



Social Trust, Environmental Violations, and Remedial Actions in China

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Abstract

The devastating impact of the climate crisis has led many countries to promulgate regulations that hold businesses accountable for their environmental externalities. However, while these formal constraints compel businesses to fulfill their legal obligations, scholars argue that acting in a socially and environmentally responsible way requires more than mere compliance with the law. Accordingly, we provide novel evidence of how the concept of social justice, implicit in society as an informal construct, underpins firms' ethical behavior, compelling them to accept their social responsibilities by reducing their environmental violations, implementing procedures to prevent further infractions, and repairing the breach in social trust that their transgressions have caused by engaging in restorative acts. Based on unique environmental violation and remedial action data from 2007 to 2022 in China, we establish that social trust significantly lowers a firm's propensity to commit further ecological abuses. We also determine that firms in high-trust regions are more likely to undertake remedial actions in the aftermath of an environmental breach. Moreover, cross-sectional analyses reveal that the relationship between social trust and environmental violations is more pronounced for firms that face greater reputational pressure from higher media reporting, analyst coverage, auditing by Big Four auditors, and institutional site visits. This study augments the literature on environmentalism and argues that social trust also shapes corporate ethical behavior in addition to regulatory pressures.

Keywords Social trust · Environmental violations · Irresponsible business practices · Remedial actions · Restorative justice · Unethical environmental behavior

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Introduction

Firms have an ethical duty to protect their surrounding communities by ensuring that their activities do not harm the environment. However, they often neglect their ethical obligations by engaging in self-interested behaviors¹ (Goodstein & Butterfield, 2010; Lee & Xiao, 2020; Nadeem, 2021). Companies' environmental violations, ranging from improper waste disposal to excessive emissions, not only

¹ i) Several incidents of environmental violation have occurred in recent decades: for instance, in China, the discharge of toxic algae into Tai Lake in 2007; arsenic water pollution in Wuxi City in Hunan Province in 2007; and the discharge of acidic wastewater by Zijin Mining (a listed firm) in Fujian Province in 2010, among a number of other similar infractions (Xu et al., 2012). ii) The toxic chemical release at Union Carbide in Bhopal in 1984 killed thousands of people and left hundreds of thousands with lifelong disabilities, while inflicting incalculable damage on the ecosystem (Weick, 2010). iii) Volkswagen's Dieseldieselgate is one of the largest ongoing corporate environmental violation scandals globally (Bouzzine and Lueg, 2020).

threaten ecosystems and result in environmental penalties² being imposed on firms but also undermine trust between corporations and the societies they serve. Given the urgency of the climate crisis stemming from the excessive use of natural resources, carbon emissions, and corporate environmental violations, several countries have introduced strict regulations compelling businesses to minimize their environmental footprints (Benlemlih et al., 2023). However, while regulatory proscriptions oblige businesses to fulfill their legal duty, studies (Nadeem, 2021) argue that businesses must go beyond statutory requirements and demonstrate their ethical responsibility to make a positive impact on the environment and society, and it is this phenomenon that our study sets out to investigate.

Social trust is regarded as ‘an important lubricant of a social system’ (Arrow, 1974), representing the extent to which individuals trust other members of their society. In this context, despite the growing literature on the consequences of social trust from business ethics and social performance perspectives (Chen et al., 2021; Jha & Cox, 2015), two important research questions remain unexplored. First, does a high level of social trust (embedded in high social norms) discourage firms from engaging in harmful environmental practices that could jeopardize the trust shared with diverse stakeholders? Second, does a high level of social trust impel firms to engage in restorative justice by undertaking remedial actions in the aftermath of ecological violations to demonstrate their commitment to environmental justice? We seek to investigate these questions in the unique context of the greatest global polluter, China.

To address the first question, we adopt the social trust perspective, grounded in social norms theory, which asserts that individuals internalize the ideals of acceptable behavior inculcated by their culture and, once this transformation occurs, that the adopted social norms (or unwritten laws) engender consonant behaviors in society, as people conform to normative expectations because of the fear of social disapproval (Cialdini et al., 1991; Elster, 1989). We argue that the normalized core of business ethics obliges firms and their managements to account for and justify their corporate actions because committing environmental violations jeopardizes stakeholders’ wealth and well-being and degrades corporate reputations (Karpoff et al., 2005; Lee & Xiao, 2020; Xu et al., 2012). Moreover, strongly established social norms in a particular region might convince managers that their shareholders also adhere to similar ideals, and

it is their fiduciary duty to respond to shareholder aspirations. Such feelings can intensify managers’ perceptions of the social cost incurred by environmental violations, and the risk that prosecution will expose them to the public is a powerful incentive for them to accept societal norms and forgo self-interested behaviors. Thus, firms located in such regions with strongly established social norms are powerfully motivated to adopt responsible business operations because of the moral ethos of the communities in which they trade. Conversely, companies breaching these social norms suffer reputational damage, lose stakeholder support, and may, in the most serious cases, forfeit their license to operate (Nadeem, 2021). Based on these arguments, we expect that firms in high-trust regions are less likely to commit ecological violations.

To address the second question, we first discuss the concept of restorative justice (Braithwaite, 1999), which maintains that following irresponsible behavior, firms are more likely to achieve reconciliation with their stakeholders if they recognize their culpability, offer clear explanations of their transgressions, accept the penalties imposed, and put in place effective safeguards to prevent future misbehavior (Pfarrer et al., 2008). Moreover, when judicial remediation systems are not strong (as in China), embracing a restorative justice paradigm could be a beneficial strategy for firms’ responses to violations of stakeholders’ interests (Schormair and Gerlach, 2020). In this context, recent studies argue that corporate governance controls, including smaller boards, greater board independence, CEO duality (Nadeem, 2021), and shareholders’ environmental activism (Lee & Xiao, 2020), are important precursors of corporate remedial actions, functioning as a mechanism for restorative justice. The fact that such remedial interventions are voluntarily undertaken by firms, even when their cost may exceed the penalty imposed, emphasizes the sincerity of managements’ endeavors to restore the environment and fulfill their ethical responsibility (Robertson, 2008).

Departing from the prior literature examining the role of social trust in financial outcomes, we focus on whether social trust is influential in changing a firm’s propensity to undertake restorative actions after violations. In particular, this research endeavors to address the concerns of Du et al. (2023) and Hockerts and Searcy (2023), who advocate that business ethics studies should shift their focus from firms’ financial outcomes to social and ecological objectives (emphasizing environmental protection). Accordingly, we argue that because environmental violations reveal firms’ transgressions and irresponsible behaviors, such revelations not only negatively affect the stock market (Xu et al., 2012) but also undermine societal trust among stakeholders and other firms. Previous studies have shown that a breach of

² According to the Ministry of Ecology and Environment (MEE), total environmental damage fines for Chinese companies reached 15.28 billion yuan (about \$2.15 billion) in 2018, in comparison to 3.17 billion yuan in 2014. Retrieved from the official site of the State Council. Available at http://english.www.gov.cn/statecouncil/ministries/201909/29/content_WS5d90b63bc6d0bcf8c4c14594.html

trust³ prompts victims of deception to reevaluate their confidence in the violator, which ultimately undermines trust (Elangovan et al., 2015; Robinson, 1996). Nevertheless, the extent to which trust is affected depends on the level of trust in the region (Cahan et al., 2023). For example, in regions with a high level of trust (Cialdini et al., 1991; Elster, 1989), stakeholders are more likely to protest when a firm pollutes the environment, damaging its reputation, due to strong social norms and people's demands for greater commitment to socially responsible behavior (Chen et al., 2021; Kong et al., 2023). Conversely, stakeholders in regions with low levels of social trust are less inclined to regard environmental violations as breaches of trust because of their lower expectations of responsible behaviors. Furthermore, reestablishing social trust following violations is often a difficult task since communities may feel betrayed and skeptical of good corporate faith. Undertaking restorative actions is more arduous in the absence of social trust, as stakeholders may be reluctant to participate in substantive discourse and refuse to cooperate. Therefore, while integrating the arguments of restorative justice and social trust, we contend that to reestablish trust between firms and society's stakeholders post-violation, firms must perform "moral repair" (Walker, 2006), which requires the willingness and sense of responsibility of violators to make restitution. Therefore, if restorative justice is founded on the principles of accountability and a commitment to responsible behavior, offenders in high-trust regions are more likely to engage in remedial environmental actions, restoring society's trust and avoiding reputational damage.

As a context for our investigation, China is ideal for two reasons. First, the country has been criticized for being the world's most egregious polluter, with industrial output powered primarily by harmful fossil fuels. Moreover, the institutional environment and legal structure are too weak to enforce compliance with environmental policies, and the effectiveness of the voluntary avoidance of environmental violations is questionable (Chen et al., 2015). Second, China is a nation with many idiosyncratic variations in ethnicity,⁴ history, language, and philosophy across its 31 provinces (Wu et al., 2014). This diversity implies variations in regional trust, facilitating a provincial-level examination of

the impact of social trust on environmental abuse (Li et al., 2019).

In our study, we employ a unique dataset of Chinese listed firms, resulting in 5970 firm-year observations between 2007 and 2022. Arguably, the conventional measurement of social trust (as employed in previous studies in China (Chen et al., 2021; Dong et al., 2018; Jin et al., 2016; Li et al., 2017, 2019)) lacks the significant dimension of time variation. Therefore, to address this concern, we build on the literature (Liu et al., 2022a, 2022b) and develop a time-varying measurement of social trust utilizing the "Report on the Business Environment Index for China's Provinces" (Wang et al., 2013).⁵ Using this proxy of social trust, we first find a negative relationship between social trust and environmental violations, indicating that firms in high-trust regions exhibit greater environmental responsibility. In economic terms, a one-standard deviation increase in social trust is associated with a 36.37% lower likelihood of environmental violations.⁶ Second, we find that, following the incidence of violations, firms in high-trust regions are more likely to engage in environmental remedial actions⁷ than are firms in low-trust regions. Our cross-sectional results, which are based on firms' exposure to reputational pressure, demonstrate that the negative relationship between social trust and environmental violations is more pronounced in firms (a) with higher media coverage and (b) receiving a greater number of institutional site visits. Importantly, our main findings remain robust to (a) two-stage least squares (2SLS) techniques, (b) a series of alternative measures of social trust, (c) propensity score matching (PSM), (d) the entropy balance method (EBM), and (e) Heckman-two-stage estimations.

Our study makes significant contributions to the business ethics literature. First, departing from prior literature (Chen et al., 2021; Dong et al., 2018; Hoi et al., 2018; Jha & Cox, 2015), we establish social trust as an essential precursor of normative pro-ecological behaviors in the form of reduced environmental transgressions. Our contention is that social trust must be engendered before such norms can be accepted and practiced in society. For this to occur, measures to control pollution must be shown to be equitable, practical, and efficacious. By investigating whether robust social trust discourages firms from committing environmental violations that could jeopardize the mutual trust shared with

³ Elangovan et al., (2015, 82) defined a breach of trust as the perception by the trustor that the trustee's conduct fails to meet his or her expectations.

⁴ The existence of 56 ethnic groups in the nation's 31 provinces, speaking over 80 native dialects (not understandable to foreigners), results in enormous diversity in China's social trust in different regions. In addition, religious beliefs also affect the features of social trust of the provinces. China remained a Communist country, but the predominant religious beliefs, for instance Buddhism, Christianity and Islam, and cultural beliefs, e.g., Confucianism and Taoism, have influenced the social trust of different provinces of China.

⁵ We are thankful to an anonymous reviewer and the Editor for this valuable suggestion.

⁶ Economic significance is calculated as the standard deviation of trust (0.335) × coefficient of trust (-0.241) / mean value of environmental violations (0.222) = 0.3637, or 36.37%. Please see Column 3, Table 2.

⁷ Environmental remedial actions are measured by environmental investments and the development and marketing of environmentally friendly products.

stakeholders, this study contributes to the growing literature on corporate ecological and ethical responsibility (Lee et al., 2018; Li et al., 2020, 2023). Understanding how social trust acts as a determinant of corporate pro-environmental behavior provides crucial insights for policy-makers, businesses, and communities that are anxious to foster sustainable and responsible corporate behavior.

Second, we provide original evidence on how social trust influences a firm's predisposition to engage in remedial actions in the aftermath of violations to restore environmental justice. By integrating social trust and restorative justice perspectives, we reveal the crucial role of social trust in shaping corporate responses to environmental harm and reputational damage, ensuring moral repair. We thus contribute to an understanding of how social trust may be leveraged to encourage genuine reparative actions, providing valuable insights for corporate sustainability strategies, regulatory frameworks, and community engagement.

Third, our study answers the call of Du et al. (2023) and Hockerts and Searcy (2023), who propose a shift in business ethics research from a business-centric focus (i.e., firm financial performance) to a society-centric focus (i.e., social and ecological outcomes) by examining corporate engagement in pro-environmental behavior from the perspectives of communities and external stakeholders. Thus, our findings also contribute at the theoretical, ethical, and practical levels.

At a theoretical level, this study contributes to the business ethics literature by integrating social trust with the analysis of corporate environmental behavior. It conceptually emphasizes the society-centric dimension, demonstrating that social trust (an important societal actor) significantly influences environmental violations and post-violation remedial actions. This expands the current literature (Chen et al., 2021; Dong et al., 2018; Hoi et al., 2018; Jha & Cox, 2015) on how social capital influences corporate ethics and behavior. The study also extends the theoretical perspective of the application of restorative justice to the corporate environmental domain, demonstrating that firms in high-trust regions are more likely to engage in remedial actions. This finding shifts the focus from the prevention of violations to understanding and encouraging positive corrective actions, emphasizing the role of social mechanisms in promoting ethical recovery.

At an ethical level, this study emphasizes the moral responsibility of firms to maintain trust with external stakeholders by aligning their operations with societal values while highlighting the importance of environmental remediation in high-trust regions, which is consonant with the principles of restorative justice. Our investigation also emphasizes corporate accountability, underscoring the need for corporations to avoid harm and take responsibility for

their actions, thus contributing to a fuller understanding of corporate ethical responsibility.

At a practical level, this study highlights the importance of fostering social trust in businesses and communities to improve environmental compliance and argues that, in addition to regulatory policies aimed at environmental protection, policies promoting social trust can be more effective than punitive measures alone. Businesses can build trust through corporate social responsibility initiatives, stakeholder engagement, and transparent operations. Proactive remediation strategies can enhance corporate reputation and stakeholder trust, generating long-term benefits. Our research also emphasizes the role of the media and institutions in amplifying the effects of social trust on corporate behavior, enabling communities and watchdog organizations to hold firms accountable for their actions and promote ethical practices.

Literature Review and Hypothesis Development

Social Trust

Trust plays an important role in virtually every economic transaction (Williamson, 1993). Trust is defined as 'a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action' (Williamson, 1993 p. 463) or the propensity for people to cooperate with others (Coleman, 1994; Putnam et al., 1994). Generalized trust, nurtured by shared social values and norms, increases over time and is evidenced by the collective actions, cooperation, and altruistic predispositions of the members, institutions, and organizations of society as a whole (Guiso et al., 2004; Portes, 1998; Putnam, 2000).

Social trust is viewed as the product of a set of social networks from which individuals benefit, meaning that high social trust areas encompass vigorous networks that benefit all parties involved (Payne et al., 2011). Conceptualizing social trust as a construct of social norms, Cialdini and Goldstein (2004) argue that such norms strongly shape corporate culture and managerial attitudes when facing critical decision-making. Individuals always seek guidance from social norms for a precise understanding of, and productive response to, social situations (Cialdini, 2001). Categorizing norms into injunctive and descriptive genres, Cialdini et al. (1991) describe the former as indicators of what is typically approved or disapproved and the latter as indicators of what is typically done.

Hence, established normative behaviors are paramount in building the pressure that individuals face when making a

decision for which they are accountable, and individuals in such situations tend to conform to expectations to gain the approval of the people to whom they are answerable (Quinn & Schlenker, 2002). Elster (1989) argues that people obey social norms to avoid disapproval, indicating that individuals in a high-trust environment, characterized by established social norms, are more likely to face peer pressure and avoid irresponsible behaviors.

Social norms are also defined as customary rules that foster conformity, constraining irresponsible behavior (Bicchieri & Mercier, 2014). Thus, social norms are a collective awareness of the most appropriate social behaviors, and when they are internalized, people conform to them even when their irresponsible behaviors would otherwise remain unexposed (Elster, 1989). It follows, then, that social trust, encompassing well-established and internalized social norms, represents an informal governance mechanism constraining managers' opportunistic behavior (Goodell et al., 2023).

In the context of business, prior studies (Beugelsdijk & Klasing, 2016; Méon & Sekkat, 2015) argue that social trust is an informal concept fostering common values that encourage people to comply with accepted behaviors. Qiu et al. (2021) contend that social trust implicitly guarantees executives' good character, as irresponsible behavior will damage their market reputation and place their future careers at stake. Chen et al. (2021) argue that communities with high levels of trust are conditioned by social norms that constrain corporate fraud, as such fraud is incompatible with social morality. Thus, people in high-trust areas pay close attention to social issues that threaten social welfare (Putnam, 1993). Similarly, it can be argued that firms in high-trust regions are more likely to exceed regulatory compliance and behave responsibly by committing fewer environmental violations and undertaking restorative actions promptly in the aftermath of a breach (Nadeem, 2021); this is because environmental breaches not only hamper the environment and society but also have the potential to tarnish executives' personal reputations (Lee & Xiao, 2020).

The Impact of Social Trust on Environmental Violations

The social psychology literature suggests that social trust, built on established social norms, influences people's behavior (Cialdini et al., 1991). Social norms represent normative expectations requiring individuals to exhibit behaviors that are considered compatible with social morality. Thus, social trust, which is based on social norms, has the propensity to influence firm-level outcomes, as management decisions are shaped by individuals' personal beliefs.

As members of a society in which social norms have developed to an elevated degree, individuals avoid unethical

acts because they fear that their peers will disapprove of their antisocial behaviors. Therefore, if managers behave responsibly, they will be viewed as trustworthy members of society and will earn greater reputational capital (Dong et al., 2018). Conversely, irresponsible behaviors not only place their own reputations at stake but also undermine the social approval of their firms. Hence, an environment of high social trust, shaped by internalized social norms, helps constrain managers' opportunistic behavior. Social trust also acts as an alternative monitoring mechanism, since individuals who internalize positive social norms are likely to support socially and morally responsible decision-making. Empirical evidence establishes that firms in high-trust regions are negatively associated with corporate misconduct (Dong et al., 2018).

Based on this rationale, we contend that since trust affects economic activities and influences individuals' actions, it is probable that companies in high-trust regions commit fewer environmental violations, as such violations would undermine their reputation for socially responsible behavior, deplete their store of social capital, and damage their managers' reputations. Moreover, firms' executives bear a fiduciary responsibility to protect the well-being and interests of all their stakeholders, and committing environmental violations will conflict with this duty. Consequently, applying the precepts of social norms theory, we posit that greater social trust nurtures an altruistic proclivity for more compassionate, moralistic, and less self-interested corporate decision-making (Tang & Yang, 2024), resulting in fewer environmental violations and increased restorative justice.

Consistent with the arguments of social trust and underpinned by concepts of the common good and social welfare (Coleman, 1994; Putnam et al., 1994; Williamson, 1993), firms' actions, while seeking to serve the needs of a wider range of stakeholders, can lead to a loss of earnings when reducing environmental pollution at the expense of profit. Although this approach might gain the approval of diverse stakeholders, it would conflict with management's fiduciary duty to serve shareholders' interests, since implementing a strategy of environmental protection might reduce short-term corporate value (Li et al., 2020). However, an executive in a high-trust region might reason that shareholders would adhere to the same social ideals and that a company's failure to do likewise would alienate shareholders, inducing them to invest their capital elsewhere. Moreover, as argued in prior literature (Lins et al., 2017; Lu et al., 2018), managers could justify an ostensible sacrifice on the grounds that the ultimate benefits might well exceed the costs.

Thus, in high-trust regions, managers are wary of committing environmental violations because they violate government regulations and social norms, making such managers more likely to behave ethically to avoid the disapproval of stakeholders and socially conscious shareholders. Moreover, companies in such regions are less likely to

commit ecological violations because this will undermine the corporate reputational capital and social approval of their companies, exposing management to prosecution and fines. Accordingly, we propose our first hypothesis:

Hypothesis 1: Firms in regions with high social trust are less likely to commit environmental violations.

Social Trust and Remedial Actions: A Restorative Justice Perspective

Restorative justice, as articulated by Braithwaite (1999, p. 5), is a collaborative process involving all stakeholders affected by a particular transgression or wrongdoing in dealing with its repercussions and its future consequences. In contrast to traditional justice models centered on punishment, retribution, and whistleblowing, restorative justice transforms ethical considerations by redefining when ethics matter and who and what matters in ethics (Goodstein & Butterfield, 2010). The forward-looking nature of the restorative justice perspective renders it (a) instrumental in nature by assisting organizations in mending strained stakeholder relationships and (b) normative in practice, as its foundation lies in Aristotelian ethics of virtue, the ethics of care, and philosophical discourse concerning the process of making amends (Goodstein & Butterfield, 2010). Walker (2006) contends that making amends or moral repair are vital responses to wrongdoing, involving reparative actions by responsible parties to redress the harm caused. Thus, this perspective views wrongdoing as a breach of the relationship between perpetrators and society, advocating that wrongdoers repair damage by making amends. This approach is particularly relevant in cases of environmental violations, where trust has been breached, and the restoration of moral relationships becomes crucial (Walker, 2006).

Prior studies indicate that in the aftermath of environmental violations, offenders frequently employ diverse strategies to restore their damaged reputations or absolve themselves from responsibility for the transgression. These approaches involve favorable environmental information reporting (De Villiers & Van Staden, 2011), greater environmental disclosure (Patten, 1992), and improved external communication (Cho, 2009) to bolster a firm's reputation or deflect accountability. However, critics argue that these strategies can be superficial or symbolic, i.e., lacking in genuine actions to establish accountability and failing to demonstrate authentic intentions to rectify the environmental harm inflicted (Cho, 2009; Cho et al., 2009; Nadeem, 2021). We emphasize that as a response to environmental violations, restorative justice stands out from traditional legitimization strategies by offering concrete benefits, such as environmental restoration, rather than merely symbolic gestures, such as increased disclosure or positive news coverage (Lee & Xiao, 2020; Nadeem, 2021).

Currently, firms tend to favor remedial actions in the period following their ecological violations, a tendency that aligns with restorative justice principles. Remedial actions provide a framework for violators to engage in reparative activities that extend beyond regulatory requirements, offering an avenue for moral repair and contributing to the restoration of the environment (Lee & Xiao, 2020; Nadeem, 2021). Unlike conventional approaches, reparative actions demonstrate a commitment to tangible benefits, making them a potential vehicle for implementing restorative justice in the aftermath of environmental harm (Schembera & Scherer, 2017). The integration of remedial actions into the restorative justice framework reflects a holistic and community-centered approach, emphasizing the importance of repairing relationships and addressing the broader implications of environmental offenses (Lee & Xiao, 2020; Nadeem, 2021). Recently, a few studies have examined the factors that motivate firms to engage in such activities. In particular, by employing a restorative justice approach, recent studies have shown that (a) corporate governance attributes (Nadeem, 2021), such as smaller boards, higher board independence and CEO duality, and (b) shareholder environmental activism (Lee & Xiao, 2020), are significant indicators of firms' likelihood of undertaking remedial actions to demonstrate restorative justice. However, whether an informal governance mechanism underpinned by social trust can play a significant role in firms' decisions regarding restorative justice remains unexplored.

We argue that social trust might play a crucial role in firms' probability of undertaking remedial actions in the post-violation period. Trust is fundamental in fostering cooperation and collaboration between various stakeholders, including the offending party, regulatory bodies, affected communities, and environmental organizations (Coleman, 1994; Putnam et al., 1994; Williamson, 1993). We contend that in the aftermath of environmental violations, rebuilding relationships with stakeholders is often a complex process, as communities may feel betrayed and skeptical about the sincerity of the violator's intentions (Walker, 2006). The initiation of remedial actions becomes more challenging when social trust is lost, as stakeholders may hesitate to engage in meaningful dialog and collaboration. Thus, we argue that trust can be a catalyst for effective communication, transparency, and the establishment of common goals, which are essential elements for the successful implementation of remedial actions.⁸

⁸ Liu et al. (2022a, 2022b) find that honest and timely sharing of information improves confidence in organizations, lowering public disapproval of government entities, which could damage the social trust and impede cooperation with containment measures.

Prior research (Elangovan et al., 2015; Robinson, 1996) has demonstrated that a breach of trust causes victims to reassess their faith in trustees, leading to a subsequent loss of such trust. Moreover, social trust influences perceptions of the legitimacy of the offending party's commitment to environmental remediation (Schormair and Gerlach, 2020). However, the consequences of irresponsible behavior depend on the degree of trust within the region in which it occurs (Cahan et al., 2023). For example, stakeholders are more inclined to vocalize their disapproval, thus damaging the reputation of a company, of wrongdoing in regions characterized by a high degree of trust (Cialdini et al., 1991; Elster, 1989). This is primarily because of the influence of robust social norms and the expectation of a greater dedication to socially and environmentally responsible conduct (Chen et al., 2021; Kong et al., 2023).

It might be argued that firms operating in areas where norms of trust are high do not engage in willful acts that pollute the environment in the first place. However, as individuals are fallible, so are the organizations they create, and breaches of social norms may occur for a variety of reasons. For example, management incompetence or a mistake by an individual in the production chain may result in pollution. A disgruntled employee could open a valve that should remain closed, or a rent-seeking manager might decide to benefit himself at the expense of the local community. A coincidence of events might cause a poisonous effluent to leak into an aquifer, since manufacturing processes are complex and not every contingency can be foreseen. Arguably, therefore, companies in high-trust areas will still commit mistakes with consequences that are deleterious to the environment. However, we argue that in high-trust regions, executives, guided by internalized social norms, respond by acknowledging their mistakes and offering amends to restore the environment to demonstrate a commitment to justice.

The foregoing arguments suggest that in the aftermath of environmental damage, organizations in high-trust regions are more likely to implement “moral repair” (as proposed by Walker, 2006) to restore confidence among society and stakeholders. This approach commences with the perpetrators' acknowledgment of their obligation and willingness to make amends. Therefore, managers in high-trust regions will feel greater pressure from societal disapproval and moral obligations than managers in low-trust regions, leading them to acknowledge their wrongful actions and demonstrate contrition through reparative acts. In summary, if restorative justice is predicated on the tenets of social trust and a sense of responsible conduct, it is expected that violators in regions with high trust will be more inclined to undertake remedial environmental actions in the post-violation phase to preserve societal trust and prevent reputational harm to the firm. Therefore, we present our second hypothesis as follows:

Hypothesis 2: Firms in regions with high (low) social trust are more (less) likely to engage in environmental remedial actions in the post-environmental violation period.

Research Design

Data and Sample

We collected data on financial and corporate governance variables for Chinese A-share listed firms from the China Securities Market and Accounting Research (CSMAR) database. For our main outcome variables, we collected data on environmental violations from the Corporate Social Responsibilities (CSRs) database available on the China Research Data Services (CNRDS) platform. Our sample period starts in 2007, as this is the first year in which information on environmental violations became available. Following previous studies (e.g., Li et al., 2019), we omit data concerning (a) special treatment (ST) and financial firms; (b) firms that do not reveal or reveal insufficient environmental data on CSRs; and (c) firm-year observations with missing information for the control variables. We winsorize continuous variables at the 1% and 99% levels to mitigate the effect of outliers. Our final sample (firm-year observations) totals 5,970 data points. All the variables used are described in online Appendix A.

Measuring Environmental Violations

Our first outcome variable is environmental violations. Following previous studies (Kong et al., 2020; Shahab et al., 2023a, 2023b), environmental violations (ENV) are a dummy variable equal to 1 if a firm commits an environmental violation and 0 otherwise. Pollutant discharges,⁹ toxic or hazardous, damage the environment and are environmental violations according to international standards. These environmental violations represent firms' environmentally negative actions in contributing to the deterioration of, or failure to protect, the environment.

Measuring Environmental Remedial Actions

We employ two measures to represent a firm's environmental remedial actions. Our main measure for environmental remedial actions is “environmental investment (Env_Inv)”,¹⁰ measured as the firm's environmental investment divided by

⁹ We collected data on pollutant discharges from the China Research Data Services (CNRDS) platform, which maintains information on firms' pollutant discharges in terms of the variety of pollutants.

¹⁰ We collected data for environmental investments from the China Securities Market and the Accounting Research (CSMAR) database.

revenue in the year following an environmental violation. Our alternate measure of environmental remedial actions for robustness check is “Environmentally Friendly Products (*Env_Fri_Pro*)”,¹¹ a dummy variable equal to 1 if a firm develops environmentally friendly products in the year following an environmental violation and 0 otherwise. Environmentally friendly products include firms’ involvement in environmentally sustainable merchandise, processes, and energy-saving technologies, which are implemented to alleviate environmental harm. These environmental remedial actions represent firms’ environmental remedies to demonstrate their commitment to environmental justice by contributing to the restoration of the environment.

Measuring Social Trust

Our main trust variable across all regression analyses is the time-variant social trust variable (*Trust1*). We obtain the time-variant social trust variable from the “Report on the Business Environment Index for China’s Provinces” (Wang et al., 2013). This report includes province-level social trust indices for the years 2006, 2008, 2010, and 2012, derived from biennial surveys conducted by the China Reformation Foundation National Economic Research Institute and the Chinese Entrepreneur Survey System. Over 4,000 CEOs or chairpersons from 29 provinces and autonomous regions (excluding Tibet and Qinghai Provinces) participated in the study. The questionnaire encompassed various dimensions of the business environment (e.g., legal, tax, and finance) to characterize the commercial atmosphere at the provincial level. One question related specifically to province-level social trust. The respondents were asked to rate their general perceptions on a scale of 1 to 5.¹² The social trust index in each province is the average of the scores of all the qualified responses. We follow prior studies (Jha & Chen, 2015) and use linear interpolation and extrapolation¹³ to estimate missing values (2007, 2009, 2011, and 2013–2022) based on known data points.

For a robustness check, we use alternative measures of social trust. Like the social trust proxy used in previous studies (Ang et al., 2015; Li et al., 2019; Wu et al., 2014), our second measure of social trust (*Trust2*) represents the degree to which the residents of a province trust strangers;

it is a provincial-level index extracted from the survey¹⁴ undertaken by the “China General Social Survey,” initially performed in 2003 and repeated in a slightly different form in 2013. We adopt the latest survey for our analysis. In particular, *Trust2* measures the mean value of people’s opinions in a province, and we use this value as a measure of trustworthiness, with a higher index value denoting that people in a province have greater trust in strangers and vice versa.

We also employ three non-survey-based social trust measures to minimize endogeneity concerns that historical environmental violation incidents might impact survey responses and, consequently, might affect *Trust1* and *Trust2*. Following related studies (Jin et al., 2016; Li et al., 2017, 2019; Wu et al., 2014), our third measure of social trust (*Trust3*) is charitable donations (in 100 yuan units) per person at the provincial level on an annual basis, as people in provinces with greater trust are more likely to make charitable donations.¹⁵ We obtain data for the period 2010 to 2022 from China’s Statistical Yearbook. Data for 2007–2009 are not available from the Statistical Yearbook, so we derive data for these years via linear interpolation (Jha & Chen, 2015).

Our fourth measure of social trust (*Trust4*) represents the number of non-government organizations¹⁶ in a province per million of the population. We extract data for the number of NGOs between 2007 and 2022 from the National Bureau of Statistics (NBS).

Our fifth measure of social trust (*Trust5*) represents blood donations calculated as the milliliters of blood donated, on a voluntary basis, in 2000 in a province, divided by the province’s population. We obtain these data from the Chinese Society of Blood Transfusion. Like charitable contributions, voluntary blood donations also denote citizens’ altruism and willingness to help the needy.

Empirical Model

To examine the relationship between social trust and environmental violations (H1), we construct our baseline probit regression model as follows:

¹¹ We collected data for environmentally friendly products from the China Research Data Services (CNRDS) database.

¹² The numbers represented “Strongly Disagree,” “Disagree,” “Neutral,” “Agree,” and “Strongly Agree,” respectively.

¹³ The linear method involves estimating an unknown value between two known data points by constructing a straight line between them. The value at the desired point is determined by the equation of the line.

¹⁴ The survey asked individuals: “Do you trust strangers?” We develop *Trust2* by ranking the five options (do not trust greatly, do not trust, neutral, trust, trust greatly) from one to five, i.e., from the lowest to the highest trust choice, and take the average scores for the survey respondents’ selected options by province (for further details, please see Li et al., 2019; Wu et al., 2014).

¹⁵ Previously established evidence (Brooks, 2005; Putnam, 2000) indicates that charitable donations are made on a voluntary basis by individuals, firms and institutions and represent altruism and trust in society.

¹⁶ NGOs are constituted by volunteers to address and solve social issues and represent regional social trust (Putnam, 1994).

$$\text{Prob}(\text{ENV}_{i,t+1}) = b_0 + \beta_1 \text{Trust}_{i,t} + \sum \beta_n \text{Controls}_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t} \tag{1}$$

where the outcome variable is environmental violations (*ENV*) and the main predictor is social trust (*Trust1*), as discussed in Sections "Data and Sample" and "Measuring Social Trust," respectively. "Controls" refer to a vector of control variables (at both the firm and regional levels), which can affect our baseline model, according to related studies (Ang et al., 2015; Jin et al., 2016; Kong et al., 2020; Wu et al., 2014), and which are presented in online Appendix B. λ_t represents time fixed effects. η_i represents industry fixed effects. $\varepsilon_{i,t}$ is an error term. If Hypothesis 1 holds, we expect β_1 to be negative; i.e., social trust (*Trust1*) reduces environmental violations (*ENV*).

Furthermore, in the examination of our second hypothesis (H2), our outcome variable is environmental remedial actions, represented by two proxies: environmental investment (*Env_Inv*) and environmentally friendly products (*Env_Fri_Pro*). We define these variables in Section "Measuring Environmental Remedial Actions."

Descriptive Statistics

Table 1 reports the summary statistics for all variables used in our study. The mean of environmental violations (*ENV*) is 0.222, indicating that 22.2% of firm-year observations are related to environmental deterioration and violations in the form of pollutant discharges. The mean and standard

deviation of environmental violation measures are comparable to that of Kong et al. (2020).

In respect of our main social trust proxy, *Trust1* has a mean of 3.198 and a standard deviation (SD) value of 0.335. Overall, the descriptive statistics on different social trust measures are comparable to related studies (Ang et al., 2015; Shahab et al., 2023a, 2023b; Wu et al., 2014). In terms of environmental remedies, the mean values of environmental investments (*Env_Inv*) and environmentally friendly products (*Env_Fri_Pro*) are 0.014 and 0.479, respectively. The summary statistics for our control variables are also in line with previous literature. We report the results for mean difference tests and correlation in online Appendix C.

Empirical Results and Discussions

Baseline Results: Social Trust and Environmental Violations

Table 2 provides the Probit regression results of Eq. (1) for the impact of social trust (*Trust1*) on environmental violations (*ENV*) in the presence of a set of control variables including industry, year, province, and firm fixed effects. Column (1) shows a significant, negative relationship between *Trust1* and *ENV* without control variables. In column (2), we test the relationship by including control variables and industry and year fixed effects. The results remain consistent with the significant, negative coefficients

Table 1 Descriptive statistics

Variables	N	Mean	SD	5th Percentile	Median	95th Percentile
ENV	5970	0.222	0.415	0.000	0.000	1.000
Trust1	5970	3.198	0.335	2.670	3.205	3.695
Trust2	5825	2.647	0.197	2.315	2.688	3.057
Trust3	3182	0.587	0.630	0.023	0.364	1.930
Trust4	5970	3.232	1.035	1.690	3.180	5.190
Trust5	5895	1.742	1.497	0.280	1.310	3.420
Env_Inv	905	0.014	0.043	0.000	0.003	0.044
Env_Fri_Pro	5680	0.479	0.499	0.000	0.000	1.000
LEV	5970	0.491	0.182	0.167	0.506	0.769
MB	5970	3.007	2.434	0.727	2.278	8.052
CF	5970	0.062	0.070	-0.047	0.056	0.187
Growth	5970	0.176	0.333	-0.215	0.122	0.704
ROE	5970	0.093	0.107	-0.061	0.088	0.267
Size	5970	23.245	1.108	21.567	23.147	25.268
FC	5970	-1.062	0.073	-1.189	-1.060	-0.943
DUAL	5970	1.802	0.399	1.000	2.000	2.000
Inst_Share	5970	12.181	13.190	0.226	8.169	40.536
Strategy	5970	16.888	4.508	10.000	17.000	25.000
GDP	5970	8.133	2.862	3.000	8.000	13.620

Note: This table presents the descriptive statistics (whole sample) for all the main variables of the study

Table 2 Probit regression results for the impact of social trust on environmental violations

	(1)	(2)	(3)	(4)
	ENV			
Trust1	-0.501*** (-4.167)	-0.383*** (-3.290)	-0.241** (-2.021)	-0.760** (-2.455)
LEV		0.583** (2.008)	0.510*** (3.166)	-0.882 (-1.325)
MB		-0.010 (-0.475)	-0.007 (-0.482)	0.126** (2.543)
CF		-0.219 (-0.423)	-0.240 (-0.633)	1.254 (1.206)
Growth		0.493*** (5.219)	0.459*** (5.920)	-0.340* (-1.855)
ROE		-0.160 (-0.450)	-0.002 (-0.007)	1.251 (1.607)
Size		0.025 (0.329)	-0.002 (-0.052)	-0.871*** (-4.925)
FC		0.392 (0.315)	-0.090 (-0.110)	-1.956 (-0.864)
DUAL		0.032 (0.302)	-0.032 (-0.555)	-0.078 (-0.396)
Inst_Share		-0.005 (-1.354)	-0.004* (-1.912)	-0.003 (-0.339)
Strategy		-0.128*** (-10.222)	-0.129*** (-20.529)	0.044* (1.841)
GDP		0.038 (1.481)	0.011 (0.540)	0.123*** (2.716)
Constant	-0.979** (-2.043)	-0.200 (-0.166)	-0.262 (-0.289)	17.079*** (3.932)
Industry effects	Yes	Yes	Yes	No
Year effects	Yes	Yes	Yes	Yes
Province effects	No	No	Yes	Yes
Firm effects	No	No	No	Yes
No of Obs	5970	5970	5970	1141
Pseudo R ²	0.165	0.290	0.314	0.365

Note: This table reports the Probit regression results for the impact of social trust on environmental violations. In all models, the dependent variable is environmental violations (*ENV*). The Independent variable is *Trust1*. In column (3), we include province fixed effects. In column (4), we include firm fixed effects. All continuous variables are winsorized at the 1st and 99th percentiles. Numbers in parentheses are t-statistics. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively. Detailed descriptions of variables are presented in Appendix A

of *Trust1*, thus supporting *Hypothesis 1*. In column (3), we include industry, year, and province fixed effects and in column (4) we control for year, province, and firm fixed effects. Our main results continue to hold across all these specifications. For instance, the results in column (3) show a negative and statistically significant effect of social trust

on environmental violations with a coefficient of -0.241 at the 5% significance level. In terms of economic significance, this result indicates that a one-standard deviation increase in social trust is associated with a 36.37% lower likelihood of environmental violations.¹⁷ In terms of control variables, leverage (*LEV*), revenue growth rate (*Growth*), and strategy (*Strategy*) are significantly associated with environmental violations. Overall, the results of all columns in Table 2 consistently show that *Trust1* can significantly reduce environmental violations.

Theoretically, our findings are in line with the contention that social norms impose normative pressure (Cialdini et al., 1991; Elster, 1989), under which managers become reluctant to violate environmental laws in high-trust areas, and consequently, firms exhibit behaviors considered compatible with social morality. Businesses in high-trust areas are less inclined to violate environmental laws because this could result in legal action and sanctions, which would damage the managers' reputational capital and also call into question the legitimacy of their enterprises. Empirically, our results add fresh evidence to the growing literature examining the financial and non-financial outcomes of (regional) social trust, including higher CSR performance (Hoi et al., 2018; Jha & Cox, 2015), increased foreign ownership (Jin et al., 2016), reduced crash risk (Li et al., 2017), reduced risk of expropriation for foreign firms (Ang et al., 2015), IPO underpricing (Li et al., 2019), and access to increased credit from suppliers (Wu et al., 2014). Departing from these studies, our analyses demonstrate that the positive impacts of social trust not only help by protecting shareholders' interests, but also preserve the environment. promoting the well-being of a wider range of stakeholders and the community by inculcating corporate behaviors that underpin firms' ecologically responsible strategies, thereby providing strong support for our *H1*.

Remedial Actions in the Aftermath of Environmental Violations: The Role of Social Trust

To empirically test hypothesis H2, we examine the firm's propensity to engage in restorative justice by engaging in remedial actions in the post-violation period. We focus on environmental investment as our main proxy for environmental remedial actions undertaken by firms to foster environmental justice.

The results in Table 3 and Fig. 1 demonstrate that environmental offenders (ENV_t) are more likely to undertake environmental remedial actions by way of increased

¹⁷ Economic significance is calculated as standard deviation of trust (0.335) × coefficient of trust (-0.241) / mean value of environmental violations (0.222) = 0.3637, or 36.37%.

Table 3 Social trust and remedial actions in the aftermath of environmental violations

	(1)
	Env_Inv _{t+1}
Trust1 * ENV _t	0.002*** (3.187)
ENV _t	-0.004** (-2.531)
Trust1	-0.001 (-1.544)
LEV	-0.0008 (-1.228)
MB	-0.000 (-0.833)
CF	0.002* (1.837)
Growth	-0.001* (-1.687)
ROE	0.002*** (2.615)
Size	-0.001** (-2.374)
FC	0.004 (1.347)
DUAL	-0.001* (-1.781)
Inst_Share	0.000 (1.098)
Strategy	0.000 (0.628)
GDP	-0.000 (-0.186)
<i>Additional Controls for Remedial Actions</i>	
ESG_SH	0.001*** (3.255)
Board_Size	0.001** (2.175)
Independent	0.005*** (2.800)
ISO14001	-0.001 (-1.273)
Environmental_regulatory_intensity	0.004 (1.520)
Constant	0.013*** (3.831)
Year FE	Yes
Firm FE	Yes
Province FE	Yes
N	750
Adj. R ²	0.384

Note: This table reports the regression results for social trust and remedial actions in the aftermath of environmental violations using an interaction term. In column (1), we use environmental investment divided by revenue (*Env_Inv*) as the main proxy for environmental remedial actions. All continuous variables are winsorized at the 1st and 99th percentiles. Numbers in parentheses are t-statistics. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% lev-

Table 3 (continued)

els, respectively. Detailed descriptions of variables are presented in Appendix A

environmental investments (column 1, Table 3) in high-trust regions in the post-violation period. In particular, the interaction term in columns 1 of Table 3 is positive and significant at a 1% level, providing support for hypothesis H2. These results show that in the post-violation period, firms in high-trust regions are more likely to undertake environmental remedial actions.¹⁸ Moreover, we have also included additional controls¹⁹ for an in-depth analysis of our second hypothesis.²⁰ First, following previous literature (Lee & Xiao, 2020; Nadeem, 2021; Zhang et al., 2021, 2024), we include (a) shareholder environmental activism (*ESG_SH*) to represent activism toward environmental agendas and measure it as an indicator variable equal to 1 if ESG funds have invested in the firm and 0 otherwise; (b) board size (*Board_Size*) defined as the natural logarithm of the total board size; (c) board independence (*Independent*) calculated as the number of independent directors divided by the total number of directors; (d) certification of ISO14001 standard (*ISO14001*) as an indicator variable that equals 1 if a firm has installed an effective environmental management system by implementing the ISO14001 standard and 0 otherwise. Second, following Chen et al. (2023), we add an environmental regulatory-related control variable (*Environmental_regulatory_intensity*) computed as the annual environmental regulatory intensity of various provinces based on the frequency of sentences pertaining to “environmental protection” stated in government reports during our sample period. Our results continue to hold after controlling for these additional factors.

Theoretically, these findings reaffirm our arguments based on social trust and restorative justice perspectives (Coleman, 1994; Goodstein & Butterfield, 2010; Putnam et al., 1994; Williamson, 1993) that social trust is an important factor in morally repairing the damage caused by environmental infractions, which can help in regaining the confidence of stakeholders and society. These findings contribute to the nascent but growing literature on the determinants of environmental justice (Lee & Xiao, 2020; Nadeem, 2021) and emphasize that in the post-violation phase, violators in

¹⁸ We report the results for the alternate proxy of environmental remedial actions (i.e., environmental friendly products) in Panel A of online Appendix D. Our results hold at 10% significance level, further providing support to our hypothesis H2.

¹⁹ We collected data for these additional controls from China Stock Market and Accounting research (CSMAR), China National Research Database and Services (CNRDS) and other government reports.

²⁰ We are thankful to an anonymous reviewer for this suggestion.

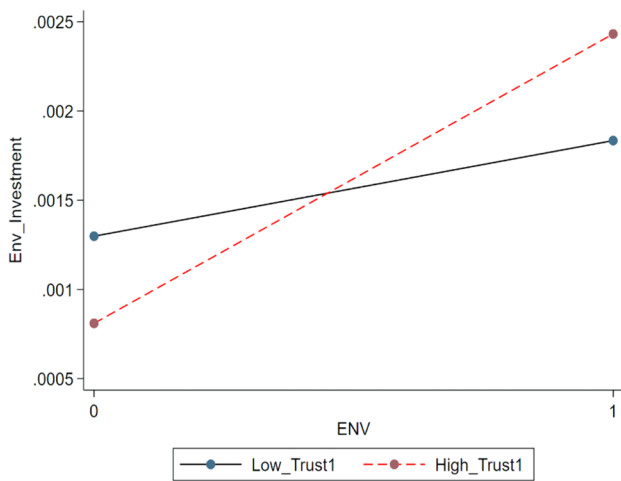


Fig. 1 The interaction plot for social trust and remedial actions, i.e., environmental investments in the aftermath of environmental violations

regions of high trust are more likely to engage in remedial environmental actions (in the form of environmental investments and the production of environmentally friendly products). Thus, we find support for our hypothesis H2.

Further Analyses

Alternative Measures of Social Trust

For robustness, we re-estimate Eq. (1) by using four alternate proxies of social trust (*Trust2*, *Trust3*, *Trust4* and *Trust5*).²¹ The results, presented in Panel B of online Appendix D, indicate that, regardless of whether we use survey-based or non-survey-based measures of social trust, our baseline results remain consistent across all the models' specifications. The results demonstrate that social trust, which represents the level of citizens' trustworthiness, the extent of charitable donations, and the number of NGOs and voluntary blood donations, reduces the likelihood of a firm's committing environmental violations, thus reaffirming the baseline findings.

In addition, we re-estimate results for our hypothesis H2 using these four alternate proxies of social trust (*Trust2*, *Trust3*, *Trust4* and *Trust5*) and introduce interaction terms between each of these alternate proxies with the post-environmental violation period into the estimation. The results, presented in Panel C of online Appendix D, indicate that,

regardless of whether we use survey-based or non-survey-based measures of social trust, our interaction results for hypothesis H2 remain consistent in all the models' specifications, indicating that our main findings are robust to alternative measures of social trust.

Addressing Endogeneity

We address endogeneity concerns in the following ways. First, we utilize an instrumental variable (IV) approach, employing a two-stage least squares (2SLS) estimation technique. A valid instrument for our predictor variable (social trust) must meet the validity condition that it has a high correlation with the independent variable (trust), as well as the exclusion condition that it has no correlation with the residuals from the baseline Eq. (1). Following Ang et al. (2015) and (Li et al., 2019), we employ the number of dialects in a province (*Dialects*) as our instrument. Some studies (Ang et al., 2015; Jin et al., 2016; Li et al., 2019, among others) reason that the diversity among dialects in China is an exogenous factor driving huge differences in levels of social trust across provinces.

To check the validity of our instrument, we perform exclusion tests. We follow the literature (Acemoglu et al., 2012) and add our instrument, i.e., the number of distinctive dialects in a province (*Dialects*),²² into Eq. (1). If our instrument is exogenous to environmental violations, we predict that the coefficients of *Dialects* will not be significant. Table 4, column (1) presents the results, confirming that the coefficient of *Dialects* is not significant. We also conduct the Hansen over-identification test, where the *p*-value of Hansen's J-statistic is 0.291, indicating that we cannot reject the null hypothesis that the instrument is exogenous.

Column (2) presents the results of the first stage, where the dependent variable is our main proxy of social trust (*Trust1*), and we include *Dialects* as an IV, all control variables, and industry and year fixed effects. Column (2) shows that the IV (*Dialects*) is highly significant and negatively associated with *Trust1*, with a strong value of the F-statistic ($F = 177.004$, weak IV test), thus meeting the requirements of relevance tests. Column (3) reports the results for the second stage, where the dependent variable is environmental violations (*ENV*) and instrumented $Trust1^{\wedge}$ from the first stage is the predictor. The coefficient of the instrumented $Trust1^{\wedge}$ remains negative and significant. The 2SLS results reinforce support for hypothesis H1 that social trust reduces the likelihood of environmental violations.

²¹ Previous studies (Ang et al., 2015; Li et al., 2017, 2019; Wu et al., 2014) on social trust have also employed these alternative measures of social trust for a robustness check while investigating the different outcomes of social trust in Chinese listed firms.

²² *Dialects* represents the number of distinctive dialects spoken in a province and is obtained from the Chinese Academy of Social Sciences (1987, 1990).

Table 4 Endogeneity test results using two-stage least squares (2SLS) estimation technique

	(1) Exclusion Tests ENV	(2) First_stage Trust1	(3) Second_stage ENV
Dialects	0.033 (1.430)	−0.035*** (−13.304)	
Trust1	−0.352** (−1.459)		−1.252*** (−3.767)
LEV	0.568*** (3.664)	−0.056* (−1.882)	0.493*** (3.133)
MB	−0.010 (−0.717)	0.002 (0.689)	−0.008 (−0.583)
CF	−0.233 (−0.628)	−0.093 (−1.281)	−0.308 (−0.850)
Growth	0.490*** (6.444)	−0.049*** (−3.260)	0.424*** (5.179)
ROE	−0.179 (−0.685)	−0.079 (−1.528)	−0.244 (−0.953)
Size	0.029 (0.663)	0.017** (1.969)	0.044 (0.998)
FC	0.431 (0.540)	−0.336** (−2.184)	0.105 (0.134)
DUAL	0.035 (0.623)	0.008 (0.707)	0.041 (0.738)
Inst_Share	−0.005** (−2.513)	0.000 (0.684)	−0.004** (−2.345)
Strategy	−0.128*** (−21.350)	0.005*** (4.303)	−0.118*** (−14.185)
GDP	0.031* (1.875)	−0.036*** (−11.428)	−0.003 (−0.153)
Constant	−0.401 (−0.506)	2.831*** (22.044)	2.207* (1.838)
Industry effects	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
No of Obs	5970	5970	5970
Adj R2/Pseudo R2	0.291	0.317	0.191
Weak IV Test (F-Statistics)		177.004	

Note: This table reports the results of the endogeneity test for the relationship between social trust and environmental violations using the 2SLS estimation technique. Following related literature (Li et al., 2019), we employ one instrumental variable (IV), i.e., dialects. In column (1), the dependent variable is *Trust1* and the instrumental variable is *Dialects*. In column (2), the dependent variable is *ENV*, and the independent variable is *Trust1*. All continuous variables are winsorized at the 1st and 99th percentiles. Numbers in parentheses are t-statistics. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively. Detailed descriptions of variables are presented in Appendix A

Social Trust and Environmental Violations: The Role of Reputational Pressure

In additional analyses, we examine the moderating role of reputational pressure in the social trust–environmental violations relationship, arguing that social trust should have an even more powerful effect when firms face higher reputational pressure. Firms operating within high-trust

communities face heightened reputational pressures as negative information regarding their environmental violations may be more widely disseminated (through high media coverage and high analyst coverage) and scrutinized (by the Big 4 audit firms). Furthermore, firms will suffer greater reputational damage in the event of irresponsible behaviors or violations of trust because they operate businesses in trustworthy regions (Cahan et al., 2023). Media coverage is

a powerful means of holding companies to account for their environmental transgressions; for example, by disclosing (a) their involvement in pollution (Jia et al., 2016), or (b) their misuse of harmful pesticides in agricultural farming (Mohr & Höhler, 2023). Media accounts of such activities increase public awareness of corporate wrongdoing, driving away both consumers and investors and increasing the likelihood of legal and regulatory actions. Hence, the resulting reputational pressure can motivate companies to engage in responsible environmental practices to protect their public image. Based on the foregoing discussions, we contend that the impact of social trust in curbing environmental violations should be markedly higher in firms exposed to greater reputational pressure, contributing toward the internalization of strong societal norms discouraging unethical conduct and environmentally irresponsible behavior.

To empirically test these assertions, we employ (a) media coverage (*Media*), calculated as the natural logarithm of the total number of media reports for each firm-year (Francis et al., 2008); (b) analyst coverage (*Analysts*), calculated as the natural logarithm of one plus the total number of analysts making earnings forecasts (Zhang et al., 2015); (c) Big 4 audit firms (*BIG4*), which is a dummy variable equal to 1 if

the auditor is one of the Big-4 audit firms, and 0 otherwise; and (d) the number of institutional site visits (*SV*) to measure a firm's reputational pressure. We incorporate interaction terms of each of these variables with our main measure of trust (*Trust1*). The results are presented in Table 5, indicating that the interaction terms in all the columns are negative and statistically significant. These results demonstrate that the negative impact of social trust on environmental violations is stronger in companies that experience greater reputational pressure in the form of (a) media coverage (column 1), (b) analysts coverage (column 2), and (c) the presence of Big-4 audit firms (column 3). Figure 2 illustrates the interaction plots for the moderating role of reputational pressure on the nexus between social trust and environmental violations. These results are clear evidence that firms faced with greater reputational pressure conform to social norms and are less likely to commit environmental infractions.

Theoretically, our findings align with the social norms perspective (Cialdini et al., 1991; Elster, 1989) that social norms induce normative pressure, and firms under higher reputational pressure are even more likely to avoid anti-environmental behaviors and adhere to pro-environmental policies by demonstrating commitment to the new normative

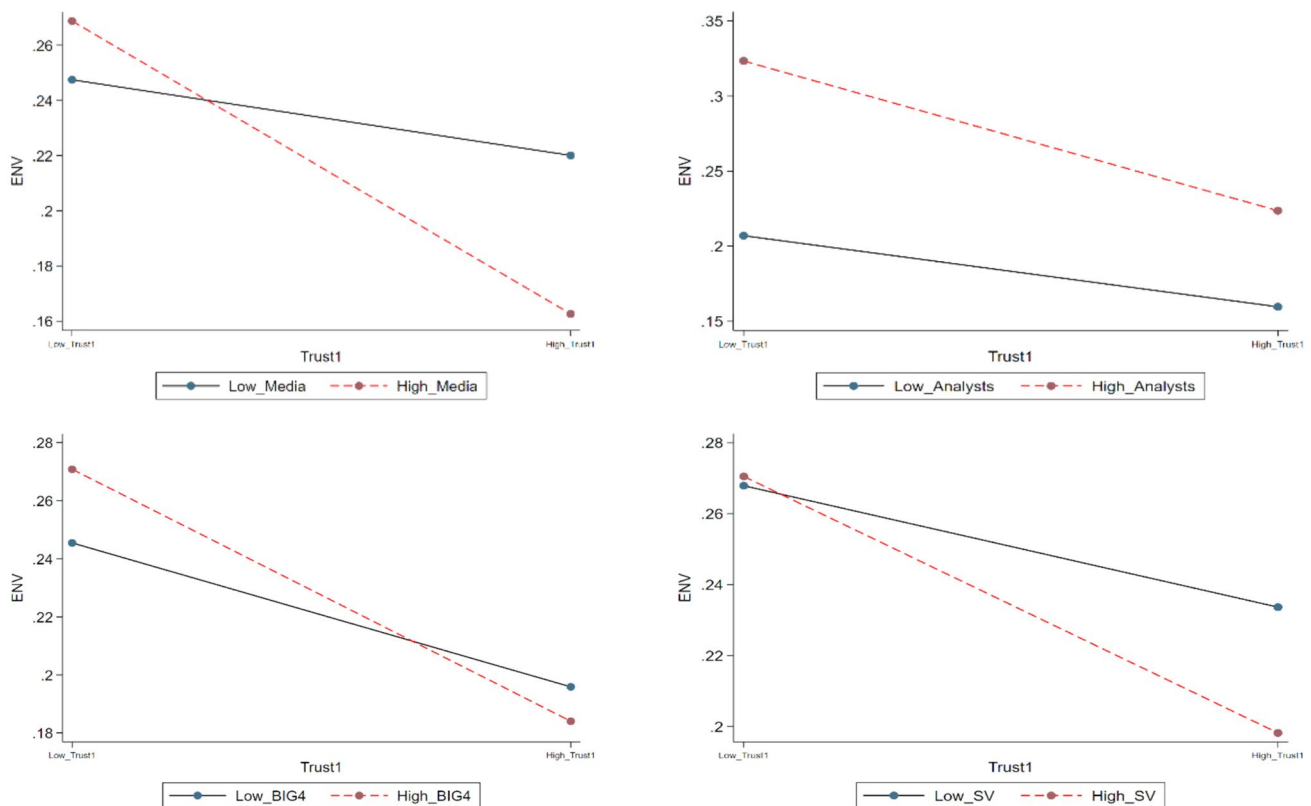


Fig. 2 Interaction plots for social trust and environmental violations: The role of (a) media coverage, (b) analyst coverage, (c) big four auditors and (d) institutional site visits

Table 5 Results for the role of reputational pressure

	(1)	(2)	(3)	(4)
	ENV			
Trust1 * Media	-0.282*** (-4.144)			
Trust1 * Analysts		-0.076** (-2.315)		
Trust1 * BIG4			-0.411* (-1.945)	
Trust1 * SV				-0.193 (-1.190)
Trust1	0.807** (2.461)	-0.343*** (-3.425)	-0.474*** (-6.059)	-0.053 (-0.169)
Media	0.858*** (3.932)			
Analysts		0.350*** (3.281)		
BIG4			1.347** (1.981)	
SV				0.568 (1.091)
Constant	-5.26*** (-3.753)	0.136 (0.157)	-0.374 (-0.443)	4.559*** (2.814)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
N	5711	5616	5616	1635
Pseudo R2	0.289	0.290	0.286	0.303

Note: This table reports the Probit regression results for the impact of social trust on environmental violations while including the interaction term on the basis of different measures of reputational pressure. In all models, the dependent variable is environmental violations (ENV). The Independent variable is *Trust1*. We use media coverage (*Media*), analyst coverage (*Analysts*), top four audit firms (*BIG4*), and the number of institutional site visits (*SV*) to measure firm's reputational pressure. All continuous variables are winsorized at the 1st and 99th percentiles. Numbers in parentheses are t-statistics. ***, **, and * indicate significance (two-tailed) at the 1%, 5%, and 10% levels, respectively. Detailed descriptions of variables are presented in Appendix A

standards. Thus, a firm with high reputational pressure has more to lose if it undermines positive norms by proselytizing negative environmental behaviors (Liu et al., 2022a, 2022b).

Other Robustness Tests

We perform additional robustness checks. (a) We re-run our results for Tables 2 and 3 using four alternate proxies of social trust, reporting the results in online Appendix D. (b) We implement propensity score matching (PSM), the entropy balancing method (EBM), and the Heckman two-step model to control for self-selection bias, providing the

discussion and results in the online Appendices E, F, and G, respectively. (c) We re-examine our baseline model, excluding the time periods of the Global Financial Crisis and Covid-19 Pandemic, providing robust results in online Appendix H.

Discussion and Conclusions

In this study, we address two novel questions. First, we employ the social norms perspective and examine whether social trust reduces a firm's likelihood of committing environmental violations. Second, we integrate the arguments of social trust with the restorative justice perspective and determine whether social trust influences firms' decisions to undertake environmental remedial actions in the post-violation period. Thus, we focus on the concrete rather than the symbolic practices of firms in the post-environmental violation period. We employ a time-variant measure of social trust and analyze a unique sample of environmental infractions and environmental remedial actions of Chinese firms. Our findings are twofold. First, social trust is influential in reducing environmental infractions. This negative nexus illustrates the normative pressure that deters managers from engaging in environmental infractions in high-trust areas and motivates ethical behaviors that are consistent with accepted social morality. Second, high social trust stimulates firms to engage in environmentally remedial actions by undertaking ecological investments and the production of environmentally friendly products, thus supporting social trust and restorative justice.

Our findings contribute to the business ethics, social trust, and restorative justice literature in the following ways. First, in contrast to previous studies of corporate environmental responsiveness to climate change, our investigation elucidates the relationship between social trust and corporate ethical behavior through environmental violations. From shareholder-oriented to stakeholder-oriented perspectives, we argue that social trust—as an informal construct—can play a vital role in curbing corporate unethical behavior.

Second, we present novel evidence of the potential impact of social trust on a firm's propensity to participate in remedial actions in the aftermath of environmental violations, such as by accepting responsibility for making environmental restitution or applying measures to prevent future infractions. By incorporating restorative justice and social trust frameworks, our analysis of a firm's conduct following violations establishes that social trust significantly influences how corporations react to reputational and environmental harm as well as how they initiate ethical restoration. In this manner, we enhance the understanding of the potential for operationalizing social trust to promote environmentally reparative actions. Thus, our research has significant

implications for the development of corporate sustainability strategies, regulatory frameworks, and community engagement practices.

Moreover, although social trust is crucial in promoting corporate ethical behavior, we do not posit that social trust alone can effectively address climate change. Based on our findings, the introduction of environmental standards and social trust may have complementary effects. Environmental standards provide a structured framework for businesses to meet environmental performance benchmarks, whereas social trust fosters voluntary compliance and ethical behavior. Trust enhances the effectiveness of environmental standards by promoting greater acceptance and adherence. Social trust builds commitment, encourages innovation, and promotes transparency and accountability. In high-trust regions, firms are more likely to internalize environmental standards and integrate them into their corporate ethos, leading to more meaningful and sustained environmental improvements. This combination of trust and environmental standards is essential for addressing global climate change. For example, the recent introduction of International Financial Reporting Standards (IFRS) S1 and S2, which provide a framework for corporate behavior,²³ can complement social trust on the basis of our novel findings. The study highlights the need for such standardized frameworks to guide corporate behavior, enhance accountability, promote consistency, and support corporate decision-making. This dual approach can create a more comprehensive strategy for addressing environmental challenges.

This study also has policy implications, from an ethical perspective, in the development of socially focused research (Du et al., 2023; Hockerts & Searcy, 2023). The findings suggest that policy-makers should integrate a code of ethics into environmental regulations, thus combining stringent standards with moral precepts that will build social trust. We recommend that companies inculcate ethical cultures that emphasize transparency, accountability, and stakeholder engagement; promote long-term sustainability; and align corporate interests with societal well-being. Policy-makers should adopt an integrated approach, combining stringent environmental standards with initiatives to build social trust. For example, engaging stakeholders in policy-making and promoting transparency in corporate environmental reporting can foster trust and ensure fairness.

In the current era, politicians are confronted by the dystopian threat of climate change and the urgent need to implement policies to halt and hopefully reverse the impact of global warming. Similarly, companies are under intense

public pressure to enhance their green credentials and adhere to environmental rules and regulations, risking fines, loss of investment, and possibly liquidation should they fail to comply. By identifying the relationships among environmental infractions, levels of social trust and social norms, and environmental remedies, our study determines that this fundamental problem requires both an ethical and a practical solution. Governments cognizant of this relationship can develop strategies that consider these factors, while companies wishing to avoid the negative consequences of breaking environmental regulations will be encouraged to implement effective systems of control and restorative justice by means of remedial actions.

Although our findings are arguably relevant to other economic contexts, the differing levels of social trust likely to be found in other countries mean that no single solution will apply in all arenas. Therefore, engaging in similar research in different nations will generate insights that will be vital in the global struggle to combat climate change, ultimately establishing an integrated strategy that will obviate the dystopian threat that the world confronts. We also acknowledge several limitations of our study due to differences in regulatory frameworks, cultural norms, institutional structures, and economic and developmental contexts. In particular, the rapid evolution of China's regulatory environment (with a focus on rigorous environmental policies and enforcement), the US's established Environmental Protection Agency (EPA), and the European Union's cohesive environmental policy framework confront unique challenges. Cultural norms, institutional structures, and economic development also play a role in shaping environmental standards. Additionally, the generalizability of the findings may be limited by industry-specific regulations and the level of economic development and industrialization in different countries. Consequently, future research should explore the interaction between trust and environmental standards across nations to understand how social trust in varying cultural contexts shapes corporate environmental behavior. Such research will provide new insights into ethical implications and deeper insights into effective environmental governance. We also acknowledge that, while our newly introduced main social trust variable is a time-variant measure, our alternative proxies of social trust lack time-variant characteristics. This limitation presents an opportunity for future research to explore more dynamic proxies. Furthermore, although we employed four different proxies to capture reputational pressure—specifically, media coverage, analyst coverage, the scrutiny of Big Four auditors, and institutional site visits—these measures remain indirect. Future studies could enhance the assessment of reputational pressure by developing more direct and precise evaluation methods.

²³ The detailed report can be accessed from the official website of IFRS. <https://www.ifrs.org/content/dam/ifrs/project/general-sustainability-related-disclosures/project-summary.pdf>

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Data Availability The authors do not have the right to share data.

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