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Long-Term Organizational Growth Following Disasters: The Role of Collective Empathy

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This study examines how organizations exposed to disasters transform collective adversity into sustained growth. Drawing on organizational learning and collective emotion theories, we argue that disasters, while often disruptive in the short term, can also foster the emergence of collective empathy—an organizational-level sensitivity to others' needs that motivates coordinated actions to support societal well-being—which, as organizations recover, contributes to long-term growth. Using difference-in-differences analyses on an 11-year panel of 575 Japanese companies affected by the 2011 Great East Japan Earthquake, combined with unique survey data, we find that organizations with moderate disaster exposure achieved, on average, higher long-term growth than those with low or high exposure. Further analyses suggest that this pattern is mediated by heightened collective empathy. The study identifies collective empathy as a key pathway to post-disaster organizational learning, underscoring the critical yet underexplored role of collective emotions in shaping organizational growth trajectories after disasters.

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Supplemental material for this article is available with the manuscript on the JOM *website.*

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On March 11, 2011, a magnitude 9.0 earthquake struck off Japan's northeastern coast, followed by hundreds of aftershocks and a tsunami that devastated more than 500 kilometers of shoreline (Adler, 2021). In the immediate aftermath, *Hanamaki Onsen*—a hotel and spa in Iwate Prefecture—faced severe damage, frightened guests and employees, and disrupted communications. Yet its management and staff quickly mobilized to keep guests safe, host evacuees, provide food and shelter, and coordinate relief efforts for surrounding communities. As Executive Director Yutaka Sasaki recalled: "I started to cry. But that was not the end of the matter. . . With the single-minded determination to help the victims no matter what, the company accepted as many aid workers as possible, disregarding profitability." In the years that followed, *Hanamaki Onsen* leveraged its role in community recovery to develop tourism programs centered on learning and disaster prevention that generated sustainable revenue.

Disasters—such as earthquakes, terrorist attacks, or pandemics—are sudden events that severely disrupt the functioning of communities and societies, causing widespread psychological, relational, material, economic, and environmental losses that exceed local coping capacities (World Health Organization [WHO], 2019). These events are intensifying globally, making it increasingly urgent to understand how disaster-exposed organizations respond and how those responses shape organizational outcomes (Gregg, Restubog, Dasborough, Xu, Deen, & He, 2022). In the short term, disasters disrupt operations, deplete resources, and hinder organizational growth (Zhou & Botzen, 2021). Yet, as the case of *Hanamaki Onsen* illustrates, such disruption can also catalyze organizational learning: By breaking established routines, exposing hidden vulnerabilities, and forcing reflection, disasters may spur the development of new routines and capabilities that, once recovery is complete, enhance long-term growth (Rerup, 2009; Weick, 1995). Yet, such learning is far from automatic. Multiple factors shape organizations' capacity to transform disruption into growth, including cognitive, strategic, and emotional dimensions (Smith & Elliott, 2007). Prior research, however, has predominantly emphasized the cognitive and strategic aspects affecting learning, giving limited attention to emotions (Maitlis & Sonenshein, 2010). When emotions are considered, the focus has largely been on organizational members' negative emotions—such as fear and anxiety—that often arise after disasters and constrain learning (Cornelissen, Mantere, & Vaara, 2014; Liu & Maitlis, 2014).

The focus on individual-level negative emotions overlooks two critical aspects. First, disasters can trigger not only negative but also positive emotional responses, particularly empathy. By making others' suffering highly visible, they can heighten organizational members' sensitivity to others' needs (Madden, Duchon, Madden, & Plowman, 2012; Simpson, Cunha, & Clegg, 2015). Second, disasters are shared experiences that affect entire organizations and communities, giving rise not only to individual feelings but also to collective emotions—macro-level phenomena that emerge from the emotional dynamics among individuals

responding to the same situation (Barsade & Gibson, 2012). Through interaction, individual empathic responses can spread within organizations and coalesce into a collective emotional state that shapes collective actions (Farny, Kibler, & Down, 2019). Collective empathy is *an organizational-level emotional response characterized by a shared sensitivity to others' needs and a collective motivation to address them through coordinated organizational actions that support societal well-being* (Muller, Pfarrer, & Little, 2014). As seen at *Hanamaki Onsen*, despite sustaining damages, disaster-exposed organizations often redirect scarce resources to support affected stakeholders, prioritizing collective welfare over immediate organizational gains (Gregg et al., 2022; Simpson et al., 2015).

However, despite its potential emergence in post-disaster contexts, we still know little about how collective empathy influences organizational growth after disasters. On the one hand, given the resource constraints organizations typically face after disasters, trade-offs may arise between prioritizing organizational survival and supporting affected communities (McKnight & Linnenluecke, 2016). Collective empathy may redirect attention and resources away from operational recovery, potentially constraining learning and future growth. On the other hand, research suggests that collective emotions can align members' attention and motivate coordinated organizational responses (Barsade & Gibson, 2012; Goldenberg, Garcia, Halperin, & Gross, 2020), which may enable post-disaster learning. This pattern is evident at *Hanamaki Onsen*, which prioritized helping disaster victims even at the expense of short-term profitability, yet ultimately achieved higher growth than its pre-disaster level—reflecting the organizational capacity to learn after the event. Yet existing research on collective empathy has focused primarily on its benefits for recipients—such as affected communities and stakeholders (Lilius, Worline, Maitlis, Kanov, Dutton, & Frost, 2008)—while overlooking its potential implications for the organizations that experience it. Considering the growing need to understand how organizations achieve positive outcomes after disasters, we ask: *What role does collective empathy play in the long-term growth of disaster-exposed organizations?*

To answer this question, we examine Japanese companies' responses to the Great East Japan Earthquake (GEJE or 東日本大震災), which struck the Tōhoku region in 2011. Our analysis combines panel data from 2009 to 2019 with unique survey data collected in 2012 from a representative quota sample of 575 Japanese organizations and uses *difference-in-differences* (DiD) and mediation models. Consistent with our argument that learning is most likely to occur following moderate disruptions—large enough to trigger collective reflection but not so overwhelming as to paralyze change—we find that organizations with moderate disaster exposure experienced higher average long-term revenue growth than those with low or high exposure, relative to their pre-disaster trajectory. We also find that such organizations were more likely to develop higher levels of collective empathy after the disaster, which in turn was linked to higher long-term revenue growth. When accounting for the indirect effects of collective empathy, the direct relationship between moderate disaster exposure and revenue growth was no longer significant. This highlights the critical mediating role of collective empathy in fostering long-term growth following disasters for organizations moderately exposed to their consequences. We argue that collective empathy mitigates negative emotions, strengthens internal cohesion, and motivates members to embrace routine change, thereby enabling the learning process leading to long-term organizational growth. To illustrate these dynamics, we draw on archival evidence from a

company in our sample—*Hanamaki Onsen*—showing how collective empathy shaped its ability to learn and seize post-disaster growth opportunities.

Our study brings together the literature on organizational learning and collective emotions to offer theoretical and empirical insights into long-term organizational growth after disasters. First, we advance organizational learning theory by introducing collective empathy as a key pathway to post-disaster learning. In doing so, we challenge the view that emotional responses in these contexts are primarily detrimental (Cornelissen et al., 2014; Maitlis & Sonenshein, 2010) and show that learning can arise unintentionally when organizations act beyond self-interest, rather than solely through strategic or survival-oriented reflection (Rerup, 2009). Second, we shift attention from the recipients to the providers of collective empathy, demonstrating its enduring impact on organizational performance (Dutton, Worline, Frost, & Lilius, 2006). Finally, our analysis reveals "silver linings" that emerge only after recovery, addressing calls for quantitative longitudinal research on how disasters shape organizations (Bundy, Pfarrer, Short, & Coombs, 2017; Gregg et al., 2022; Iqbal, Bundy, & Pfarrer, 2021) and highlighting the importance of tracing their effects over time.

Theoretical Background

Long-Term Organizational Growth After Disasters

Natural disasters impose severe and multifaceted effects on affected regions and organizations (Chakrabarti, 2015; Zhou & Botzen, 2021). Following Gregg et al. (2022), we define disaster exposure as the extent to which an organization's key assets—such as headquarters, production facilities, or procurement activities—are located in disaster-affected areas, or a substantial share of its revenues and profits depends on those areas. Disaster-exposed organizations, even when not directly damaged, face significant operational and financial disruptions in the immediate aftermath of disasters (Dahlhamer & Tierney, 1998). Supply-chain breakdowns, capital shortages, damage to neighboring businesses, and broader economic decline often limit growth and increase the risk of failure (Altay & Ramirez, 2010). Although the duration and trajectory of recovery vary across contexts and organizations, recovery typically unfolds over several years as local companies and communities work to replenish depleted resources and rebuild capacity (Farny et al., 2019).

However, over the long term—that is, beyond the recovery phase, once organizations have restored operations, rebuilt resources, and stabilized performance—the outlook tends to improve, and surviving organizations may even achieve higher growth trajectories than before the disaster (Nava, 2022; Shepherd & Williams, 2023). The organizational learning literature identifies disasters as potential triggers for organizational growth (Brockner & James, 2008; Schein, 1970). Learning is the process through which organizations encode insights from past experiences into new routines and capabilities, enhancing their capacity to prepare for future threats and seize emerging opportunities (Levitt & March, 1988). Because disasters disrupt established routines and expose hidden vulnerabilities, they can prompt members to reexamine capabilities and experiment with new practices (Lampel, Shamsie, & Shapira, 2009; Smith & Elliott, 2007). Through this process, organizations surface tacit knowledge, clarify their core competencies, and develop new capabilities that improve preparedness, efficiency, and innovation (Beck & Plowman, 2009; Oetzel & Oh, 2014, 2021). Once recovery is complete, these strengthened capabilities can lead to performance gains,

particularly higher revenues and profitability (Rerup, 2009). For example, after a snowstorm caused the catastrophic collapse of the B&O Railroad Museum's roof—devastating exhibits just before a major fundraising event—the museum reopened with a new identity and strategy. Rather than simply rebuilding, the organization enhanced its fundraising capacity, expanded exhibits, and introduced new offerings to target a broader audience, which led to a surge in visitors and revenues (Christianson, Farkas, Sutcliffe, & Weick, 2009).

Yet, this potential for learning is not automatic. Effective learning begins when organizational members collectively engage in mindful, critical sensemaking to interpret the disaster and question taken-for-granted assumptions about routines and capabilities (Weick, Sutcliffe, & Obstfeld, 2005). Moreover, for learning to occur, organizations must also translate insights into concrete adjustments to routines that strengthen capabilities and enable future growth (Beck & Plowman, 2009; Rerup & Levinthal, 2014). Without this translation from insight to action, learning remains superficial (Smith & Elliott, 2007; Starbuck, 2009). Accordingly, the literature highlights the importance of strategic enablers that facilitate both collective reflection and routine change implementation (Rerup & Levinthal, 2014). For instance, organizations with a strong learning orientation—a strategic commitment to continual improvement and capability development—are better positioned to engage collectively in sensemaking, identify knowledge gaps, and adapt routines that enhance long-term survival and growth (Brockner & James, 2008).

We argue that, when disaster exposure is high, learning becomes less likely. When most organizational assets and resources are concentrated in disaster-affected areas, the resulting material and social damage deprives organizations of the means needed to implement routine changes. Under such conditions, members tend to focus on immediate survival, and their narrow attention limits the capacity for collective reflection, leading surprising events to be assimilated into preexisting frames rather than prompting adaptation (Weick, 1995). At the same time, when disaster exposure is low, learning may also fail to occur, as minor disruptions do not provide a strong enough trigger for reflection or routine change, echoing arguments that more disruptive events are more likely to prompt behavioral and organizational change (Morgeson, Mitchell, & Liu, 2015). Although organizations can learn vicariously from others' experiences (Madsen, 2009), such learning is typically rare and limited (Hora & Klassen, 2013). In most cases, direct exposure is required to trigger the collective reassessment of routines and capabilities that underpins learning (Lampel et al., 2009; Starbuck, 2009).

We propose that moderate disaster exposure—when a substantial share of organizational resources and assets is tied to disaster-affected areas, yet sufficient capacity for adaptation remains in unaffected ones—best supports learning. Such exposure allows organizations to reassess routines, experiment with new practices, and develop new capabilities to strengthen future preparedness and opportunity recognition. Once recovery is complete, these capabilities translate into higher long-term growth—a key observable outcome of organizational learning (Christianson et al., 2009; Rerup, 2009). Accordingly, we expect post-disaster growth to be highest among organizations with moderate disaster exposure and propose the following:

Hypothesis 1: Relative to their pre-disaster levels, organizations with moderate disaster exposure experience, on average, higher long-term organizational growth than organizations with low or high exposure.

Collective Empathy Emergence After a Disaster

Disasters often heighten empathy—i.e., sensitivity to others' needs (Batson, Fultz, & Schoenrade, 1987). As collective shocks, disasters generate a sense of common fate and shared vulnerability among those affected (Frazier, Greer, Gabrielsen, Tennen, Park, & Tomich, 2013), which renders human suffering and others' needs highly salient, increasing empathy and prompting a reorientation of personal and professional priorities toward community, solidarity, and mutual support (Madden et al., 2012; Simpson et al., 2015). For instance, following the GEJE, affected individuals were more likely to pursue altruistic careers such as firefighting and to travel with their family members, reflecting a shift toward relational priorities (Oishi, Yagi, Komiya, Kohlbacher, & Ishii, 2017; Uchida, Takahashi, & Kawahara, 2014).

Within disaster-exposed organizations, empathy can evolve from an individual feeling into a collective emotional state (Barsade & Gibson, 2012; Muller et al., 2014). As collective experiences, disasters evoke strong empathic reactions among organizational members who witness or become aware of others' suffering both inside and outside the organization (Dutton et al., 2006; Madden et al., 2012). When members exchange these reactions—implicitly through nonverbal cues and explicitly through conversation—empathy diffuses across the organization and consolidates into a collective state (Muller et al., 2014). This collective state does not imply uniform agreement but rather reflects a predominant shared sensitivity to others' needs that increases the likelihood the organization will act in ways that promote collective and societal well-being (Dutton et al., 2006). Once collective empathy emerges, it carries an action orientation that influences what organizational members attend to, recall, and prioritize (Muller et al., 2014). As a result, organizations often heighten their concern for the less fortunate, strengthen corporate social responsibility (CSR) and philanthropic initiatives, and deepen their commitment to the well-being of employees and external stakeholders (Arnold & Ross, 2023). Therefore, collective empathy is not merely the sum of individual feelings but a catalyst for organizational change, transforming dispersed emotional responses into coordinated action that reshapes processes and practices (Dutton et al., 2006; Madden et al., 2012). Following the Haiti earthquake, for instance, the collective empathy emerging within local organizations became a major source of motivation for sustaining community recovery efforts (Farny et al., 2019).

We argue that collective empathy is most likely to emerge when organizations are exposed to a disaster and experience its effects firsthand. When a substantial share of an organization's assets and resources is located in disaster-affected areas, key stakeholders—such as employees, suppliers, and local communities—are also directly impacted. These disruptions make the disaster's consequences highly salient within the organization, confronting its members with a shared sense of vulnerability and adversity alongside external stakeholders. This shared experience, in turn, activates collective empathy and motivates coordinated efforts to address the needs of affected internal and external stakeholders (Gregg et al., 2022; Muller et al., 2014). This argument is consistent with psychological research showing that empathic concern is strongest toward those who share a similar experience or are closely connected to oneself (Cialdini, Brown, Lewis, Luce, & Neuberg, 1997). Importantly, we do not imply that organizations without disaster exposure cannot engage in CSR or philanthropy to support disaster victims—as is often the case for large corporations under public

scrutiny—but such actions are more frequently driven by reputational motives rather than collective empathy (Godfrey, 2005; Madsen & Rodgers, 2015; Muller & Kräussl, 2011).

However, when disaster exposure is high and organizational survival is at risk, empathic concern is often overshadowed by self-protective strategies aimed at securing critical resources (McKnight & Linnenluecke, 2016). Even when empathy emerges among organizational members, high levels of disaster exposure deplete available resources, leaving little capacity to collectively act on that empathy and support affected stakeholders. We therefore argue that collective empathy is most likely to emerge among organizations with moderate disaster exposure—levels of impact substantial enough to trigger empathic concern, yet not so overwhelming as to redirect all attention and slack resources toward organizational survival. Based on this argument, we propose the following:

Hypothesis 2: Organizations with moderate disaster exposure exhibit, on average, higher levels of collective empathy after the disaster than organizations with low or high exposure.

Collective Empathy as a Catalyst for Long-Term Organizational Growth

We argue that collective empathy emerging after disasters fosters long-term organizational growth by enabling the collective reflection and routine change required for learning. First, collective empathy can mitigate the intense negative emotions—such as fear, anxiety, and grief—that often arise in the aftermath of disasters and hinder collective reflection (Liu, Morgeson, Zhu, & Fan, 2023; Maitlis & Sonenshein, 2010). These emotions, driven by sudden losses, survival threats, and uncertainty, can narrow attention and constrain sensemaking (Cornelissen et al., 2014). Collective empathy can help counteract these effects by redirecting members' focus from self-concerns toward the needs of others (Batson et al., 1987). This outward orientation channels distress into prosocial, community-oriented action, preventing negative emotions from spiraling into paralysis (Lilius et al., 2008). Research suggests that engaging in actions that support others not only benefits those in need but also fosters a sense of usefulness and positive affect among helpers, strengthening their capacity to cope with distress (Williams & Shepherd, 2016). For instance, a study of post-9/11 diaries showed that negative emotions diminished when individuals adopted a collective orientation (Cohn, Mehl, & Pennebaker, 2004). Therefore, by giving organizational members an other-oriented purpose, collective empathy functions as an emotional regulator that sustains the collective reflection needed for the learning process to occur—fostering long-term growth.

Second, organizational learning requires strong internal cohesion, as collective reflection depends on members' willingness to come together, share experiences, and listen—broadening interpretive frames and preventing premature, superficial explanations (Barton & Kahn, 2019; Gittell, 2008). We argue that collective empathy strengthens internal cohesion in two main ways. First, it fosters the social sharing of emotions: For emotions to become collective, individual feelings must be expressed and acknowledged, and this very act of sharing strengthens interpersonal bonds—as observed among Spanish students following the 2004 terrorist attack in Madrid (Rimé, Páez, Basabe, & Martínez, 2010). Second, when members experience empathy collectively, they unite around a shared moral imperative to help (Dutton et al., 2006). This shared motivation rebuilds trust, bridges hierarchical and departmental divides, and encourages open dialogue and mutual support, as seen after a Midwestern

university campus shooting where collective empathy helped repair and strengthen relational bonds (Powley, 2009). Conversely, neglecting empathy—for example, through layoffs—can erode trust and damage cohesion, as found in several airlines after 9/11 (Gittell, Cameron, Lim, & Rivas, 2006). Thus, by facilitating deeper emotional exchange and creating a shared motivation, collective empathy strengthens internal cohesion, creating the relational foundation necessary for organizational learning.

Third, organizational learning requires implementing routine changes that strengthen preparedness for future threats and enable the pursuit of new opportunities (Christianson et al., 2009; Lampel et al., 2009). Yet decades of research show that resistance to change often undermines this step, as members struggle to agree on a direction or cling to established practices (Starbuck, 2009). Collective empathy can help overcome these barriers by providing a moral vision that legitimizes new directions and mobilizes coordinated action (Farny et al., 2019). When organizational responses are grounded in collective empathy, members perceive organizational change as both morally justified and socially meaningful, which increases their willingness to adopt new routines and contribute to transformation efforts (Dutton & Dukerich, 1991; Plowman, Baker, Beck, Kulkarni, Solansky, & Travis, 2007; Simpson et al., 2015). This dynamic echoes prosocial motivation theories, which suggest that connecting organizational change to broader purposes enhances members' motivation, belonging, and alignment with leadership's vision (Bolino & Grant, 2016), increasing acceptance of new routines (Nguyen Huy, 2005). The experience of Sandler O'Neil—a bank located in the World Trade Center—illustrates this process. After losing a third of its employees and all physical assets on 9/11, the bank adopted an empathy-driven mission to support the families of the deceased. This shared purpose unified members around a clear direction, strengthened employees' commitment, and legitimized the structural and procedural changes that facilitated organizational adaptation. As a result, the bank not only stabilized operations but ultimately secured more contracts than ever before (Freeman, Hirschhorn, & Maltz, 2004). Thus, by aligning members around a common vision, collective empathy reduces change resistance and increases organizational members' willingness to embrace routine adjustments, over time creating fertile ground for long-term growth.

In sum, collective empathy contributes to long-term organizational growth after disasters by mitigating negative emotions, strengthening internal cohesion, and encouraging members to embrace routine change. These processes cultivate the collective reflection and openness to change that underpin learning, enabling organizations, once the recovery phase is complete, to achieve higher long-term growth than before the disaster. However, as discussed in Hypothesis 1, such learning processes tend to occur most readily when organizations face a moderate disaster exposure. Likewise, as proposed in Hypothesis 2, moderate disaster exposure also provides conditions under which collective empathy is most likely to develop. Together, these arguments suggest that, when disaster exposure is moderate, collective empathy is most likely to foster long-term organizational growth. Specifically, we propose the following:

Hypothesis 3: For organizations with moderate disaster exposure, higher levels of collective empathy are, on average, associated with greater long-term organizational growth relative to pre-disaster levels.

Taken together, Hypotheses 2 and 3 suggest that collective empathy acts as a mediator between moderate disaster exposure and long-term organizational growth.

Context and Methods

Sampling and Data Collection

We test our hypotheses in the context of the March 2011 GEJE, which resulted in more than 20,000 fatalities and caused an estimated $235 billion in damages, according to the World Bank, making it one of the most catastrophic disasters in history. We contacted a sample of 3,404 Japanese companies using data from the Teikoku Data Bank (TDB), Japan's largest corporate database, which covers approximately 120,000 companies with over 20 employees across all major industries. Our sample was constructed to be broadly representative of Japanese companies with more than 20 employees.[1]

We contacted each company's CEO or general administrative affairs office to request participation from a senior executive (vice president or managing director level).[2] We also verified each informant's authority and knowledge of the company's internal strategy. Selecting senior managers as key informants aligns with the tradition of relying on their comprehensive awareness of organizational responses to environmental changes (Delmas & Toffel, 2008; Oetzel & Oh, 2021), as they possess a deep understanding of the GEJE's impacts and play a central role in shaping post-disaster responses. Moreover, in our study of Japanese companies—primarily small and medium-sized, reflecting the overall Japanese company population—the few executives generally have a well-rounded knowledge of the company's inner workings and strategic direction (Hemingway & Maclagan, 2004). Senior managers from 575 of these companies responded to the questionnaire in 2012, yielding a 16% response rate.[3] Administering the questionnaire one year after the disaster allowed respondents to reflect on their organizations' immediate recovery processes while minimizing retrospective bias and reverse causality concerns. We also tested the representativeness of our final sample and found no substantial differences in key variables (e.g., industry classification, company size) between respondents and non-respondents. The questionnaire was designed to explore organizational characteristics and changes in the aftermath of the disaster and primarily used multi-item measures drawn from existing literature and validated through various analyses. However, no measure of collective empathy emerging after a disaster was available in the literature. For this construct, we developed a new scale, validated through a separate questionnaire administered in 2013 following the scale validation steps recommended by Hinkin (2009). Moreover, we collected additional archival panel data from the TDB database for each of the 575 companies in our sample, covering fiscal years ending between March 2009 and March 2019, to assess potential differences in growth rates and obtain verifiable control measures.

In our main models, we adopt a panel DiD research design with company fixed effects. This approach compares changes in post-disaster organizational growth rates between companies differentially exposed to the GEJE, controlling for unobserved, time-invariant heterogeneity across companies (Angrist & Pischke, 2008). A DiD approach is particularly well-suited in this context because large-scale natural disasters represent exogenous shocks that are outside the control of individual companies, allowing for a quasi-experimental design.

Measurement and Validation of Constructs

Our *dependent variable* is long-term organizational growth following the GEJE. Consistent with prior research on organizational growth (Boeker, 1997; Weinzimmer, 2000), we operationalized it as log-transformed revenues observed over time in a panel that includes three pre-disaster years (as standard in DiD approaches; cf. Flammer, 2015) and eight post-disaster years. We extended the panel to 2019 for two reasons. First, while most disaster studies observe only two to three post-event years (e.g., Chakrabarti, 2015; Zhou & Botzen, 2021), our theoretical arguments concern long-term dynamics that emerge after the recovery phase. By 2019, all earthquake and tsunami debris had been recycled or incinerated (Reid, 2019), and most companies and communities in the GEJE-affected areas had resumed normal operations, making 2019 an appropriate endpoint for capturing post-recovery outcomes. Second, data beyond 2019 are likely confounded by the COVID-19 pandemic, making them unsuitable for isolating the GEJE effects. For robustness, we also estimated cross-sectional models in which growth is a composite measure averaging revenue, full-time employment, and capital growth. In these models, long-term growth is the log difference between the pre-disaster baseline (fiscal years ending March 2009–2011) and the long-term endpoint (fiscal years ending March 2018–2019).

To measure the *independent variable*—organizational disaster exposure—we asked respondents to report the percentage of their companies' revenues, profits, and production/procurement tied to the GEJE-affected area on a 10-point scale (1 = 0–10%, 10 = 90–100%). As these indicators are exogenous in nature and less complex than most psychological constructs (Hair, Black, Babin, & Anderson, 2010), single-item measures are appropriate (Petrescu, 2013). Since the three items are conceptually aligned and strongly correlated (pairwise $r = .72–.93$), we followed Landis, Beal, and Tesluk (2000) and improved model fit by averaging them into a composite disaster-exposure measure. As a robustness check, we re-estimated models using each item separately. To capture moderate disaster exposure, we transformed this continuous measure into three dummy categories: low (<30%), moderate (30–80%), and high (>80%). We also tested alternative cut-offs (e.g., 40–70%) with consistent results and, in robustness analyses, repeated estimations using the continuous variable.

To measure our *mediator*—organizational-level collective empathy following a disaster—we developed a new scale following the guidelines of Hinkin (2009). Online Appendix A details each development and validation step. The final scale comprises four items measured on a 7-point scale and, consistent with the definition of collective empathy (Muller et al., 2014), captures both heightened sensitivity to others' needs and the action orientation inherent in this construct. Specifically, item CE01 assesses heightened organizational care for the less fortunate; CE02 captures shifts in the importance of CSR after the GEJE; CE03 and CE04 measure, respectively, changes in organizational thinking and action aimed at enhancing others' well-being. Our items are designed to capture the increase in collective empathy after the GEJE rather than its absolute level, as collective empathy is theorized to emerge in response to shared adversity rather than as a stable preexisting cultural trait. Moreover, because disasters represent exogenous shocks, we do not expect pre-disaster levels of collective empathy to vary systematically with disaster exposure. We validated the scale through a separate questionnaire administered in 2013 to the same sample of Japanese companies. We then constructed a single latent factor score representing collective empathy, using structural equation modeling.

In the panel DiD models with company fixed effects, used to test Hypotheses 1 and 3, we used TDB data to *control* for prior-year company size—measured as the log of employees and capital—to account for differences in resources and growth potential. We also included year, industry, and regional fixed effects to absorb common shocks, sectoral dynamics, and geographic variation. For the cross-sectional models used to test Hypothesis 2 and for robustness checks, we included several strategic control variables informed by the resource dependence theory (Pfeffer & Salancik, 2003).[4] We also included potential confounding factors, particularly *organizational learning orientation*, measured using the four-item scale from Sinkula, Baker, and Noordewier (1997). Including this construct allows us to isolate the distinct role of collective empathy relative to learning orientation—a strategic learning antecedent—and helps mitigate social desirability concerns, as learning orientation captures respondents' general tendency toward socially desirable responses (Grimm, 2010). We also controlled for the potential increase in *business opportunities from the disaster*, arising from heightened demand for services and participation in reconstruction efforts.[5] Online Appendix B reports descriptive statistics and pairwise correlations for all cross-sectional variables.[6]

Research Design and Validation

To test our *first hypothesis*, we use the following DiD specification (Equation 1) for each company *i*, in region *r*, industry *k*, and year *t*:

$$Y_{irtk} = \alpha + \beta_1 (Treat_i \times Post_t) + \delta' X_{it} + \mu_i + \lambda_t + \gamma_t + \theta_k + \varepsilon_{irtk} \quad (1)$$

where Y_{irtk} = log yearly revenues from 2009 to 2019; $Post_t$ = dummy equal to 1 after 2011, 0 otherwise;[7] $Treat_i$ = dummy representing the treatment group; depending on the specification, it captures moderate, high, or combined moderate–high exposure to disaster effects relative to low exposure; X_{it} = vector of time-varying controls; μ_i = company fixed effects; λ_t = year fixed effects; γ_r = region fixed effects; θ_k = industry fixed effects; and ε_{irtk} = clustered standard errors at the company level. The coefficient β_1 captures the average differential change in post-disaster revenues between disaster exposure groups over the specified post-recovery window.[8]

A central assumption of the DiD design is that, absent treatment, treated and control groups would have followed parallel trends (Angrist & Pischke, 2008). We first followed Cunningham's (2021) recommendation to visualize the raw data. Figure 1 plots yearly means of log revenues for companies with low versus moderate/high disaster exposure. Pre-disaster trajectories exhibit no significant differences between companies with different levels of disaster exposure. We then ran an event-study specification (Cunningham, 2021), which estimates dynamic treatment effects by interacting disaster exposure status with yearly indicators. As shown in Figure 2, pre-disaster coefficients are near zero, consistent with parallel pre-disaster trends. For both groups, 2018–2019 coefficients are positive and significant, indicating long-run divergence. A joint F-test for 2009–2010 relative to 2011 also found no significant pre-disaster differences. Overall, the analyses support the parallel-trends assumption and show how the revenues of disaster-exposed companies dipped initially—as expected—but then recovered faster and remained more stable in the long term.

Figure 1
Graphical Diagnostic of Parallel Trends

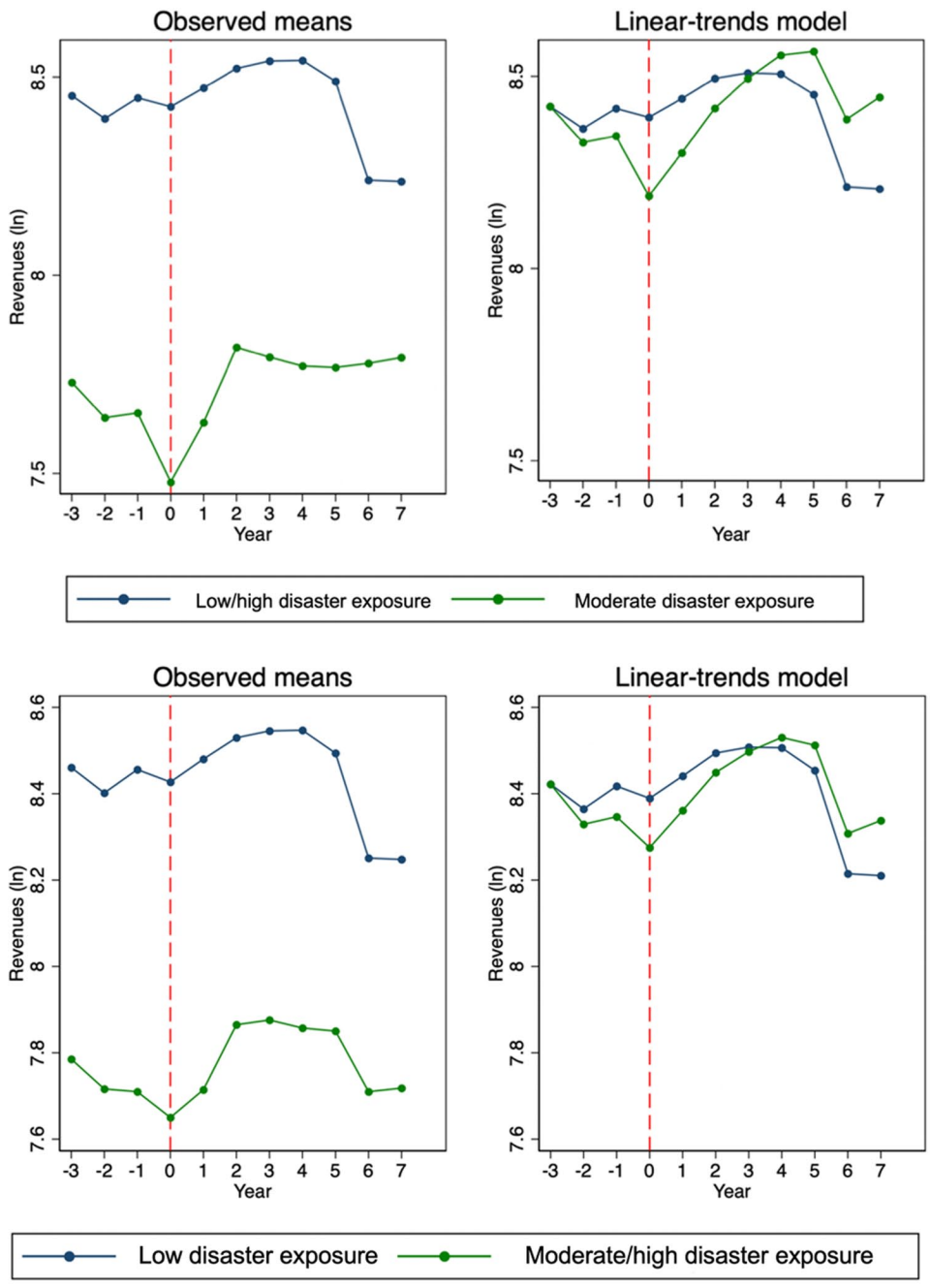
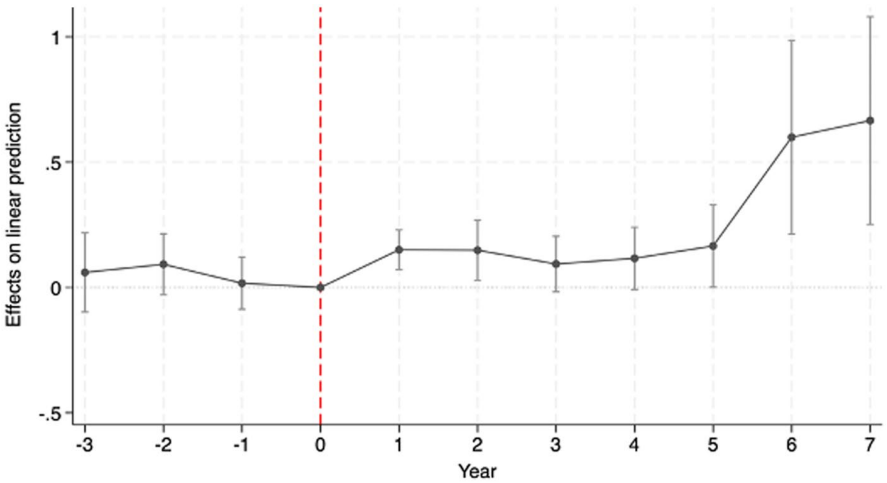
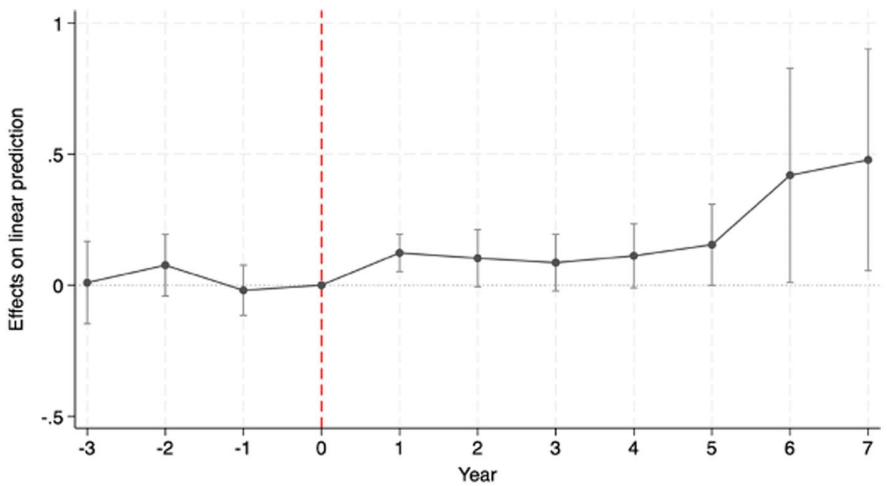


Figure 2
Event Study Estimates of Disaster Effects on Log Revenues Using Leads and Lags (95% confidence intervals [CIs])



Average marginal effects of moderate disaster exposure with 95% CIs.



Average marginal effects of moderate and high disaster exposure with 95% CIs.

Robustness tests. First, we complemented our DiD design with *propensity-score matching* (PSM) to further strengthen comparability between treated and control companies, reducing the risk that results may be driven by systematic differences in observable pre-disaster characteristics (Leuven & Sianesi, 2003).[9] Second, we replicated the analyses using *split samples*, directly comparing moderate vs. low and high vs. low disaster exposure over short-,

medium-, and long-term periods. Third, we re-estimated models with *alternative measures of disaster exposure*, using the percentage of sales, profits, and production/procurement generated from the GEJE-affected area separately instead of the composite measure. Fourth, we ran a *placebo test*, replacing disaster exposure with the percentage of sales, profits, and production/procurement generated from environmentally conscious products and services. Finally, we replicated the analyses with *cross-sectional models*, employing different dependent variables (average long-term growth in revenues, employees, and capital) and alternative disaster exposure specifications (continuous and dummy).

Addressing attrition. As of 2019, 74 companies from our initial sample no longer existed: 22 dissolved or ceased operations, while the rest were acquired or merged. Although our theoretical interest lies in organizational changes among survivors, restricting the sample to these companies may bias results toward more resilient organizations. First, we tested whether exit events were related to disaster exposure status at baseline (2010). Chi-square tests showed no significant differences between companies with different levels of disaster exposure in their likelihood of exiting. Second, we re-estimated the DiD models after excluding failed companies, and the main results remained unchanged. Third, we ran cross-sectional logistic regressions of exit outcomes on disaster exposure and pre-disaster company characteristics, finding that disaster exposure was not a significant predictor of failure. Fourth, we estimated Cox proportional hazard models on the full panel to test whether disaster exposure increased the hazard of bankruptcy or merger/acquisition over time (Lin & Wei, 1989); again, no significant effects emerged. As an additional check, in our cross-sectional robustness models we followed the recommendation of Iqbal et al. (2021) and implemented a Heckman two-step selection model (Heckman, 1979). This test first estimates the probability that the dependent variable is observed and then embeds this into the main model. In the first-stage selection equation, we included the same controls as in the outcome regression along with indicators for merger/acquisition and bankruptcy. In the second-stage outcome equation, we modeled growth as a function of disaster exposure and the full set of controls. The selection term was not significant, suggesting attrition does not bias our main results.

To test our *second hypothesis*, we estimated logit models predicting the likelihood of high empathy (operationalized as a dummy equal to 1 for companies above the mean level of empathy). Specifically, we estimated the following Equation 2 for each company *i*:

$$\Pr(CE_i = 1) = \Lambda(\alpha + \beta_1 Treat_i + \delta' X_i + \gamma_r + \theta_k) \quad (2)$$

where $\Lambda(\cdot)$ is the logistic cumulative distribution function; $CE = 1$ if company *i* exhibits high collective empathy; Treat_i = the disaster exposure indicator (moderate or high based on the model); X_i = vector of company-level controls; γ_r and θ_k = region and industry fixed effects.[10]

Finally, to test our *third hypothesis*, we estimated a mediated DiD model using the approach proposed by Holm and Breen (2023). This method is well suited for mediation analysis in panel data when both the independent variable and the mediator are time-invariant and when the mediator is realized after the treatment, as in our setting. In addition to Equation (2) above, we estimate the following specification (Equation 3) for each company *i* in region *r*, industry *k*, and year *t:*[11]

$$
\begin{aligned}
Y_{irtk} = {} & \alpha + \beta_1 (Treat_i) + \beta_2 (Post_t) + \beta_3 (CE_i) + \\
& \beta_4 (Treat_i \times Post_t) + \beta_5 (Treat_i \times CE_i) + \\
& \beta_6 (Post_t \times CE_i) + \beta_7 (Treat_i \times Post_t \times CE_i) \\
& \delta' X_{it} + \mu_i + \lambda_t + \gamma_r + \theta_k + \varepsilon_{irtk}
\end{aligned}
\tag{3}
$$

where Y_{irtk} = log yearly revenues; $Post_t$ = dummy equal to 1 after 2011 (or in alternative specifications distinguishing short-, medium-, and long-term effects), 0 otherwise; $Treat_i$ = dummy representing moderate disaster exposure; CE_i = collective empathy (dummy or continuous); X_{it} = vector of time-varying controls; μ_i = company fixed effects; λ_t = year fixed effects; γ_r = region fixed effects; θ_k = industry fixed effects; and ε_{irtk} = clustered standard errors at the company level. The triple interaction coefficient β_7 captures whether the average effect of moderate disaster exposure on growth differs depending on the level of collective empathy. If both β_1 in Equation (2) (the effect of moderate disaster exposure on collective empathy) and β_7 in Equation (3) are statistically significant, mediation is supported. Moreover, β_4 captures the DiD effect of moderate disaster exposure for companies with low collective empathy while β_6 captures the effect of collective empathy for low disaster exposure companies.

Robustness tests. First, we re-estimated the models *splitting the sample* for companies with moderate versus low disaster exposure to examine whether the role of collective empathy in revenue growth differed across groups. Second, we repeated the analysis using the *propensity-score matched sample* described above. Third, we conducted a *placebo test*, substituting learning orientation for collective empathy, to confirm that our effects are specific to collective empathy and not driven by strategic learning antecedents. Fourth, to decompose direct and indirect effects, we complemented our analysis with a set of *cross-sectional robustness checks*. We first tested mediation using a *generalized structural equation model (GSEM)*, which is suitable for our setting because it can accommodate both continuous and binary variables in the same model, does not assume normally distributed errors, and allows for variables measured at different levels (Rabe-Hesketh, Skrondal, & Pickles, 2004).[12] Finally, following Zhao, Lynch, and Chen (2010), we conducted a *bootstrap analysis* with 1,000 replications to compute confidence intervals for the product of the coefficients of moderate disaster exposure and collective empathy, as estimated through GSEM.[13]

Illustrative case study. We conducted an archival study of an organization within our sample, *Hanamaki Onsen*. Rather than developing new grounded theory or conducting systematic theory building, we adopted the method of illustrative case studies to deepen our understanding of the lived experiences behind the relationships we have hypothesized and quantitatively tested (Ody-Brasier & Fernandez-Mateo, 2017). Details on the case selection, data collection, analysis, and results are provided in Online Appendix D.

Findings

Evidence of Long-Term Organizational Growth After a Disaster

Table 1 shows the results of the panel DiD models developed to test Hypothesis 1. In Model 1, which estimates the overall post-disaster effect for companies with both moderate

Table 1
Difference-in-Differences Estimates of Disaster Exposure on Revenue Growth

	Unmatched Sample				PS Matched Sample
	(1)	(2)	(3)	(4)	(5)
	Revenues (ln)	Revenues (ln)	Revenues (ln)	Revenues (ln)	Revenues (ln)
Disaster exposure * post disaster	.163*				
	(.077)				
Moderate disaster exposure * post disaster		.187*			
		(.082)			
Disaster exposure * short term			.055		
			(.053)		
Disaster exposure * medium term			.095		
			(.077)		
Disaster exposure * long term			.426*		
			(.207)		
Moderate disaster exposure * short term				.041	−.02
				(.064)	(.058)
High disaster exposure * short term				.071	.029
				(.089)	(.089)
Moderate disaster exposure * medium term				.103	.041
				(.094)	(.083)
High disaster exposure * medium term				.154	.113
				(.105)	(.12)
Moderate disaster exposure * long term				.659**	.667*
				(.219)	(.273)
High disaster exposure * long term				−.151	−.387
				(.506)	(.583)
Ln Capital (t−1)	.035	.037	.036	.037	.039
	(.033)	(.033)	(.033)	(.033)	(.072)
Ln Employee number (t−1)	.488**	.488**	.486**	.487**	.78**
	(.07)	(.07)	(.07)	(.07)	(.153)
Company FE	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES
Region FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Constant	5.617**	5.59**	5.574**	5.6**	3.878**
	(.43)	(.43)	(.431)	(.43)	(1.016)
Observations	5161	5161	5161	5161	687
Within R^2	.285	.285	.285	.291	.473

Note: Clustered standard errors are in parentheses.
**$p < .01$, *$p < .05$.

and high disaster exposure (above 30%), the interaction term is positive and significant ($\beta = .163$, $p = .034$), indicating that companies with moderate and high disaster exposure experienced, on average, 17%[14] higher post-disaster revenues compared to the counterfactual trajectory of low-exposure companies. Model 2 focuses specifically on moderate exposure

(between 30% and 80%), which is positively associated with post-disaster revenues (β = .187, p = .023), indicating that these companies experienced 20% higher average post-disaster revenues compared to what would have been expected without moderate disaster exposure. Model 3 further disaggregates the post-disaster period into short, medium, and long term. The coefficients indicate that moderate and high disaster exposure does not significantly affect revenues in the short (2012–2014) or medium term (2015–2017) but becomes significant in the long term (2018–2019; β = .426, p = .039). This finding is consistent with our theoretical expectation that growth effects emerge only after recovery. Model 4 further separates disaster exposure categories across time periods. The results show that the long-term revenue effect is concentrated among companies with moderate disaster exposure (β = .659, p = .002), while the coefficient for highly exposed companies is not significant. Finally, in Model 5, we repeated this model with the PSM sample. Even in this specification, the long-term effect for moderately exposed companies remains positive and significant (β = .667, p = .015), while coefficients for high disaster exposure, and for short and medium term, are not significant. These results provide consistent support for Hypothesis 1, suggesting an inverted U-shaped relationship between disaster exposure and long-term revenue growth. While companies with moderate disaster exposure experience limited growth shortly after the disaster, possibly due to direct disruptions and recovery efforts, they outperform their peers in the long term.

To further probe the heterogeneity of disaster effects, we re-estimated the DiD models using *split samples*. Online Appendix E shows that the positive post-disaster revenue effect is driven by companies with moderate exposure (30–80%) rather than high exposure (>80%). Among moderately exposed companies, the post-disaster coefficient is positive and significant (β = .19, p = .024), with the effect strongest in the long term (β = .563, p = .005), while coefficients for highly exposed companies are small and insignificant. Online Appendix F reports the split by post-disaster period. Consistent with our expectation, disaster exposure has no significant effect in the short or medium term but becomes positive and significant in the long term (β = .347, p = .005). Again, the long-term effect is concentrated among moderately exposed companies (β = .671, p = .002), while highly exposed companies show no significant revenue gains.

Robustness Tests

We first replicated the DiD models using *alternative measures of disaster exposure*—respectively, the percentage of sales, profits, and production/procurement generated from the GEJE-affected area rather than their average. The results, shown in Online Appendix G, align with our main models: moderately exposed companies show higher long-term revenues, with effect sizes ranging from .454 (p = .060; Model 1, profit) to .479 (p = .044; Model 2, production/procurement) and .65 (p = .008; Model 3, sales), while the coefficients for highly exposed companies and for the short and medium term remain mostly statistically insignificant. We also conducted a *placebo test* by replacing disaster exposure with the average share of revenues, profits, and production/procurement generated from environmentally conscious products and re-estimating the models in Table 1. Across all specifications, coefficients for environmentally conscious products are close to zero and insignificant, providing further confidence that our main results are not artifacts of model specification or scale construction.

We then estimated *cross-sectional models* using a composite measure of long-term organizational growth, averaging logarithmic changes in revenues, employee number, and capital between the pre-disaster years and the long term (2018–2019). The results, reported in Online Appendix H, are consistent with our panel DiD analyses. Disaster exposure is positive and significant when modeled both as a continuous variable ($\beta = .034$, $p = .040$; Model 1) and as a dummy variable capturing moderate disaster exposure ($\beta = .175$, $p = .033$, Model 2; $\beta = .201$, $p = .039$, Model 3). In contrast, high disaster exposure shows no significant effect. To account for companies that exited the sample, we also estimated *Heckman two-step models* (Models 4–6). Even in these models, the effects of (moderate) disaster exposure, both as a continuous and as a dummy variable, are positive and significant.[15]

The Mediating Role of Collective Empathy

Hypothesis 2 posits that moderate disaster exposure is associated with higher levels of collective empathy after the disaster. In line with this expectation, Table 2 shows that companies with moderate disaster exposure (30–80%) were significantly more likely to report high collective empathy compared to companies with low exposure. The estimated logit coefficients are positive and significant across both specifications ($\beta = 1.168$, $p = .03$; $\beta = 1.239$, $p = .04$), corresponding to odds ratios above 3, meaning that companies with moderate disaster exposure had more than three times the odds of displaying high collective empathy relative to low-exposure companies. By contrast, the coefficient for companies with high disaster exposure is not statistically significant. Among controls, stronger learning orientation ($p < .001$), greater R&D intensity ($p = .042$), and higher business opportunities from the disaster ($p = .033$) emerge as significantly and positively associated with high collective empathy.

Hypothesis 3 posits that, for organizations moderately exposed to a disaster, higher collective empathy is associated with higher long-term organizational growth relative to their pre-disaster trajectories. Table 3 presents the DiD models with interaction terms for disaster exposure and collective empathy. In the short- and medium-term specifications (Models 1–4), the triple interaction coefficients are small and not statistically significant. However, in the long-term models (Models 5–8), the effect of collective empathy becomes positive and significant. In the unmatched sample, the triple interaction between moderate disaster exposure, post-disaster period, and collective empathy is positive and significant (continuous: $\beta = .243$, $p = .012$, Model 5; dummy: $\beta = .393$, $p = .034$, Model 6). The matched-sample analysis confirms these results, showing an even larger effect for collective empathy (continuous: $\beta = .701$, $p = .021$, Model 7; dummy: $\beta = 1.189$, $p = .002$, Model 8). Conversely, collective empathy in companies with low disaster exposure is negatively associated with long-term revenues ($\beta = -.163$, $p = .025$ in Model 5; $\beta = -.769$, $p = .024$ in Model 7), suggesting that collective empathy may entail costs for organizations not directly exposed to the disaster. Moreover, the direct effects of moderate disaster exposure on revenue growth for low levels of collective empathy are generally not significant, suggesting that this relationship operates primarily through collective empathy.

We further examined whether the effect of collective empathy on revenue growth differed by level of disaster exposure. The split-sample results, shown in Online Appendix I, reveal that high collective empathy is significantly associated with higher post-disaster revenues only for companies with moderate disaster exposure. For this subgroup, the interaction between high empathy and the post-disaster period is positive and significant ($\beta = .177$, $p = .045$), suggesting

Table 2
Effects of Disaster Exposure on Collective Empathy (Logit Regression Models)

	(1)	(2)
	High collective empathy	High collective empathy
Moderate disaster exposure	1.168*	1.239*
	(.537)	(.603)
High disaster exposure		.132
		(.768)
R&D/sales	.207*	.204*
	(.1)	(.099)
Growth in market share	.194	.196
	(.128)	(.128)
Top managers over 50 (%)	−.033	−.034
	(.039)	(.039)
International revenues (%)	.001	.001
	(.009)	(.009)
Financial performance (pre-disaster)	.058	.054
	(.139)	(.139)
Company age	.004	.004
	(.005)	(.005)
Public (dummy)	.026	.02
	(.401)	(.401)
Business opportunity from disaster	.262*	.266*
	(.123)	(.124)
Learning orientation	.609**	.604**
	(.185)	(.185)
Pre-disaster employee number	0	0
	(0)	(0)
Pre-disaster capital	0	0
	(0)	(0)
Pre-disaster revenues	0	0
	(0)	(0)
Industry control	YES	YES
Region control	YES	YES
Constant	−2.69**	−2.697**
	(.92)	(.923)
Observations	417	417
Pseudo R^2	.118	.117

Note: Robust standard errors are in parentheses.
**$p < .01$, *$p < .05$.

that high collective empathy positively affects post-disaster growth, while for companies with low disaster exposure, the coefficient is small and not statistically significant.

Robustness Tests

First, we ran a *placebo test*. Substituting learning orientation for collective empathy yielded non-significant triple interactions ($\beta = .106$, $p = .563$ for the dummy specification;

Table 3
Difference-in-Differences Estimates of Disaster Exposure and Collective Empathy on Revenue Growth

	Short term (2012–2014)		Medium term (2015–2017)		Long term (2018–2019)			
					Unmatched sample		PS matched sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Revenues (ln)	Revenues (ln)	Revenues (ln)	Revenues (ln)	Revenues (ln)	Revenues (ln)	Revenues (ln)	Revenues (ln)
Moderate disaster exposure * post disaster	.323	.032	.063	.022	−.713	.165	.554*	−.014
	(.213)	(.047)	(.361)	(.072)	(.453)	(.125)	(.238)	(.208)
Moderate disaster exposure * post disaster * collective empathy	−.063		.005		.243*		.701*	
	(.05)		(.081)		(.104)		(.317)	
Collective empathy * post disaster	.03*		.014		−.163*		−.769*	
	(.018)		(.025)		(.068)		(.314)	
Moderate disaster exposure * post disaster * high collective empathy		.007		.112		.393*		1.189**
		(.094)		(.129)		(.185)		(.44)
High collective empathy * post disaster		.049		.04		−.13		−1.142*
		(.032)		(.044)		(.116)		(.44)
Ln Capital (t−1)	.052	.053	.094**	.093**	.029	.018	.11	.074
	(.029)	(.029)	(.035)	(.034)	(.056)	(.058)	(.24)	(.273)
Ln Employee number (t−1)	.397**	.399**	.526**	.524**	.568**	.55**	1.031**	1.131**
	(.082)	(.082)	(.093)	(.092)	(.088)	(.088)	(.16)	(.163)
Company FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Constant	5.855**	5.825**	4.746**	4.762**	5.287**	5.506**	2.009	1.958
	(.412)	(.41)	(.432)	(.431)	(.727)	(.748)	(2.624)	(2.992)
Observations	2848	2860	2899	2910	2387	2395	325	325
Within R^2	.143	.143	.187	.187	.165	.156	.353	.371

Note: Clustered standard errors are in parentheses.
**$p < .01$, *$p < .05$.

$\beta = .156$, $p = .240$ for the continuous factor score), indicating that the effect we document is specific to collective empathy and not accounted for by this strategic organizational learning antecedent. We further tested the mediation mechanism in *cross-sectional specifications using GSEM*. As shown in Online Appendix J, moderate disaster exposure has a positive and significant effect on collective empathy ($\beta = .236$, $p = .033$), and collective empathy, in turn, is positively associated with the composite growth measure ($\beta = .081$, $p = .048$). The direct effect of moderate disaster exposure on growth is small and not significant, consistent with full mediation. To assess the robustness of this mediation effect, we applied a nonparametric *bootstrap procedure* with 1,000 replications to generate bias-corrected confidence intervals for the product of the estimated coefficients for moderate disaster exposure and collective empathy. The resulting 95% confidence interval for the indirect effect ranged from .00011 to .06112, excluding zero. Thus, the mediation effect is statistically significant at conventional levels.

Post-Hoc Analysis: The Moderating Role of Learning Orientation

Our central argument is that collective empathy fosters the learning processes that underpin long-term post-disaster growth. Learning orientation, an antecedent of organizational learning (Brockner & James, 2008) that is also positively associated with the emergence of collective empathy post-disaster (Table 2), may therefore amplify the growth benefits of collective empathy. We thus expect learning orientation to positively moderate the relationship between collective empathy and long-term organizational growth for organizations with moderate disaster exposure, as a stronger learning orientation helps embed collective empathy into new routines and capabilities that support sustained performance improvements.

To probe this moderating pattern, we conducted a split-sample analysis distinguishing companies with below-average versus above-average learning orientation. We re-estimated our DiD models specified in Equation 3 within each subgroup. As reported in Online Appendix K, the triple interaction is positive and significant among companies with high learning orientation ($\beta = .383$, $p = .01$, Model 1), but not among those with below-average learning orientation. In Online Appendix L, we further restrict the sample to companies with moderate disaster exposure, adding the interaction between the long-term period, learning orientation, and collective empathy. The triple interaction is positive and statistically significant ($\beta = .291$, $p = .001$), indicating that learning orientation amplifies the long-term growth benefits of collective empathy for these companies. Notably, collective empathy exhibits a modest positive association with post-disaster long-term growth when learning orientation is low ($\beta = .18$, $p = .088$), but this growth-enhancing effect becomes substantially stronger at higher levels of learning orientation. In contrast, learning orientation in the post-disaster period, for low levels of collective empathy, is negatively associated with long-term growth ($\beta = -1.325$, $p < .001$). Online Appendix M further illustrates these results by plotting the DiD marginal effect of collective empathy on long-term revenue growth across levels of learning orientation for companies with moderate disaster exposure, showing that the effect of collective empathy becomes increasingly positive as learning orientation rises, consistent with its moderating role.

These results indicate that the relationship between moderate disaster exposure and long-term growth, mediated by collective empathy, is stronger among companies with higher

learning orientation. This evidence supports our argument that collective empathy enables organizations with moderate disaster exposure to achieve long-term growth by fostering post-disaster learning.

Discussion and Conclusion

We found consistent evidence that organizations moderately exposed to a disaster experienced higher long-term growth than those less or more severely exposed, relative to their pre-disaster trajectory. This finding supports the view that, although the short and medium term may be marked by recovery setbacks, disasters can catalyze long-term organizational growth—especially when their impact is moderate. However, this higher long-term growth was primarily observed in organizations that, after being impacted by the event, enhanced their collective empathy through commitments and actions to restore people's well-being. Collective empathy thus emerges as a key mechanism of long-term organizational growth after disasters. Notably, in organizations that were not moderately exposed to the disaster—where learning was therefore less likely—higher levels of collective empathy did not translate into greater growth. This pattern aligns with mixed evidence on the performance effects of post-disaster philanthropy among organizations not exposed to disasters (Godfrey, 2005; Muller & Kräussl, 2011) and reinforces our argument that the benefits of collective empathy stem from its role in fostering post-disaster learning, indicating that collective empathy enhances growth primarily where disaster exposure creates opportunities for learning. The case of *Hanamaki Onsen* illustrates how the mechanisms theorized in our hypotheses operate in practice, and how collective empathy can enable learning by mitigating negative emotions, strengthening internal cohesion, and motivating employees to embrace routine change.

Despite supporting evidence, *alternative explanations* for our findings must be considered. First, the growth of disaster-exposed organizations might stem from reduced competition due to competitors' failure or external resource inflows, such as donations or government subsidies, rather than from organizational responses. Regarding the latter, prior research suggests that private and public aid alone is generally ineffective in fostering recovery and sustained organizational growth (Dahlhamer & Tierney, 1998). In the case of the GEJE, public aid was largely limited to repairing immediate damage rather than funding innovation or expansion (Kashiwagi & Todo, 2021). Moreover, if resource inflows were the primary drivers of growth, we would expect all similarly exposed organizations in the same area and industry to benefit similarly. Yet our results show that organizations with high levels of collective empathy achieved higher average long-term growth. Similarly, if changes in the competitive environment were the primary cause of growth, we would expect these effects to appear immediately—before new entrants could re-enter the market—rather than with delay. Yet, we found that these effects emerged only years after the disaster. These patterns suggest that how organizations responded emotionally and behaviorally, rather than simply the receipt of aid or market shifts, was critical in translating disaster exposure into enduring growth.

An alternative explanation for the mediating effect is that organizations may promote societal well-being not out of collective empathy but as a strategic effort to protect or enhance their reputation (Godfrey, 2005; Muller & Kräussl, 2011). Indeed, post-disaster CSR can stem from two distinct logics: a bottom-up, collective empathy-driven process, captured by

our measurement, where shared sensitivity to others' needs creates a moral responsibility that translates into organizational action, and a top-down, strategically motivated process, where leaders deliberately invest in CSR initiatives to manage reputation (Muller et al., 2014). However, reputation-oriented CSR is more typical of large, highly visible corporations (Madsen & Rodgers, 2015; Muller & Kräussl, 2011), whereas our sample is dominated by smaller organizations with limited public scrutiny—reflecting the broader population of Japanese companies. Moreover, the low correlation between pre-disaster size and collective empathy (Online Appendix B) suggests that our measure is less likely to capture reputation-driven behaviors associated with larger organizations. Finally, in our sample, collective empathy was highest among organizations with moderate disaster exposure rather than marginally exposed ones. The prominence of disaster exposure in explaining collective empathy supports an internally emergent emotional response rather than a strategic, top-down initiative aimed at external visibility, which, unlike collective emotions, should not depend on the level of disaster exposure. While we acknowledge that collective empathy can also enhance organizational reputation, the slow onset of its effects—becoming visible only in the long term—further supports an interpretation centered on capability development through learning rather than short-term reputation enhancement, whose performance effects are typically more immediate.

Additionally, caution is warranted in *generalizing our results*. The GEJE was an exceptionally catastrophic natural disaster, causing over 20,000 deaths and unprecedented physical and social disruption. Such scale likely strengthened empathic responses, especially in a high collectivistic culture like Japan (Hofstede, 2011). Other disasters may differ in ways that affect whether collective empathy emerges and whether it supports organizational growth. For instance, human-made disasters (e.g., terrorist attacks, industrial accidents, or financial crises) often involve divisive narratives that may fragment rather than unify organizational members (Oishi et al., 2017), while more gradual-onset disasters such as global warming may lack the immediacy and shared emotional salience that typically elicit collective empathy. At the same time, our proposed mechanisms are not inherently tied to one culture or disaster and should operate across other large-scale, community-disrupting events, though the strength and manifestation of their effects might vary. Future studies should test these boundary conditions by examining different types of disasters in diverse contexts to assess when collective empathy is most likely to emerge and contribute to long-term growth.

Our study makes several *theoretical and empirical contributions*. First, we contribute to research on organizational learning after disasters by introducing collective emotions—particularly collective empathy—as a mechanism that enables post-disaster learning. Responding to calls for a deeper understanding of emotional processes in organizations (Liu & Maitlis, 2014), we shift the focus from the dominant view that post-disaster emotions are primarily individual-level and negative in their effects on learning (Cornelissen et al., 2014; Maitlis & Sonenshein, 2010) to show that positive and collective emotional processes can also support learning in these contexts. In doing so, we empirically distinguish the effects of collective empathy from those of strategic antecedents—particularly organizational learning orientation—challenging the assumption that learning after disasters arises only from deliberate efforts aimed at improving organizational survival and growth (Beck & Plowman, 2009; Rerup, 2009). Instead, we show that post-disaster learning can also emerge unintentionally, as a social-emotional process rather than a strategic one, and can be a byproduct of collective

empathic responses directed at supporting societal well-being rather than advancing organizational performance. Our findings suggest that bottom-up, collectively felt empathy, while not intended to enhance performance, can sustain collective reflection and openness to change and, over the long term, supports rather than undermines organizational performance—offering important practical implications for organizations exposed to disasters.

This process parallels research on post-traumatic growth at the individual level, which shows that survivors of life-threatening events can experience positive psychological changes in the aftermath of a trauma (Jayawickreme & Blackie, 2014; Tedeschi & Calhoun, 2004). Like our findings at the organizational level, this work emphasizes that post-traumatic growth is not purely a cognitive process: It is deeply rooted in affective and emotional responses that strengthen kinship and interpersonal relationships (Tedeschi & Calhoun, 2004). While the possibility of post-traumatic growth at the individual level has been extensively examined, empirical research on whether this process can affect organizational outcomes remains scarce, leading scholars to call for a deeper understanding of post-traumatic phenomena at the organizational level (Maitlis, 2020). Our study advances this emerging stream of work by suggesting that individual post-traumatic responses can become shared within organizations and coalesce into a collective state that shapes organizational-level action. Future research should further explore the connections between individual- and organizational-level responses to traumatic events and how individual responses aggregate into organizational routines.

We also identify boundary conditions for post-disaster learning, adding nuance to mixed findings on its occurrence, as prior research often portrays it as rare (Smith & Elliott, 2007; Starbuck, 2009). Specifically, we identify which organizations are most likely to learn, proposing and finding support for an inverted U-shaped relationship between disaster exposure and long-term growth: learning is most likely when exposure is moderate, providing organizations with both the need and the capacity to learn. Importantly, consistent with prior quantitative research (e.g., Madsen, 2009; Oetzel & Oh, 2014, 2021), we treat performance improvement as an organizational outcome reflecting the latent learning process unfolding after disasters. We encourage future research to capture learning more directly through longitudinal observations of specific capability development or routine changes.

Second, we contribute to the literature on collective emotions—particularly empathy—by examining their role in organizational performance, expanding the conversation beyond social outcomes and responding to Powley's (2009) call to connect social and financial consequences of disasters. Prior research has primarily highlighted how collective empathy benefits its recipients—improving members' well-being (Lilius et al., 2008) and supporting community recovery after disasters (Farny et al., 2019; Williams & Shepherd, 2018). We shift the focus to the empathy-activating organizations themselves and investigate the long-term impact of collective empathy on organizational performance. In doing so, we open new avenues for research on the enduring effects of collective emotions within organizations. To facilitate this line of inquiry, we also develop and validate a measure of collective empathy after disasters, providing a methodological contribution for future quantitative studies. However, despite various robustness tests, causal inferences should be interpreted with caution, since collective empathy was measured only cross-sectionally. Future research should adopt longitudinal designs to examine how collective empathy evolves over time, assessing its stability and progression. Moreover, further studies could explore the organizational and

contextual factors—such as cultural norms, leadership styles, and structural characteristics—that make some organizations more likely than others to develop collective empathy following disasters.

Finally, we answer recent calls for quantitative, longitudinal research on the enduring effects of disasters on organizations (Bundy et al., 2017; Gregg et al., 2022; Iqbal et al., 2021). While prior quantitative work has examined how learning after disasters improves organizations' capacity to prepare for similar events in the future (e.g., Baum & Dahlin, 2007; Madsen, 2009), ours is, to our knowledge, the first to quantitatively investigate long-term growth among organizations exposed to a disaster, and the role of collective empathy in enabling it. While post-disaster organizational changes are typically documented in cross-sectional or case studies focused on the immediate aftermath of the event, looking beyond recovery is critical to understand how growth unfolds and persists over time. Empirically, we disentangle short-, medium-, and long-term disaster effects, showing that positive aggregate outcomes appear only once the recovery is complete. While organizational learning is often assumed to fade as organizational memory erodes (Madsen, 2009; Smith & Elliott, 2007; Starbuck, 2009), looking at the long term reveals that, when supported by collective empathy, learning can drive enduring positive transformation. In our context, these effects become visible roughly seven to eight years after the disaster—highlighting that post-disaster learning can have remarkably durable consequences. However, it remains unclear how long these benefits endure and under what conditions they may eventually fade. Future research should therefore investigate the temporal limits of post-disaster long-term growth fostered by collective empathy and the factors that sustain or diminish its impact over time.

Our findings present important *managerial implications*. First, disaster-exposed organizations should reconsider post-disaster CSR initiatives not merely in terms of external reputation, as often implied in the management literature (Madsen & Rodgers, 2015), but as a key path to capability development and resilience. In such contexts, leaders should move beyond a narrow focus on rapid operational recovery and intentionally create opportunities for collective sensemaking and emotional engagement—providing spaces to communicate, express, and manage emotions and experiences—while actively backing emerging initiatives across the organization to support affected suppliers, employees, and community partners, for instance through temporary resource sharing or joint recovery initiatives. In the long term, these strategies can provide tangible benefits for the organization that go well beyond reputational gains. Our implications also extend beyond disaster-prone organizations. Organizational learning is an essential capability not only after disasters but also during internal and external crises, such as restructurings, leadership transitions, or regulatory changes (Argote & Miron-Spektor, 2011), that are common across organizations. Our findings suggest that, during crises, managers should deliberately cultivate collective empathy by reinforcing norms of mutual responsibility toward stakeholders and embedding stakeholder support into crisis-response protocols. Institutionalizing such practices can leverage the role of collective empathy in mitigating negative emotions and change resistance and in strengthening internal cohesion, thereby increasing the likelihood that shared adversity becomes a source of learning and long-term capability building rather than fragmentation.

In conclusion, our study shows that when collective empathy emerges, disasters can leave not only debris and loss but also spark positive change in surviving organizations. This work aligns with positive organizational scholarship, which calls for exploring how a positive lens

can unlock resources and capabilities to strengthen organizations (Spreitzer, Myers, Kopelman, & Mayer, 2021). While management research often emphasizes utilitarian motives, our findings show that lasting growth can also stem from a genuine human will to help and support others rather than purely strategic considerations.

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Notes

1. To achieve this, we began with the full company population recorded in the TDB and then constructed a sample that maintained the same proportional distribution by region, industry, and company size (revenues and employee number) as in the overall population. This stratified approach ensures that the sample is broadly representative of the Japanese economy and minimizes the risk that our findings are driven by sampling bias.

2. In Japan, these titles denote substantially higher hierarchical authority than in countries such as the United States, where they often refer to upper-middle or middle management roles.

3. We pretested our survey with additional 72 senior Japanese executives. The questionnaire was first developed in English, then back-translated and refined into Japanese by an experienced research firm, two trained bilingual graduate students, and the bilingual author. The pretest responses helped ensure item clarity, appropriate length, scale reliability, and adequate response variability.

4. Specifically, we controlled for an organization's market share growth in its primary market (using a single item based on Matsuno & Mentzer, 2000), annual research and development (R&D) expenditures as a percentage of sales to capture innovativeness (Li & Calantone, 1998), the percentage of top management aged 50 or older, a composite indicator of the organization's overall pre-disaster financial performance (Matsuno & Mentzer, 2000), and the percentage of international (vs. domestic) revenues. Moreover, using TDB data, we controlled for the number of employees, capital, and revenues (averaged across pre-disaster years to improve accuracy), as well as industry classification, headquarters location (region), foundation year, and whether the organization is publicly listed. For the cross-sectional models used in robustness checks for Hypotheses 1 and 3, we included additional control variables, drawing on prior research on the antecedents of organizational growth (Boeker, 1997; Weinzimmer, 2000). In an extensive review of the management literature, Weinzimmer (2000) identified four categories of antecedents of organizational growth. The first category concerns industry attributes, particularly industry munificence and competition intensity. Our questionnaire measured industry munificence using Dess and Beard's (1984) scale, which calculates the industry's average growth rate across five indicators (sales, price–cost margins, total employment, value added, and number of establishments). For competition intensity, we used Atuahene-Gima's (1995) six-item formative scale. For the remaining three categories—organizational strategy, top management, and slack resources—we included the same control variables as in the models testing Hypothesis 2. Unless indicated otherwise, all the variables were measured in the 2012 questionnaire.

5. To assess this, we followed Hinkin's (2009) steps to create and validate (through the 2013 questionnaire) a scale to measure the perception of disasters as business opportunities, intentionally framing items negatively to reduce acquiescence bias (Schriesheim & Hill, 1981).

6. For the five multi-item latent constructs (collective empathy, business opportunity of disaster, learning orientation, industry munificence, and competition intensity), we assessed reliability and validity using a confirmatory factor analysis (CFA) measurement model estimated with robust maximum likelihood. The goodness of fit indicators suggest an acceptable fit considering multiple criteria: the Root Mean Square Error of Approximation (RMSEA) is .065, below the maximum threshold of .07 (Steiger, 2007); the Standardized Root Mean Squared Residual (SRMR) is .053 (with 90% confidence intervals below the maximum threshold of .08 indicated by Hu and Bentler, 1999); and the Comparative Fit Index (CFI) is .926, above the minimum threshold of .90 (Byrne, 1994). Online Appendix C reports the purified measurement items, literature sources, standardized loadings and significance, Cronbach's alpha, and average variance extracted (AVE). All items load significantly on their intended construct ($p < .001$), and all constructs demonstrate acceptable reliability (composite reliability [CR] $> .70$), convergent validity (AVE $> .50$), and discriminant validity (the square root of each construct's AVE exceeds its inter-construct correlations), satisfying the thresholds recommended by Hair et al. (2010).

7. In some DiD models, we also partition the post-disaster period into short-term (2012–2014), medium-term (2015–2017), and long-term (2018–2019) intervals to trace the evolution of disaster effects over time. This approach allows us to directly test our hypotheses focused on long-term outcomes and to assess whether effects unfold gradually.

8. Because we estimate a two-way fixed-effects DiD model with a common post-disaster period and measure disaster exposure in discrete intensity categories, the interaction coefficient should be interpreted as the average post-disaster effect for companies with moderate (or moderate and high) disaster exposure relative to the low-exposure (or low- and high-exposure) comparison group over the specified post-recovery window—that is, an average treatment effect on the treated in our setting. This estimate is a weighted average of potentially heterogeneous company-level responses across the post-disaster specified time period.

9. We computed PS using pre-disaster averages of revenues, capital, and employment, along with company age, public status, industry, and regional identifiers from TDB. We then applied nearest-neighbor matching (up to three neighbors, caliper = .05), ensuring balance across industries and regions. Covariate balance was verified before and after matching. Finally, matched weights were reassigned to the panel, and fixed-effects regressions were estimated using only matched companies with appropriate weights.

10. Although both disaster exposure and collective empathy were measured in the same survey, common method bias is unlikely to account for our findings. Disaster exposure captures factual, objective conditions—such as the percentage of assets or sales generated in GEJE-affected regions—rather than subjective perceptions measured via attitudinal scales. Such objective, single-item indicators are less prone to evaluative or affective biases than self-reported psychological constructs (Podsakoff, Podsakoff, Williams, Huang, & Yang, 2024). Moreover, our models include controls that help account for social desirability bias and general respondent tendencies.

11. For transparency, we present the full model, although some coefficients are not separately identified in the estimation due to the inclusion of company fixed effects.

12. Although traditional structural equation modeling fit indices are not appropriate for GSEM, we followed recommended practice (Vrieze, 2012) by comparing model fit using the Akaike information criterion (AIC) and Bayesian information criterion (BIC), which balance fit against model complexity.

13. This method provides a more reliable test of mediation than the Baron and Kenny (1986) approach, as it does not assume normality and is less sensitive to data distribution (Hayes & Scharkow, 2013).

14. Computed as $(e^{\beta}-1)\%$.

15. Consistent with our earlier attrition tests, the inverse Mills ratio (λ) was not significant, and the estimated correlation between the selection and outcome equations (ρ) was also insignificant (all $p > .85$), with Wald tests confirming independence, indicating that attrition is not likely to bias our results.

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