs are competent (or capable or skillful) in managing a high-growth IT start-up?

	Very little (1)	2	3	Neither (4)	5	6	Very much (7)
Black female/competence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. How much do you think an entrepreneur's prior experience in the IT industry would affect the entrepreneur's competence (or capability or skillfulness) in managing a high-growth IT start-up?

	Very little (1)	2	3	Neither (4)	5	6	Very much (7)
experience/competence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4.1 Please indicate below what year range of prior experience would be most appropriate for an entrepreneur to run a new IT start-up competently.

	Less than 1 year	1-5 years	5-10 years	10-15 years	15 years or more
experience/competence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Where is the company, ScrewTurbo located?

Austin, Texas	Brooklyn, New York	San Jose, California	Seattle, Washington
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. How much do you think a company's operating location would affect the entrepreneur's competence (or capability or skillfulness) in managing a high-growth IT start-up?

	Very little (1)	2	3	Neither (4)	5	6	Very much (7)
location/competence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6.1. Which of the following you think a company’s operating location would most positively influence the start-ups’ growth/success?

	California	New York	Washington	Texas	Other
location/competence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6.2 If your answer was “others,” please indicate where it is.

“Competence” might be too broad to evaluate an entrepreneur’s quality. We want to know more about what you think “competence” is, and how it is related to an entrepreneur’s individual characteristics. The questions below aim to know about such specific ideas.

7. Please rank among the attributes below in an order that you think are most relevant to an entrepreneur’s competence (1: most relevant 5: least relevant).

Leadership (ability of an individual to influence and guide other members of an organization)	1
Risk management (ability of an individual to find, assess, and control threats to a firm's financial security)	2
Philanthropism (affection for mankind, manifested in the devotion of work or wealth to persons or socially useful purposes)	3
Adaptability (ability of adjusting his/her approach or actions in response to changes in an external environment)	4
R&D knowledge (knowledge about how a firm works to obtain new knowledge that it might use to create new technology, products, services, or systems)	5

8. For your first three top choices for Q7, how much do you think entrepreneurs’ education is associated with the given attributes.

(Leadership / Risk management / Philanthropism / Adaptability / R&D knowledge)

	Very little (1)	2	3	Neither (4)	5	6	Very much (7)
education/ top 3 attributes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. For your first three top choices for Q7, how much do you think entrepreneurs' age is associated with the given attributes?

(Leadership / Risk management / Philanthropism / Adaptability / R&D knowledge)

	Very little (1)	2	3	Neither (4)	5	6	Very much (7)
age/ top 3 attributes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. For your first three top choices for Q7, how much do you think Black female entrepreneurs do well in terms of the given attributes?

(Leadership / Risk management / Philanthropism / Adaptability / R&D knowledge)

	Very little (1)	2	3	Neither (4)	5	6	Very much (7)
Black female/ top 3 attributes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. For your first three top choices for Q7, how much do you think entrepreneurs' prior experience in the IT industry is associated with the given attributes?

(Leadership / Risk management / Philanthropism / Adaptability / R&D knowledge)

	Very little (1)	2	3	Neither (4)	5	6	Very much (7)
experience/ top 3 attributes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The final question below aims to assess your financial interest in an IT start-up.

12. Assume that you've assigned \$10,000 of your pension fund to invest in an IT start up, "X," attracted by the company's business plan (e.g., beautiful Artificial Intelligence (AI) technology) WITHOUT knowing anything yet about the CEO's profiles.

Based on your prior answers on expected competence, please indicate in each blank how much you are willing to add (in addition to \$10,000) or subtract (out of

\$10,000) when you learn that the start-up X's CEO has each of the following demographics. Please be frank in indicating the numbers (please indicate \$ amount in each blank with + or - sign; if no change would be made, you can input 0).

	The amount (\$) you want to add (+) or subtract (-) to/from \$10,000 (e.g., -525 or +1294 without comma)
CEO's highest education degree: Bachelor's degree	<input type="text"/>
CEO's age: 33	<input type="text"/>
CEO's race/gender: Black/female	<input type="text"/>
CEO's prior experience in the IT industry: 5 years	<input type="text"/>
CEO's location: San Jose, CA	<input type="text"/>

Please answer the below post-survey questions

13. In the text box below, please briefly state what you think this study is about.

14. What is the race of the ScrewTurbo's CEO?

- Black
- white
- Hard to specify

15. What is the gender of the ScrewTurbo's CEO?

- Female
- Male
- Hard to specify

16. How competent do you think the ScrewTurbo's CEO is in managing his/her business?

	Very incompetent (1)	2	3	Neither (4)	5	6	Very competent (7)
ScrewTurbo CEO's competence	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. Did the table on the first page (table for CEOs' demographic features who achieved venture capital investment in 2020) CHANGE what you had previously perceived about the prototypical successful IT entrepreneur (e.g., 30s/white/male/Silicon Valley-located dominant structure)?

- Yes (changed significantly)
- No (not significantly changed)

18. When you were answering questions on race/gender, how frank and candid do you think you were?

	Very much not candid (1)	2	3	Neither (4)	5	6	Very much candid (7)
frank/candid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. Any suggestions for us on improving the design of this survey?

Appendix 2. Survey description and questions used for the pre- and post-survey in Study 2

[pre-survey] we've been running a venture competition for 15 Information Technology (IT) start-ups since May 2019 in support of the US Small Business Administration. The 15 start-ups are in the seed-funding stage (very early stage; pre-series A financing), and striving to raise funds from private investors including venture capitalists as well as angel investors. This year's startups are all in the space of Artificial Intelligence (AI) with telecommunication services and cloud computing. To

maintain confidentiality and fairness of the competition, we do not provide additional information about the firms.

At the end of the competition, we will choose only one winner based on the entrepreneur's expected "competence" to lead his/her firm to grow 10x within the next 5 years. The winner will be announced early September 2022. For the reward, the winner will receive \$50,000 in cash and be given a chance to meet with influential venture capital investors one-on-one at one of the most prominent venture capital conferences, SuperTechnology North America 2023.

In parallel with the competition, we are holding an event that asks for the general public's forecast about the final winner of the competition. At the award ceremony, we will show the participating audience and all 15 IT start-ups on the screen which entrepreneur the general public forecasted to win the competition. The current survey—in which you are now participating—is for that event. The rule of this survey is very simple: just choose an answer for each question that you think is a characteristic that the final winner of the competition would have.

So, for example, for question 1, which asks you to forecast the competition winner's education-level, (Choice A. below undergraduate b. undergraduate degree c. master degree d. phd degree), if you think the winner would hold an undergraduate degree, you choose "b". Or, if you think s/he would have no undergraduate degree, choose "a," or you think s/he would have a phd degree, select "d" for your answer. Likewise, you will continue answering questions on your forecast about the winner. We do NOT give any demographic information at this moment about the competing entrepreneurs.

Think carefully about who you expect to win! We will award you bonus cash if you correctly identify ALL the actual winner's profiles once the winner is announced in early September.

- Question

Q. which of the following characteristics (Education-level) do you think the final winner of the competition will have?

Education-level	Below undergraduate	Undergraduate degree	Master degree	PhD degree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q. which of the following characteristics (Major) do you think the final winner of the competition will have?

Major	Business/economics	Computer science	Biology/ecology	Humanities (e.g., language, literature, history)	Chemical	Social science (e.g., sociology, anthropology, communications)	No academic degree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q. which of the following characteristics (Gender) do you think the final winner of the competition will have?

Gender	Male	Female
	<input type="radio"/>	<input type="radio"/>

Q. This is an attention-check question. Do not answer any and leave the following text box empty.

Q. which of the following characteristics (Prior experience) do you think the final winner of the competition will have?

Prior experience	No start-up experience	Experience with founding a start-up before
	<input type="radio"/>	<input type="radio"/>

Q. which of the following characteristics (Race) do you think the final winner of the competition will have?

Race	White	Black	Latino	Asian	Others
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q. which of the following characteristics (Age) do you think the final winner of the competition will have?

Age	18-24	25-34	35-44	45-54	55+
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q. How many candidates are participating in our venture competition?

5	10	15	20	25
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[post-survey (no failure case)]

To remind you, we are running a venture competition for 15 Information Technology (IT) start-ups in support of the US Small Business Administration. We would like to know how the general public forecast the winner's demographic characteristics.

The rule of this follow-up survey is the same as the previous survey: Just choose/finalize your answer for each question that you think is a characteristic that the final winner of the competition would have.

- Question

Q. which of the following characteristics (Education-level) do you think the final winner of the competition will have?

Education-level	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Below undergraduate	Undergraduate degree	Master degree	PhD degree

Q. which of the following characteristics (Major) do you think the final winner of the competition will have?

Major	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Business/economics	Computer science	Biology/ecology	Humanities (e.g., language, literature, history)	Chemical	Social science (e.g., sociology, anthropology, communications)	No academic degree

Q. which of the following characteristics (Gender) do you think the final winner of the competition will have?

Gender	<input type="radio"/>	<input type="radio"/>
	Male	Female

Q. This is an attention-check question. Do not answer any and leave the following text box empty.

Q. which of the following characteristics (Prior experience) do you think the final winner of the competition will have?

Prior experience	<input type="radio"/>	<input type="radio"/>
	No start-up experience	Experience with founding a start-up before

Q.

which of the following characteristics (Race) do you think the final winner of the competition will have?

Race	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	White	Black	Latino	Asian	Others

Q.

which of the following characteristics (Age) do you think the final winner of the competition will have?


Age	18-24	25-34	35-44	45-54	55+
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q. How many candidates are participating in our venture competition?

5	10	15	20	25
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[Post-survey (failure case; e.g., male entrepreneur’s failure)] Our sincerest apologies, but the following team has dropped out of the competition after our judges’ screening on all 15 candidates’ basic competencies. This screening process has included various factors—e.g., the companies’ financial solvency, business model and team/internal problems. The founder wished to share this statement with our judges and each one of you, the survey participant:

“I deeply regret that we are unable to complete the competition at this time. We hope to participate in the future.”

Sincerely,

 Daniel Scott

Due to this unexpected event, we decided to ask you once again about your expectation of the final winner of the competition among 14 candidates. Please complete the following question.

- Question

Q. which of the following characteristics (Education-level) do you think the final winner of the competition will have?

Education-level	Below undergraduate	Undergraduate degree	Master degree	PhD degree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q. which of the following characteristics (Major) do you think the final winner of the competition will have?

Major	Business/economics	Computer science	Biology/ecology	Humanities (e.g., language, literature, history)	Chemical	Social science (e.g., sociology, anthropology, communications)	No academic degree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q. which of the following characteristics (Gender) do you think the final winner of the competition will have?

Gender	Male	Female
	<input type="radio"/>	<input type="radio"/>

Q. which of the following characteristics (Prior experience) do you think the final winner of the competition will have?

Prior experience	No start-up experience	Experience with founding a start-up before
	<input type="radio"/>	<input type="radio"/>

Q. which of the following characteristics (Race) do you think the final winner of the competition will have?

Race	White	Black	Latino	Asian	Others
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q. which of the following characteristics (Age) do you think the final winner of the competition will have?

Age	18-24	25-34	35-44	45-54	55+
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please answer the below post-survey questions

Which of the following attributes did the entrepreneur *who quit the competition* have? (education-level)

Education-level	Below undergraduate	Undergraduate degree	Master degree	PhD degree	Don't know (or not applicable)
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Which of the following attributes did the entrepreneur *who quit the competition* have? (gender)

	Male	Female	Don't know (or not applicable)
Gender	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Which of the following attributes did the entrepreneur *who quit the competition* have? (age)

	18-24	25-34	35-44	45-54	55+	Don't know (or not applicable)
Age	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Which of the following attributes did the entrepreneur *who quit the competition* have? (race)

	White	Black	Latino	Asian	Others	Don't know (or not applicable)
Race	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>