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ORIGINAL RESEARCH

Nothing to fear: strong corporate culture and workplace safety

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Abstract
In this paper, we investigate the link between corporate culture and workplace safety. Using a machine learning based measure of corporate culture and data on employee- and safety-related violations, we find that firms with stronger corporate culture are less likely to be penalized, incur lower regulatory fines, and have a reduced number of violations. As a potential channel, we document higher safety expenditures with stronger corporate culture. When we examine establishment-level data on actual injuries and illnesses, we find that firms with stronger corporate culture have significantly lower injury and illness rates. While shareholders have previously been found to benefit from a stronger corporate culture, we contribute with both research and practical implications on the positive effects of a strong corporate culture for employees and society at large.

Keywords Employee well-being · Corporate culture · Workplace injuries · Workplace safety

JEL Classification G3 · J28 · K32 · M41

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1 Introduction

The recent survey by Graham et al. (2022) highlights that Chief Executive Officers (CEOs) view corporate culture as a key component of financial performance. Li et al. (2021a) and Li et al. (2021b) empirically validate the finding, by showing that firms with stronger corporate culture have greater operational efficiency and higher firm value, in both normal and exceptional circumstances. However, it is still unclear whether these economic benefits arise at the expense of other stakeholders, or whether a stronger corporate culture promotes benefits for shareholders and other stakeholders alike. To shed further light on this question, we focus on the employees which constitute a key corporate stakeholder that may suffer from shareholder wealth maximization in the context of workplace safety. Prior research, such as Ostrom et al. (1993), Beck & Woolfson (1999), Choudry et al. (2007), and Beus et al. (2016), recognizes the importance of a safety-oriented corporate culture when it comes to mitigating workplace accidents. This is perhaps not surprising considering that such a culture should have a positive impact on workplace safety. However, a strong safety-oriented corporate culture does not necessarily indicate a strong corporate culture more broadly, and we are unaware of any study examining whether the strength of corporate culture in general influences workplace safety.

This is a salient omission because the level of safety at the workplace is an ethical consideration for business and a real corporate social responsibility (CSR) issue which translates to substantial costs and human suffering. On a yearly level, the International Labor Organization (2019) estimates a global number of 2.78 million workplace deaths and 374 million workplace accidents. In the United States (U.S.), Leigh (2011) notes that the medical and indirect costs of workplace injuries and illnesses are sizable, exceeding the cost of cancer.[1] Given the significant impact of workplace injuries, accidents, and illnesses on individuals and the society at large, it is crucial to understand the factors that contribute to their prevention and mitigation. Recent research suggests that CEOs have placed greater emphasis on corporate culture over time (Li et al. 2021b), which further highlights the need to investigate how it affects individuals and groups beyond shareholders.

Anecdotal evidence suggests that the absence of a strong corporate culture can be a fundamental aspect in avoidable institutional breakdowns. For example, the shared beliefs and values regarding appropriate attitudes and behaviors that characterize a strong corporate culture (O'Reilly & Chatman 1996) were absent in early large-scale failures such as the Chernobyl nuclear disaster (Pidgeon 1998) and Piper Alpha oil rig explosion (Paté-Cornell 1993). Furthermore, a strong corporate culture is associated with a long-term emphasis (Graham et al. 2022; Li et al. 2021a, b) and improved coordination of activities, which has been documented to create a safer working environment (Pagell et al. 2015; Cohn & Wardlaw 2016; Caskey & Ozel 2017). However, a strong corporate culture is not necessarily a panacea for workplace safety. Willmott (1993) highlights the dark side of a strong corporate culture and argues that blind adherence to a monolithic set of values and norms might rob employees of their personal autonomy and good judgement. The Deepwater Horizon disaster is a prominent example, where the profit-oriented culture disregarded both employee and environmental safety by sanctioning myopic exploration of resources which had disastrous consequences (Edersheim 2010; Amernic & Craig 2017). Finding inferior safety records in firms with stronger

[1] The costs in Leigh (2011) amount to $250 billion which includes $67 billion in direct medical costs (e.g., costs of hospital stay and treatment by physicians) and $183 billion in indirect costs (e.g., lost current and future earnings).

corporate culture would also be in line with Vaughan (1999), who underscores that the process of producing desirable financial outcomes may simultaneously create toxic corporate behavior that generates mistakes and misconduct.

At the same time, Posner et al. (1985) provide evidence that the characteristics of a strong corporate culture are related to ethical behavior and reduced work-related stress. Similarly, Hoi et al. (2013) find that firms adopting a strong corporate culture focus more on non-shareholder stakeholders in the context of tax avoidance. With employees as a primary internal stakeholder, firms with stronger corporate culture may improve employee well-being by increasing safety spending or by reducing workloads. If they do so, we would expect a higher level of workplace safety in firms with a stronger corporate culture. Without altering the use of resources, firms with stronger corporate culture may also experience a higher level of safety due to a superior ability to establish collective beliefs, norms, and knowledge within the organization (Carrol & Harrison 1991; De Jesus-Rivas et al. 2016). Furthermore, firms with stronger corporate culture have incentives to allocate resources to safer workplaces (Edmans 2011; Unsal & Hassan 2023), even though such actions initially may transfer utility from shareholders to other stakeholders (i.e., employees). In this study, we empirically disentangle the association between corporate culture and workplace safety.

Despite the pivotal importance of understanding how and why culture matters, we have a limited comprehension about corporate culture and its implications primarily due to definition and measurement issues in previous research (O'Reilly & Chatman 1996; Zingales 2015; Graham et al. 2022). We overcome many challenges by measuring the strength of corporate culture with a novel machine learning approach developed and validated by Li et al. (2021b). This analytical technique utilizes computers to identify cultural values communicated by top executives to financial analysts during the question and answer (Q&A) session of earnings calls. The starting point is the most frequently advertised corporate values of the S&P 500 firms: innovation, integrity, quality, respect, and teamwork. The final measure captures corporate culture for a broad cross-section of publicly listed firms in the U.S.

In our main statistical analyses, we combine the measure of corporate culture with data on regulatory fines for employee- and safety-related violations from Violation Tracker for a sample of 16242 firm-year observations spanning 2002–2018. This approach allows us to estimate a direct cost of breaches in workplace safety and unveils that firms with stronger corporate culture are associated with both fewer and lower fines. We conduct several additional tests to unravel the underlying reasons behind this pattern and to ensure its robustness. First, we examine the channels behind the observed relationship and document that firms with stronger corporate culture allocate more resources to workplace safety. Second, we follow Li et al. (2021a) and separately study the safety implications of people- and tech-oriented corporate cultures and observe that firms with stronger tech-oriented corporate cultures have better workplace safety. Third, we use an instrumental variable and a propensity-score matching (PSM) approach to alleviate potential concerns about endogeneity and functional form misspecifications. Fourth, we use an alternative measure of corporate culture based on Fiordelisi and Ricci (2014) and find that stronger collaborative and creative cultures are associated with better workplace safety. Finally, we examine workplace injuries and illnesses recorded by the U.S. Occupational Safety and Health Administration (OSHA). We observe that firms with stronger corporate culture have lower injury and illness rates, as well as fewer days away, restricted, or transferred due to illnesses and injuries.

We add to the existing literature in three distinct ways. First, we contribute to the workplace safety literature by studying how cultural factors within corporations can reduce

misconduct towards employees. Even though the underlying factors behind workplace safety have been thoroughly documented by previous research (Christian et al. 2009; Gyekye & Salminen 2009; Beus et al. 2016), it is relevant to acknowledge that the interaction between these factors and corporate culture remains unexplored in wider cross-sectional settings. We approach the topic in a similar way as prior finance studies showing that firms with higher leverage (Cohn & Wardlaw 2016), firms facing high external pressure (Caskey & Ozel 2017), and firms in less religious areas (Amin et al. 2021) are associated with inferior safety records. We add to prior literature with evidence that implicit values and norms within corporations can assist in mitigating the human suffering and substantial societal cost of poor workplace safety.

Second, we contribute to a relatively recent stream of literature documenting how corporate culture influences corporate behavior and decision-making with large samples (Guiso et al. 2015; Liu 2016; Jiang et al. 2019; Li et al. 2021a, b). Prior studies in this field have primarily focused on the financial effects of corporate culture and thus not emphasized potential implications for corporate stakeholders beyond shareholders. We extend this literature by documenting that corporate culture has non-financial implications which benefit both employees and society at large.

Finally, we extend the accounting and finance literature on corporate culture and commitment to CSR. This field is characterized by mixed conclusions and much of the previous findings are based on country-level measures of culture or commercial black box Environmental, Social and Corporate Governance (ESG) scores (e.g., Hoi et al. 2013; Di Giuli & Kostovetsky 2014; Bajaj et al. 2023). We contribute to this literature by providing new evidence connecting corporate culture to real workplace safety outcomes which constitutes an unambiguous component of CSR.

We discuss the concepts of corporate culture and workplace safety, related research, and develop a hypothesis in Sect. 2. In Sect. 3, we present the data, methodology, and the descriptive statistics of the sample. In Sect. 4, we report the results of our analyses. Finally, we discuss our findings and limitations and offer suggestions for future research.

2 Theory and hypothesis

2.1 Corporate culture

Corporate culture is a multidimensional subject that poses several challenges to researchers. One challenge is the many different definitions of "culture". In this regard, we follow O'Reilly and Chatman (1996), Kreps (1990), and Sørensen (2002) by viewing corporate culture as a system of shared values and norms within a firm that defines appropriate attitudes and behaviors for the members of the firm, thus serving as an internal social control system. Importantly, we refrain from arguing that only one specific dimension of culture drives a certain behavior since several different aspects of corporate culture can result in the same business outcome (Crémer 1993). Moreover, we rely on the theoretical foundations in the management literature, especially regarding the strong culture hypothesis, where Denison (1984) and O'Reilly and Chatman (1996) define a culture as strong if the values and norms are widely shared and intensely held throughout the organization.

Measurement is another challenge (Zingales 2015; Nash & Patel 2019; Graham et al. 2022). One stream of research examines country-level culture or deeply held national cultural values. For example, cross-country studies highlight the effects of culture on earnings

management (Haga et al. 2019), merger outcomes (Cao et al. 2019), and audit quality (Fung et al. 2022). At the same time, several researchers (e.g., Baskerville 2003; Zingales 2015) note problems of studying culture at an international and aggregate level. Capturing corporate culture at the firm-level in a broad sense can also be problematic and the sample sizes in early research on corporate culture were rather small. For example, Denison (1984) draws on survey data as an indication of cultural managerial style and find higher performance ratios with stronger corporate culture, based on a sample of 34 large U.S. firms. Gordon and DiTomaso (1992) measure culture strength as the coherence of replies to survey items across managers and find better growth rates with strong corporate culture in 11 insurance firms. This is consistent with Denison (1990), who argues that consensus surrounding corporate values increases firm performance. According to Kotter and Heskett (1992), the main driver of the culture and performance link is that strong cultures are more likely to achieve their goals than weak cultures. Furthermore, strong corporate cultures tend to generate an unusual level of personal commitment among employees and establish informal control structures relieved from formal bureaucracy. Building on Kotter and Heskett (1992), Sørensen (2002) finds that strong corporate cultures promote steady firm performance under relatively stable market conditions, but these benefits diminish as volatility increases.

In more recent empirical papers, researchers examine different outcomes of corporate culture with larger samples. Liu (2016) uses the culture of insiders' country of ancestry to construct a proxy for corporate culture and find more opportunistic behavior in firms with a high corruption culture. Guiso et al. (2015) proxy for corporate culture with employee surveys and find that strong cultures relate positively to financial performance, industrial relations, and prospective job applicant attractiveness. Jiang et al. (2019) focus on a single dimension of culture and rely on textual analysis of Chinese firm disclosures to identify the strength and type of corporate culture. Their results suggest that firms with a culture of high integrity exhibit lower investment-cash flow sensitivity relative to other firms.

Instead of relying on proxies or national culture data, Li et al. (2021b) take a machine learning approach. Consistent with the most influential factor in building a firm's culture being the CEO (Di Giuli and Kostovetsky 2014; O'Reilly et al. 2014; Graham et al. 2022), Li et al. (2021b) use earnings calls, where mostly CEOs speak, to score corporate culture. Firms are scored based on the five cultural dimensions of innovation, integrity, quality, respect, and teamwork that S&P 500 firms often promote as core values on their corporate websites.[2] After thorough validation of the final measure, Li et al. (2021b) find that strong corporate culture is associated with an executive compensation design promoting long-term orientation, greater operational efficiency, more corporate risk-taking, less earnings management, and higher firm value. Li et al. (2021a) extend Li et al. (2021b) by separating strong corporate culture into people-oriented and technology-oriented culture.[3] Li et al. (2021a) further find that firms strong in either culture orientation outperform their peers during the COVID-19 pandemic.

[2] Guiso et al. (2015) note that innovation is the most advertised value (80%). Integrity (70%), respect (70%), and quality (60%) are then the most common with teamwork advertised by half of the S&P 500 firms. Only 2.4% advertise all values.

[3] People-oriented corporate culture consists of the dimensions: integrity, respect, and teamwork. Tech-oriented corporate culture compromises the dimensions: innovation and quality.

2.2 Workplace safety

Considering the economic impact and human suffering associated with workplace injuries and illnesses (International Labor Organization 2019), workplace safety is indisputably an ethical issue. Consequently, rating agencies aiming to measure CSR often account for the level of workplace safety in ESG scores (Christensen et al. 2022). Thus, it is essential to understand the mechanisms shaping workplace safety.

In general, high safety standards should be a goal since incidents create direct economic costs for firms in the form of fines (Kniesner & Leeth 2014; Heese & Pérez-Cavazos 2020) as well as indirect costs through higher insurance (Caskey & Ozel 2017) and wage premiums (Viscusi 2010). Furthermore, poor safety records may impede the ability to win government contracts (e.g., U.S. Army 2017, §4) and harm the general perception of the firm (Smith et al. 2011). Higher workplace safety also increases employee satisfaction and Edmans (2011) highlights the importance of satisfied employees in terms of the stock price.

While most research on workplace safety have been conducted in the fields of industrial relations and operations management, there is a growing number of wider cross-sectional studies investigating how incentives derived from capital markets and other factors influence workplace safety. Cohn and Wardlaw (2016) show that illness and injury rates increase with financial leverage. Caskey and Ozel (2017) find that capital market pressure leading to cuts of discretionary expenditures may reduce workplace safety. Amin et al. (2021) focus on a risk-based aspect of religion and argue that local religiosity, which is linked to community solidarity, influences managers' attitude toward workplace safety. In terms of monitoring effects, Heese et al. (2022) find that workplace safety violations and regulatory fines, among other signs of misconduct, increase in local establishments of publicly listed firms after a local newspaper closure. Consistent with upper echelons theory (Hambrick & Mason 1984; Hambrick 2007), Haga et al. (2022) conclude that structurally powerful CEOs increase workplace safety whereas founder CEOs are associated with inferior safety records. Wu et al. (2023) argue that CEO compensation structure also matters and show that a CEO compensation structure aligned with the interests of corporate debtholders is associated with safer workplaces. Thus, executives seem to play an instrumental part in establishing shared values and norms which reduce the risk of workplace injuries and illnesses. De Jesus-Rivas et al. (2016) furthermore show that the presence of foreign employees, with variations in beliefs and norms, increases the probability of an unsafe work environment.

2.3 Hypothesis development

The importance of corporate culture in promoting workplace safety garnered increased attention following large scale failures in the 1980s (Pidgeon 1998; Paté-Cornell 1993), where the attitudes and behaviors that characterize a strong corporate culture (O'Reilly & Chatman 1996) were absent and resulted in catastrophic consequences. Subsequent research has established the importance of culture in this context, demonstrating that safety climate and a safety-oriented culture lead to safer work environments (Beus et al. 2016). However, it is important to note that the concept of safety climate or safety-oriented culture is a specific component of corporate

culture and distinct from an organization's other culture characteristics (Choudry et al. 2007).

The prominent relationship between shareholder value and corporate culture (Guiso et al. 2015; Graham et al. 2022; Li et al. 2021b) constitutes a reason to suspect that firms with a stronger corporate culture adopt a more conservative approach towards allocating resources to employee well-being. When firms start allocating resources to improve workplace safety, it could initially appear as if they are transferring utility from shareholders to the employees. However, such resource reallocation may align shareholder and stakeholder interest, particularly if safety-related expenditures result in increased employee satisfaction. Edmans (2011) shows that employee satisfaction is positively correlated with accounting profitability and long-run stock returns. Unsal and Hassan (2023) also find that employee lawsuits lead to lower financial performance. Moreover, high injury and illness rates lead to disruptions (Wokutch 1990; Choo and Gabrowski 2018). Because such disruptions are costly and will hurt the interests of the shareholders, lower injury and illness rates should be desirable in strong corporate cultures where shareholder value is a key component (e.g., Denison 1984; Kotter & Heskett 1992; Sørensen 2002).

We also note several other factors that underpin a positive association between strong corporate culture and workplace safety. First, survey findings of Posner et al. (1985) show that the characteristics of a strong corporate culture are related to ethical behavior and the work by Hoi et al. (2013) documents that firms adopting stronger corporate culture take a more stakeholder-oriented course of action and tend to forgo tax avoidance activities, reflecting the principles of good corporate citizenship. These findings suggest that stronger corporate culture should be positively related to workplace safety as well, since promoting safe work environments is consistent with ethical behavior and good corporate citizenship. Thus, while we refrain from assuming all firms with strong corporate culture adopt a safety-oriented culture, we consider this contingency, since the opposite would contravene the principles of good corporate citizenship. Moreover, safe work environments can be achieved through improved coordination of activities (Pagell et al. 2015) or technological optimization (Heese & Pacelli 2023). Kitchell (1995) shows that the long-term emphasis, that characterizes strong corporate culture, is predictive of a firms' propensity to embrace new technology and considering that a strong corporate culture also improves coordination and control (Sørensen 2002), we expect positive implications for employee well-being. Carrol and Harrison (1991) further show that a strong corporate culture improves firms' ability to establish collective beliefs, norms, and knowledge throughout the organization. While Willmott (1993) argues that a monolithic set of corporate values and norms deprive employees of their good judgement, we emphasize the bright side of strong corporate communality which shape implicit behavioral guidelines that prevent unforeseen contingencies such as regulatory fines. Finally, considering that myopic actions has been shown to be detrimental to workplace safety (Cohn & Wardlaw 2016; Caskey & Ozel 2017), and that a strong corporate culture is associated with a long-term emphasis (Graham et al. 2022; Li et al. 2021a, b), we posit that there is a positive relationship between stronger corporate culture and workplace safety. Building on these arguments and an expectation of better employee well-being in firms with stronger corporate culture, we express a directional hypothesis as follows:

H1 Firms with stronger corporate culture are associated with safer workplaces.

3 Research design

3.1 Sample and variables of interest

Because corporate culture is multidimensional and inherently hard to measure, we mainly rely on the strong culture hypothesis literature (e.g., Denison 1984; O'Reilly & Chatman 1996; Sørensen 2002) and the established and validated measure of corporate culture by Li et al. (2021b). The measure captures five corporate cultural values of innovation, integrity, quality, respect, and teamwork. To evaluate the strength of each value dimension, Li et al. (2021b) use a semi-supervised machine learning approach for textual analysis. This method uses a neural network word embedding model that can learn the meaning of the words and phrases in the Q&A section of earnings call transcripts so that synonymous words and phrases are used to construct a dictionary of words and phrases associated with corporate culture. The dictionary contains five lists of words and phrases, each of which corresponds to one of the five value dimensions.[4] Finally, a weighted-frequency count of the dictionary words and phrases is used to score the culture of a firm based on earnings calls. We then follow Graham et al. (2022) and take the aggregate of the five value dimensions to create our main corporate culture measure (*Culture*).[5,6] Crémer (1993) provides theoretical justification for this approach since different aspects of corporate culture can result in the same business outcome.

To quantify the level of workplace safety, we mainly use a dataset from Violation Tracker that records fines for workplace misconduct. The Violation Tracker dataset has recently gained attention in the finance and accounting literature (e.g., Heese & Pérez-Cavazos 2020; Zaman et al. 2021; Heese et al. 2022). This data source is assembled by the Corporate Research Project of Good Jobs First and incorporates statistics from more than 40 federal regulatory agencies. While the data covers a wide range of regulatory violations and other forms of malpractice, we focus on observations with fines related to employee misconduct from establishments of publicly listed firms in the private sector.[7] Following Zaman et al. (2021), we aggregate the establishment-level data to the firm-level.

We use the Violation Tracker dataset to generate three measures of workplace safety. The first is *Fined*, which is a dichotomous variable taking the value of one given that the firm was fined during the year and zero otherwise. Our second measure, *Fines*, is the dollar amount of fines. By considering the magnitude, we also manage to obtain the severity

[4] In Appendix, Table 10, we note the most frequently occurring words for each dimension. Regarding *Integrity*, we acknowledge that there is an association with safety-related words and therefore conduct additional analyses with alternative measures where such words are not included in the underlying dictionary.

[5] We conduct a principal component analysis (PCA) to empirically investigate the reasonableness of aggregating the five value dimensions to a one-dimensional measure of corporate culture. In our (untabulated) PCA, the first factor has an eigenvalue of 2.07 and accounts for 41.34% of the total variation among the five value dimensions. Moreover, the factor is positively associated with all dimensions. The second factor's eigenvalue is 0.97. Following Custódio et al. (2013), we only consider factors with eigenvalue larger than 1.00. Using the PCA, we obtain a single factor, which supports our use of a one-dimensional measure of corporate culture.

[6] Li et al. (2021a) construct a dummy variable for strong culture by first aggregating the values of the five culture dimensions and then defining firms with strong corporate culture as those in the top quartile of Compustat firms for a given year. We are able to reproduce our main results using the strong culture dummy (untabulated).

[7] Of the employee violations and related fines, 80.14% are given for workplace safety violations. Using only workplace safety violations do not impact our results (untabulated).

of the misconduct. The third measure is *Numb,* which is the number of fines during the year. To construct our sample, we begin with 158,859 firm-year observations from Compustat covering the period 2002–2018. We combine the dataset with data on corporate culture from Li et al. (2021b). We further match this dataset with executive and board data from Execucomp and BoardEx. These initial steps yield a sample of 21751 firm-year observations. We combine this sample with data on employee violations from Violation Tracker. We exclude firms from regulated (SIC 4900–4999) and financial industries (SIC 6000–6999) and observations with missing data items on any of the variables used in our main analysis (see description of Eq. (1)). The final sample covers 16242 firm-year observations from 1747 firms.

3.2 Regression models and control variables

To examine the association between corporate culture and workplace safety, we estimate the following model:

$$Fined_{i,t} = \alpha_0 + \beta_1 Culture_{i,t} + \boldsymbol{\beta} Controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $Fined_{i,t}$ is a dichotomous variable taking the value one given that firm i was fined for employee-related misconduct at time t. We firstly estimate the model using a logit regression. In alternative setups, we use the count variables, *Fines* and *Numb,* as dependent variables and estimate Eq. (1) using Poisson regressions.[8] *Culture* is our variable of interest, and to obtain robust estimates, we control for firm characteristics in accordance with Cohn and Wardlaw (2016). We include independent variables measuring firm size (*LnAssets*), financial constraints (*Cash/Assets*, *CashFlow/Assets*, *Dividend/Assets*, and *Leverage*), asset turnover (*Sales/Assets*), growth opportunities (*Capex/Assets*, *Market/Book*) and tangibility (*PPE/Assets*). Besides firm characteristics, we add additional controls for corporate governance characteristics. More specifically, we include variables for CEO age (*CEOage*), female CEOs (*CEOgender*), whether the CEO acts as the chairperson of the board (*CEOduality*), and the proportion of independent directors on the board (*BoardInd*). In Eq. (1), we also employ fixed effects (*Industry* and *Year*) to mitigate potential bias from omitted variables. Variable definitions are available in Appendix, Table 10.

3.3 Descriptive statistics

Panel A of Table 1 reports descriptive statistics for our sample. The average of *Fined* indicates that 16% of the firm-year observations have employee violations that have resulted in a regulatory fine. The average of *Culture* is 5.69, which is consistent with the average of 5.51 in Li et al. (2021b) for the universe of U.S. firms with earnings calls over the period 2001–2018. *Culture* is the sum of the values for each culture dimension and following Li et al. (2021b), and we view higher values as a sign of stronger culture. By aggregating the strength across all dimensions, we get a firm-level measure of corporate culture strength. Panel A also reports descriptive statistics for the individual culture dimensions. Among the dimensions, *Innovation* has the highest average (2.02) which indicates that innovation

[8] Cohn et al. (2022) propose that researchers should rely on Poisson regressions when dealing with count variables or continuous zero-bounded variables. Poisson regressions assume that the dependent variables' variance equals its mean. Importantly, even if this assumption is violated Poisson regressions produce unbiased estimates (Wooldridge 2002).

Table 1 Descriptive statistics and full sample composition

	Observations	Mean	p25	Median	p75	St. Dev.
Panel A: By variable						
Fined	16242	0.16	0.00	0.00	0.00	0.36
Fines	16242	6114.59	0.00	0.00	0.00	45081.98
Numb	16242	0.37	0.00	0.00	0.00	1.42
Culture	16242	5.69	3.87	5.17	6.97	2.58
Innovation	16242	2.02	1.18	1.71	2.54	1.24
Integrity	16242	0.49	0.25	0.42	0.65	0.36
Quality	16242	1.45	0.89	1.28	1.83	0.82
Respect	16242	0.98	0.45	0.74	1.23	0.85
Teamwork	16242	0.75	0.38	0.60	0.95	0.57
LnAssets	16242	7.54	6.41	7.44	8.57	1.59
Cash/Assets	16242	0.17	0.04	0.11	0.25	0.17
CashFlow/Assets	16242	0.10	0.06	0.10	0.15	0.11
Dividends/Assets	16242	0.01	0.00	0.00	0.02	0.02
Capex/Assets	16242	0.05	0.02	0.03	0.06	0.06
Leverage	16242	0.22	0.05	0.20	0.33	0.19
Market/Book	16242	1.76	0.93	1.37	2.13	1.28
Sales/Assets	16242	1.17	0.65	0.98	1.46	0.76
PPE/Assets	16242	0.25	0.09	0.18	0.35	0.21
CEOage	16242	4.01	3.93	4.03	4.09	0.13
CEOgender	16242	0.03	0.00	0.00	0.00	0.18
CEOduality	16242	0.23	0.00	0.00	0.00	0.42
BoardInd	16242	0.79	0.73	0.83	0.89	0.12
Fama–French 12-industry	Observations	*Culture*	Mean *Fined*	Observations *Fined*	Mean *Fines*	Mean *Numb*
Panel B: By industry						
Business Equipment	3718	6.72	0.03	125	16765.74	1.28
Chemicals and Allied Products	763	4.43	0.20	151	23482.11	1.56
Consumer Durables	577	4.87	0.26	254	25478.71	1.87
Consumer Nondurables	1100	5.70	0.23	150	42481.54	2.78
Energy	875	3.82	0.19	163	68936.97	2.66
Healthcare	1847	5.82	0.04	71	16123.80	1.10
Manufacturing	2421	4.61	0.27	647	37263.46	2.20
Other	2260	5.84	0.23	518	40987.94	2.97
Telecom	398	6.70	0.13	52	23279.40	2.04
Wholesale and Retail	2283	6.08	0.19	435	46267.46	2.43
Year	Observations	Culture	Mean *Fined*	Observations *Fined*	Mean *Fines*	Mean *Numb*
Panel C: By year						
2002	586	4.65	0.12	72	35890.93	2.10
2003	745	4.87	0.11	82	31231.43	1.91
2004	811	5.09	0.11	88	28469.49	1.97
2005	836	5.32	0.10	86	36478.93	1.80

Table 1 (continued)

Year	Observations	Culture	Mean *Fined*	Observations *Fined*	Mean *Fines*	Mean *Numb*
2006	845	5.31	0.11	94	20206.68	1.84
2007	1085	5.47	0.10	112	59041.24	2.46
2008	1068	5.05	0.12	124	36696.55	2.30
2009	1075	5.06	0.13	138	34065.48	2.30
2010	1073	5.27	0.15	160	42870.31	2.66
2011	1090	5.55	0.15	162	42386.56	2.70
2012	1056	5.68	0.17	183	38953.68	2.27
2013	1046	5.95	0.18	187	40834.14	2.16
2014	1012	6.17	0.17	171	37503.63	2.27
2015	1018	6.49	0.19	197	37665.42	2.32
2016	994	6.55	0.23	225	43474.14	2.56
2017	989	6.79	0.24	241	38141.40	2.61
2018	913	6.89	0.27	244	38790.20	2.45

This table reports descriptive statistics. Panel A reports mean, 25th percentile, median, 75th percentile, and standard deviation for the variables. Panel B (Panel C) reports descriptive statistics by Fama–French 12 industry (year). *Fined* is equal to 1 for years when the firm has been fined for violating their employees' rights, and 0 otherwise, *Fines* is the amount of fines for employee violations in dollars, and *Numb* is the number of fines for employee violations. The measure of corporate culture (*Culture*) is created following Li et al. (2021b) by summing the five numerical cultural values *Innovation*, *Integrity*, *Quality*, *Respect*, and *Teamwork*. Detailed descriptions of the variables are available in Appendix, Table 10

is the most frequently mentioned cultural value in earnings calls. Meanwhile, *Integrity* has the lowest average (0.49) and is thus the least frequently mentioned cultural value. Moreover, the average sample firm has $8.9 billion in total assets (*LnAssets 7.54*), a leverage ratio of 22%, and the proportion of property, plant and equipment to total assets is 25%. The average age of a CEO is 55.83 years (*CEOage* 4.01) and the CEO acts as president or chairperson in 23% of the cases. Panel B of Table 1 reports descriptive statistics based on Fama–French 12 industries. Our measure of corporate culture is highest for firms in the Telecom industry and lowest for firms in the Energy industry. Firms in the Business Equipment and Healthcare industry have few violation fines. Industries with the highest proportion of violations are Consumer Durables and Manufacturing. Panel C of Table 1 shows how the culture measure, the proportion of fined firms, and the size of the fines have changed over time. Consistent with Li et al. (2021b), we find that the strength of firm culture has increased over time. Panel C also indicates that the proportion of fined firms have monotonically increased over time. The same trend is not apparent for the size or number of fines.

Table 2 reports correlations between our variables. The correlation between *Fined* and *Culture* is − 0.11, which indicates a negative univariate relationship between corporate culture and employee violations. The correlations between the count variables, *Fines* and *Numb,* and *Culture* are also negative and statistically significant, which provides preliminary support for our hypothesis. The correlation between our independent variable of interest (*Culture*) and any of the control variables is modest, where the correlation with *PPE/Assets* is the highest correlation in absolute value. The correlation of 0.43 between *Cash/Assets* and *Market/Book* is the highest between any of the control variables. Overall, the

Table 2 Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) *Fined*	1.00															
(2) *Fines*	0.31***	1.00														
(3) *Numb*	0.60***	0.54***	1.00													
(4) *Culture*	−0.11***	−0.04***	−0.06***	1.00												
(5) *LnAssets*	0.31***	0.13***	0.24***	−0.09***	1.00											
(6) *Cash/Assets*	−0.21***	−0.07***	−0.14***	0.26***	−0.35***	1.00										
(7) *CashFlow/Assets*	0.03***	0.02***	0.03***	−0.02**	0.05***	−0.05***	1.00									
(8) *Dividends/Assets*	0.10***	0.03***	0.07***	0.01	0.20***	−0.02**	0.27***	1.00								
(9) *Capex/Assets*	0.00	0.02***	0.02***	−0.12***	−0.01	−0.13***	0.28***	−0.05***	1.00							
(10) *Leverage*	0.13***	0.04***	0.09***	−0.15***	0.31***	−0.35***	−0.10***	0.02**	−0.00	1.00						
(11) *Market/Book*	−0.09***	−0.03***	−0.06***	0.22***	−0.20***	0.43***	0.33***	0.24***	0.08***	−0.15***	1.00					
(12) Sales/Assets	0.09***	0.03***	0.06***	0.02***	−0.18***	−0.14***	0.24***	0.05***	0.04***	−0.16***	0.06***	1.00				
(13) *PPE/Assets*	0.12***	0.07***	0.12***	−0.27***	0.18***	−0.37***	0.13***	0.01	0.64***	0.21***	−0.19***	−0.05***	1.00			
(14) *CEOage*	0.08***	0.03***	0.05***	−0.14***	0.12***	−0.13***	0.02***	0.08***	−0.00	0.08***	−0.08***	0.01	0.09***	1.00		
(15) *CEOgender*	0.01	−0.00	−0.00	0.05***	−0.00	0.01*	0.01	0.01*	0.01	−0.03***	0.02***	0.05***	0.01	−0.04***	1.00	
(16) *CEOduality*	0.03***	0.00	0.02	−0.07***	0.05***	−0.07***	0.00	0.01	−0.01	0.01	−0.04***	−0.03***	0.05***	0.10***	−0.02***	1.00
(17) *BoardInd*	0.09***	0.03***	0.06***	0.04***	0.18***	−0.04***	−0.02**	0.06***	−0.06***	0.06***	−0.05***	−0.06***	−0.02**	−0.00	0.05***	0.13***

This table reports correlations between the variables in the main analyses. Detailed descriptions of the variables are available in Appendix, Table 10

low correlations suggest that our estimates should not be sensitive to small changes in the chosen control variables.

4 Results

4.1 Main results

Column (1) of Table 3 reports the results from a logit regression with *Fined* as the dependent variable and *Culture* as the independent variable of interest. Controlling for firm characteristics and including *Industry* and *Year* fixed effects, we find a negative and statistically significant coefficient on *Culture* (coef. − 0.09, t-stat − 4.27). The coefficient suggests that a one standard deviation increase in *Culture* is associated with a 23 percentage point decrease in the likelihood of being penalized. Furthermore, Column (1) reveals that *Cash/Assets* is associated with a lower likelihood of getting fined while *CashFlow/Assets*, *Dividends/Assets*, and *Sales/Assets* are associated with a greater likelihood.

In Column (2) of Table 3, we estimate a Poisson regression with *Fines* as the dependent variable. The coefficient on *Culture* is negative and statistically significant (coef. − 0.07, t-stat − 2.39). With regards to the economic magnitude, a one standard deviation increase in *Culture* is then associated with a 17.4 percentage point decrease in regulatory fines.[9] In Column (3) of Table 3, we study the association with *Numb* and we find that the coefficient on *Culture* is negative and statistically significant (coef. − 0.05, t-stat − 2.50). The result shows that firms with higher numerical values of *Culture* are associated with fewer employee-related fines. In economic magnitude, the coefficient on *Culture* in Column (3) implies that a one standard deviation increase is associated with a 12.6 percentage point decrease in number of fines. Taken together, Table 3 provides evidence that firms with stronger corporate culture are less likely to be penalized, incur lower regulatory fines, and have a reduced number of violations. In other words, we find evidence supporting the arguments that stronger corporate culture is associated with safer workplaces.

4.2 Additional results

Firms with stronger corporate culture could improve workplace safety by increasing safety-related expenditures in maintenance, training, and oversight programs. Alternatively, it is possible that firms with stronger corporate culture provide unique working conditions, where employees work fewer hours and face less work-related stress. Additional recovery time and less rushed employees could thus constitute an indirect channel which could explain our main results. To disentangle the legitimacy of these conjectures, we investigate the relation between corporate culture and numerical proxies for workplace safety spending and employee workload. First, we turn to abnormal selling, general, and administrative expenses (SG&A). Even though safety-related expenditures are seldom explicitly observable in the income statement, it is relevant to acknowledge that such expenditures

[9] We assess the economic magnitude by multiplying the standard deviation of *Culture* (2.58) with $e^{-0.07} - 1$.

can constitute a non-negligible part of SG&A.[10] We adopt the procedure in Caskey and Ozel (2017) and estimate abnormal SG&A per employee (*AbnormalSGA*) as the residual in Eq. (2), which is estimated for firm i in year t within each two-digit SIC code and year with a minimum of 15 observations:

$$\frac{SG\&A_{i,t}}{Emp_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{Emp_{i,t-1}} + \beta_2 \frac{Sales_{i,t-1}}{Emp_{i,t-1}} + \varepsilon_{i,t} \tag{2}$$

where *Emp* is total number of employees, *Sales* is total revenues, and *SG&A* equals selling, general, and administrative expenses. If additional safety-related expenditures constitute an economic channel through which firms with strong corporate culture improve workplace safety, then we expect stronger corporate culture to be associated with higher *AbnormalSGA*. Second, we turn to the two measures of *Production/Emp* (cost of goods sold adjusted for the annual change in inventory scaled by total employees) and *Revenue/Emp* (total revenues scaled by total employees). If reduced workloads constitute a partial explanation for the relationship between corporate culture and workplace safety, we expect *Culture* to be associated with lower employee workloads. To test the conjecture, we create a sample by combining the corporate culture dataset with data from Compustat and Execucomp. The sample contains 14865 firm-year observations and covers the period 2002–2018.[11]

Column (1) of Table 4 reports results for a firm-level regression where we employ *AbnormalSGA* as our dependent variable. The coefficient on *Culture* is 2.13 (t-stat 3.41), which establishes the direction and statistical significance of the relationship between *Culture* and *AbnormalSGA*. Columns (2) to (3) of Table 4 report estimates for firm-level regressions where we employ our proxies for employee workload as the dependent variable. With *Production/Emp*, Column (2) unveils a positive but insignificant coefficient on *Culture*. With *Revenue/Emp* in Column (3), the coefficient on *Culture* remains positive and insignificant. Taken together, the results in Table 4 identify higher safety spending in firms with stronger corporate culture as a potential driver of our main results.

So far, we have embraced the theoretical assumptions in Crémer (1993) and treated the concept of corporate culture as a whole, without addressing the potential impact of alternative cultural orientations. Yet, when we explore the channels through which strong corporate culture may influence workplace safety, we observe that higher safety-related spending could account for our main results. The observation aligns with Edmans (2011) and further substantiates that strong corporate culture fosters long-term orientation. However, the finding in Table 4 yields limited insight regarding the underlying cultural mechanisms that spur safety-related expenditures. To shed further light on this matter, we follow Li et al. (2021a) and explore how the inner elements of corporate culture affect workplace safety. More specifically, we divide our measure of strong corporate culture into a people-oriented corporate culture (*PeopleCulture*) that assimilates the dimensions integrity, respect, and teamwork and into a technology-oriented corporate culture (*TechCulture*) consisting of the culture dimensions innovation and quality.

[10] For example, Andy Hendricks, president and CEO of Patterson-UTI Drilling Co., estimates that the firm over the year 2001 to 2010 spent $150 million to improve workplace safety, which corresponds to 32% of the firm's SG&A over the same period (Tedesco 2013).

[11] Missing data on the total number of employees decreases the number of observations from 16242 to 14865.

Table 3 Corporate culture and workplace safety

	(1) *Fined*	(2) *Fines*	(3) *Numb*
Culture	−0.09***	−0.07**	−0.05**
	(−4.27)	(−2.39)	(−2.50)
LnAssets	0.63***	0.65***	0.61***
	(14.84)	(11.55)	(14.78)
Cash/Assets	−3.68***	−3.39***	−2.91***
	(−6.58)	(−4.76)	(−3.90)
CashFlow/Assets	0.86	3.23***	2.32*
	(1.37)	(2.85)	(1.74)
Dividends/Assets	2.71	−7.52	−3.26
	(1.24)	(−1.61)	(−1.08)
Capex/Assets	0.14	3.35	1.30
	(0.12)	(1.45)	(1.07)
Leverage	0.10	0.12	0.46
	(0.37)	(0.28)	(1.13)
Market/Book	−0.01	0.05	−0.02
	(−0.19)	(0.56)	(−0.23)
Sales/Assets	0.59***	0.35***	0.46***
	(5.93)	(2.70)	(4.96)
PPE/Assets	0.65*	0.32	0.62
	(1.74)	(0.53)	(1.62)
CEOage	0.02	0.25	0.14
	(0.05)	(0.46)	(0.36)
CEOgender	−0.19	−0.48*	−0.44*
	(−0.74)	(−1.66)	(−1.90)
CEOduality	0.05	−0.13	−0.12
	(0.54)	(−0.84)	(−1.20)
BoardInd	−0.12	−0.07	0.02
	(−0.28)	(−0.12)	(0.04)
Constant	−5.85***	3.43	−5.49***
	(−3.62)	(1.46)	(−3.30)
Fixed effects	Industry, Year	Industry, Year	Industry, Year
Pseudo R-squared	0.266	–	–
Log pseudolikelihood	–	$-1.6*10^8$	−10527.7
Observations	16242	16242	16242

This table reports regression outputs where measures of regulatory fines (*Fined*, *Fines* and *Numb*) are regressed on *Culture* and control variables. Column (1) report results from a logit regression with the dichotomous dependent variable *Fined*, taking the value 1 for years when the firm has been fined for violating their employees' rights, and 0 otherwise. Column (2) reports results from a Poisson regression with the dependent variable size of fines (*Fines*). Column (3) reports results from a Poisson regression with the dependent variable number of fines (*Numb)*. The measure of corporate culture (*Culture*) is created following Li et al. (2021b) by summing the five numerical cultural values *Innovation*, *Integrity*, *Quality*, *Respect*, and *Teamwork*. Detailed descriptions of the variables are available in Appendix, Table 10. The t-statistics disclosed in the parentheses are based on robust standard errors clustered at the firm-level and coefficients labeled with *, **, and *** are significant at 10%, 5%, and 1% level, respectively

Column (1) of Table 5 shows the outcome of the logit regression, where *Fined* is regressed on *PeopleCulture* along with *TechCulture* and the control variables from Eq. (1). We obtain an insignificant coefficient on *PeopleCulture* (coef. −0.05, t-stat −0.97), while we find a negative and statistically significant coefficient on *TechCulture* (coef. −0.12, t-stat −3.61). The result suggests that the likelihood of getting fined is lower for firms with a strong cultural emphasis on technology adoption. We notice a similar pattern in Columns (2) and (3), where we estimate Poisson regressions with *Fines* and *Numb* as our dependent variables. Namely, insignificant coefficients on *PeopleCulture* and negative and statistically significant coefficients on *TechCulture*.[12] In summary, Table 5 show that particularly strong technology-oriented culture is associated with better workplace safety.

4.3 Robustness tests

We conduct several robustness tests to address potential endogeneity concerns, biases arising from functional form misspecification, and potential measurement errors in our dependent- and independent variables. We employ an instrumental variable approach using a two-stage least-squares (2SLS) regression.[13] While it is challenging to find suitable instruments for corporate culture (Nash and Patel 2019), we rely on Harrington and Gelfand (2014) and Hasan (2022) by using the state-level tightness-looseness index (*TightnessIndex*) as an instrument for our main measure of corporate culture (*Culture*). We expect firms headquartered in states with greater tightness to exhibit lower cultural orientation. This implies a negative relationship between tightness and *Culture*, which is in accordance with the relevance condition. At the same time, it is unlikely that state-level tightness affects workplace safety directly which is consistent with the exclusion condition. For the first-stage regression in Column (1) of Table 6, where *Culture* is the dependent variable, the coefficient on *TightnessIndex* is negative and statistically significant (coef. −0.01, t-stat −3.57). The sign of the coefficient is in line with our expectation. The Kleibergen-Paap F-stat for the first-stage regression is 12.72. The significant coefficient on *TightnessIndex* and the Kleibergen-Paap F-stat over 10 suggest that the relevance condition is met (Stock and Yogo 2005). Column (2) reports the second-stage regression results with *Fined* as the dependent variable and here the coefficient on the estimated value of corporate culture is negative and statistically significant (coef. −0.07, t-stat −1.70). In Column (3), we re-estimate the second-stage regression with *LnFines* as the dependent variable, and the results again show a negative and significant coefficient on the estimated value of corporate culture. Finally, Column (4) reports the second-stage regression with *LnNumb* as dependent variable. The results show that the estimated value of corporate culture from the first-stage has a statistically significant negative relation with *LnNumb*. Taken together, the results in Table 6 support our hypothesis that firms with stronger corporate culture are associated with safer workplaces.

Next, we use a PSM approach to address potential functional form misspecification (Shipman et al. 2017). We begin by defining *StrongCulture*, which is an indicator variable

[12] The insignificant coefficients on *PeopleCulture* in Table 5 indicate that our main finding regarding the effect of *Culture* on workplace safety is not mechanically driven by safety-related words and phrases because only *PeopleCulture* puts some weight on safety-related words and phrases via the *Integrity* dimension.

[13] In the 2SLS regressions, we use the logarithmic transformed values of *Fines* and *Numb*. *LnFines* is the natural logarithm of 1 + the size of the fines and *LnNumb* is the natural logarithm of 1 + number of fines.

equal to one if *Culture* is in the highest quartile and zero otherwise (Li et al. 2021a). Observations with a strong culture belong to the treatment group and we use PSM to generate a control group based on the control covariates in Eq. (1), relying on one-to-one matching without replacement and a caliper of 0.01 (Rosenbaum and Rubin 1983). Panel A of Table 7 shows the univariate differences between our treatment and control groups. With respect to workplace safety, the univariate comparison shows that observations with *StrongCulture* equal to one are less likely to be penalized and have lower total fine amounts. The aim of a PSM approach is to create two homogeneous groups with respect to the control covariates and we conclude that the matching is successful because Panel A shows no statistically significant differences between means of the control variables. In Panel B of Table 7, we estimate Eq. (1) using only the observations in the treatment and control group. All three columns of Panel B show negative and statistically significant coefficients on *StrongCulture,* which supports our main results. In summary, the PSM approach indicates that the finding that firms with stronger corporate culture have higher workplace safety is not driven by a functional form misspecification.

We continue the robustness analyses by examining an alternative measure of corporate culture. Given the novelty of applying machine learning-based proxies for corporate culture, there might be concerns that our textual measures capture some systematic error related to the earnings calls setting rather than identifying a pure culture-specific effect. Despite the Q&A section of earnings calls presumably mirroring the tone at the top, and restricting managers ability to select topics, we cannot entirely rule out alternative agendas. To validate our measure of corporate culture and further substantiate that firms actually "walk as CEOs talk", we turn to an alternative measure of corporate culture and investigate whether the underlying values also are reflected in annual reports.

We follow the procedure Fiordelisi and Ricci (2014) and use their dictionary method, to gauge people- and tech-oriented elements of corporate culture, as in Table 5, through the lens of the competing values framework. We analyze all available 10-K filings from the Securities and Exchange Commission's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) during the period 2002–2018 and construct two new cultural variables, *Collaborate* and *Create.*[14] We generate these variables by dividing the count of a specific set of synonyms by the total number of words in the 10-K. For example, words like "cooperate", "human", and "partner" ("dream", "trend", and "pioneer") are assigned to *Collaborate* (*Create*) and a relatively high frequency of such words in the 10-K suggest that a firm has a people-oriented (tech-oriented) culture.[15]

Column (1) of Table 8 reports the estimates of the regression, where *Fined* is regressed on *Collaborate* along with *Create* and the control variables from Eq. (1). We observe negative and statistically significant coefficients on *Collaborate* (coef. − 0.67, t-stat − 4.06) and *Create* (coef. − 0.39, t-stat − 2.12). We notice a similar pattern in Column (2), where we estimate a Poisson regression with *Fines* as the dependent variable, namely, negative and statistically significant coefficient on *Collaborate* (coef. − 0.44, t-stat − 1.99) and *Create* (coef. − 0.67, t-stat − 2.21). Finally, in Column (3), we substitute our dependent variable and regress *Numb* on our cultural dimensions along with the previously used controls. While we continue to observe a negative in sample effect across both variables of interest, the coefficient on *Create* is no longer statistically significant. The results in Table 8 suggest

[14] Following Fiordelisi and Ricci (2014), we include one report for each fiscal year and exclude tables and figures from this procedure.

[15] The exact bag of words used to capture these dimensions are available in Fiordelisi and Ricci (2014).

Table 4 Corporate culture, safety-related expenditures, and employee workload

	(1) *AbnormalSGA*	(2) *Production/Emp*	(3) *Revenue/Emp*
Culture	2.13***	0.63	4.66
	(3.41)	(0.19)	(1.07)
LnAssets	−1.63	65.49***	83.44***
	(−1.04)	(6.40)	(6.04)
Cash/Assets	141.44***	273.11***	516.17***
	(10.36)	(5.07)	(7.21)
CashFlow/Assets	−41.08***	−531.85***	85.33
	(−2.62)	(−5.99)	(0.91)
Dividends/Assets	−387.91***	−1380.97***	−2363.73***
	(−4.43)	(−4.24)	(−5.53)
Capex/Assets	6.03	−149.60	630.42**
	(0.18)	(−0.76)	(2.00)
Leverage	−0.27	−64.38	−47.10
	(−0.03)	(−1.56)	(−0.81)
Market/Book	16.80***	−16.79***	−15.06*
	(7.72)	(−3.01)	(−1.92)
Sales/Assets	−23.30***	245.11***	193.12***
	(−6.50)	(7.26)	(4.13)
PPE/Assets	−72.61***	183.64**	46.63
	(−5.65)	(2.03)	(0.37)
CEOage	−24.43**	−28.16	−27.22
	(−2.25)	(−0.77)	(−0.50)
CEOgender	−5.15	−33.99	−48.66
	(−0.86)	(−1.13)	(−1.38)
CEOduality	−9.85***	12.46	5.75
	(−3.18)	(0.84)	(0.28)
BoardInd	−5.34	19.16	22.84
	(−0.38)	(0.34)	(0.27)
Constant	42.50	−438.75**	−568.06**
	(0.80)	(−2.28)	(−1.98)
Fixed effects	Industry, Year	Industry, Year	Industry, Year
R-squared	0.341	0.474	0.445
Observations	14865	14865	14865

This table reports regression outputs where *AbnormalSGA*, *Production/Emp*, and *Revenue/Emp* are regressed on *Culture* and control variables. Abnormal SG&A expenses (*AbnormalSGA*) are estimated following Caskey and Ozel (2017). *Production/Emp* and *Revenue/Emp* are defined as cost of goods sold and inventory per employee and revenue per employee, respectively. The measure of corporate culture (*Culture)* is created following Li et al. (2021b) by summing the five numerical cultural values *Innovation*, *Integrity*, *Quality*, *Respect*, and *Teamwork*. Detailed descriptions of the variables are available in Appendix, Table 10. The t-statistics disclosed in the parentheses are based on robust standard errors clustered at the firm-level and coefficients labeled with *, **, and *** are significant at 10%, 5%, and 1% level, respectively

Table 5 Inner elements of corporate culture and workplace safety

	(1) *Fined*	(2) *Fines*	(3) *Numb*
PeopleCulture	−0.05	0.06	0.02
	(−0.97)	(0.75)	(0.42)
TechCulture	−0.12***	−0.15***	−0.09***
	(−3.61)	(−3.16)	(−3.04)
LnAssets	0.63***	0.65***	0.61***
	(14.90)	(11.44)	(14.75)
Cash/Assets	−3.68***	−3.41***	−2.93***
	(−6.57)	(−4.82)	(−3.96)
CashFlow/Assets	0.90	3.42***	2.42*
	(1.44)	(2.98)	(1.81)
Dividends/Assets	2.74	−7.29	−3.12
	(1.25)	(−1.54)	(−1.03)
Capex/Assets	0.18	3.23	1.26
	(0.15)	(1.45)	(1.04)
Leverage	0.10	0.17	0.47
	(0.38)	(0.40)	(1.17)
Market/Book	−0.01	0.06	−0.01
	(−0.18)	(0.65)	(−0.21)
Sales/Assets	0.58***	0.33**	0.45***
	(5.92)	(2.55)	(4.81)
PPE/Assets	0.65*	0.28	0.59
	(1.73)	(0.49)	(1.58)
CEOage	−0.00	0.17	0.10
	(−0.01)	(0.29)	(0.26)
CEOgender	−0.17	−0.46	−0.43*
	(−0.68)	(−1.60)	(−1.85)
CEOduality	0.05	−0.12	−0.12
	(0.56)	(−0.78)	(−1.18)
BoardInd	−0.10	0.01	0.06
	(−0.24)	(0.01)	(0.13)
Constant	−5.83***	3.54	−5.45***
	(−3.61)	(1.48)	(−3.25)
Fixed effects	Industry, Year	Industry, Year	Industry, Year
Pseudo R-squared	0.266	–	–
Log pseudolikelihood	–	$-1.6*10^8$	−10515.9
Observations	16242	16242	16242

This table reports regression outputs where measures of regulatory fines (*Fined*, *Fines* and *Numb*) are regressed on *PeopleCulture, TechCulture* and control variables. Column (1) reports results from logit regressions with the dichotomous dependent variable *Fined*, taking the value 1 for years when the firm has been fined for violating their employees' rights, and 0 otherwise. Column (2) reports results from a Poisson regression with the dependent variable size of fines (*Fines*). Column (3) reports results from a Poisson regression with the dependent variable number of fines (*Numb)*. The measures of corporate culture (*PeopleCulture* and *TechCulture*) are created following Li et al. (2021a). *PeopleCulture* is the sum of *Integrity*, *Respect*, and *Teamwork* and *TechCulture* is the sum of *Innovation* and *Quality* following Li et al. (2021b). Detailed descriptions of the variables are available in Appendix, Table 10. The t-statistics disclosed in the parentheses are based on robust standard errors clustered at the firm-level and coefficients labeled with *, **, and *** are significant at 10%, 5%, and 1% level, respectively

that a strong cultural emphasis on human- and technological capital may improve workplace safety.

Finally, we substitute the dependent variables from Violation Tracker in Eq. (1) with data on workplace injuries and illnesses documented by the OSHA Data Initiative Program. This dataset covers the period 1996–2011 and consists of annual observations on workplace injuries and illnesses from establishments of firms in the private sector operating in hazardous industries (e.g., transportation, manufacturing, and sanitary services).[16] We quantify two annual establishment-level measures of workplace safety. First, we define the Total Case Rate (*TCR*) as the number of workplace injuries and illnesses divided by the number of hours worked multiplied by 200,000. *TCR* represents the workplace injury and illness rate per 100 full-time employees in a given year. Second, we calculate *DART* as the number of days away from work or days with job restrictions or transfers due to workplace injuries and illnesses, divided by the number of hours worked by all employees in a given establishment-year multiplied by 200,000.

In addition to records of illnesses and injuries, the OSHA dataset provides details on establishment name and location, standard industry classification (SIC), total employees and the total number of hours worked.[17] We follow the procedure in Caskey and Ozel (2017) and match the observations of publicly listed firms with data on corporate culture based on Li et al. (2021b), Compustat and Execucomp. Column (1) of Table 9 reports the estimates obtained when we regress *TCR* on *Culture*, a plethora of control variables, as well as *Industry*, *State*, and *Year* fixed effects. The result suggests that establishments of firms with higher numerical values of *Culture* exhibit fewer workplace injuries and illnesses. The economic magnitude of the result is also considerable. The estimated coefficient of − 0.39 (t-stat − 3.20) in Column (1) suggests that a one standard deviation increase in *Culture* is associated with 1.01 fewer workplace injuries and illnesses per year for 100 full-time employees.

In Column (2) of Table 9, we study the association between corporate culture and *DART* . The coefficient of − 7.93 (t-stat − 3.46) indicates that a one standard deviation increase in *Culture* is associated with 20.46 fewer days away, restricted, or transferred due to illnesses and injuries per year for 100 full-time employees. Whereas the regression results in Columns (1) and (2) of Table 9 are based on establishment-level data, we report regression results for firm-level data in Columns (3) and (4). We use *TCR* as the dependent variable in Column (3) and find a negative and statistically significant coefficient on *Culture*. For the firm-level regressions with *DART* as the dependent variable in Column (4), we find a negative and insignificant coefficient on *Culture*. In general, we notice a weaker relationship between corporate culture and workplace safety in our firm-level regressions with the relatively few firm-level observations as a potential explanation. However, taken together, Table 9 provides evidence of a negative association, which indicates that firms with stronger corporate culture have lower injury and illness rates.

[16] We use a subsample of the OSHA dataset, since the data collection procedure changed in 2002 which means that the data on injuries and illnesses covering 1996 to 2001 is not comparable with the data for the post-2001 years.

[17] The dataset also contains dichotomous variables which specify whether the establishment experienced any unusual event such as seasonal work, strikes, shutdowns, or natural disasters.

Table 6 Cultural tightness, corporate culture and workplace safety

	First-stage	Second-stage		
	(1)	(2)	(3)	(4)
	Culture	*Fined*	*LnFines*	*LnNumb*
TightnessIndex	−0.01***			
	(−3.57)			
$\widehat{Culture}$		−0.07*	−0.74*	−0.11*
		(−1.70)	(−1.72)	(−1.81)
LnAssets	0.04	0.06***	0.65***	0.08***
	(1.25)	(11.59)	(11.44)	(10.04)
Cash/Assets	1.86***	0.09	1.09	0.22*
	(6.74)	(1.03)	(1.18)	(1.75)
CashFlow/Assets	−1.53***	−0.19**	−1.93**	−0.26**
	(−4.53)	(−2.45)	(−2.45)	(−2.40)
Dividends/Assets	−1.30	0.21	1.63	0.01
	(−0.78)	(0.87)	(0.67)	(0.04)
Capex/Assets	0.57	0.03	0.30	0.04
	(0.80)	(0.23)	(0.27)	(0.31)
Leverage	−1.04***	−0.07	−0.70	−0.10
	(−5.07)	(−1.23)	(−1.28)	(−1.34)
Market/Book	0.19***	0.01	0.15*	0.02*
	(4.58)	(1.63)	(1.67)	(1.80)
Sales/Assets	0.08	0.06***	0.63***	0.07***
	(1.12)	(5.25)	(5.11)	(4.33)
PPE/Assets	−1.40***	−0.01	−0.11	−0.01
	(−5.02)	(−0.15)	(−0.14)	(−0.13)
CEOage	−1.84***	−0.12	−1.17	−0.16
	(−6.51)	(−1.41)	(−1.36)	(−1.40)
CEOgender	−0.14	−0.01	−0.15	−0.03
	(−0.73)	(−0.48)	(−0.48)	(−0.73)
CEOduality	−0.08	0.00	0.03	−0.01
	(−1.07)	(0.40)	(0.28)	(−0.47)
BoardInd	0.70**	0.07	0.75	0.11
	(2.05)	(1.37)	(1.37)	(1.48)
Constant	10.93***	0.52	5.57	1.07
	(9.18)	(1.10)	(1.16)	(1.56)
Fixed effects	Industry, Year	Industry, Year	Industry, Year	Industry, Year
Kleibergen-Paap F-stat	12.72	–	–	–
R-squared	0.355	0.075	0.073	0.008
Observations	16242	16242	16242	16242

This table reports regression outputs where cultural tightness (*TightnessIndex*) is used as an instrument for *Culture* in a two-stage least squares regression (2SLS). Column (1) reports results from the first-stage regression with the dependent variable *Culture* and the instrument, *TightnessIndex,* and control variables as independent variables. Column (2) reports results for the second-stage regression with a dichotomous dependent variable *Fined*, taking the value 1 for years when the firm has been fined for violating their

Table 6 (continued)

employees' rights, and 0 otherwise. In Columns (3) and (4), the natural logarithm of 1 + the size of the fine (*LnFines*) and the natural logarithm of 1 + number of fines (*LnNumb*) are used as dependent variables. The measure of corporate culture (*Culture*) is created following Li et al. (2021b) by summing the five numerical cultural values *Innovation*, *Integrity*, *Quality*, *Respect*, and *Teamwork*. The instrument, a measure of cultural tightness (*TightnessIndex*), is from Harrington and Gelfand (2014). Detailed descriptions of the variables are available in Appendix, Table 10. The t-statistics disclosed in the parentheses are based on robust standard errors clustered at the firm-level and coefficients labeled with *, **, and *** are significant at 10%, 5%, and 1% level, respectively

5 Conclusions

In this study, we propose that corporate culture is an important determinant of workplace safety. Our findings are consistent with the notion in Posner et al. (1985) and Hoi et al. (2013) that firms with stronger corporate culture comply with standards of good corporate citizenship and take more stakeholder-oriented actions. Where Hoi et al. (2013) analyze tax avoidance, our study centers on the well-being of employees.

According to the strong culture hypothesis, corporate values and norms may boost financial performance in proportion to the strength of their manifestation (e.g., Denison 1984; Kotter & Heskett 1992; Sørensen 2002). Recent studies also find a positive link between stronger corporate culture and firm value (e.g., Graham et al. 2022; Li et al. 2021b). Based on this, shareholders may be seen as the primary beneficiaries of a stronger corporate culture. While our study primarily examines non-financial effects and underscores that employees need not fear a stronger corporate culture, our results do not contradict the aim of maximizing shareholder wealth. In fact, Edmans (2011) discovered that a firm's concern for employees can ultimately benefit shareholders through long-term stock returns. Building on this finding, we propose that stronger corporate culture can have positive financial value implications via better employee relations and a reduction in costly disruptions caused by workplace accidents. Besides employees and shareholders benefiting from safer workplaces, we also stress that there is a positive effect of stronger corporate culture for the families involved as well as the local community and society at large.

We acknowledge several limitations with our study. One limitation is that we are not able to infer causality from our regressions or conduct a changes analysis. However, we provide evidence of a robust association with other means. Another limitation is that the main measure of strong culture overlaps slightly with the concept of safety climate through the integrity dimension. Importantly, our results are evident also when technology-oriented culture without a direct safety reference is used. We are also limited to only studying physical well-being at work, while studying more holistic well-being would include several other aspects. We leave such a research avenue open for future research. Finally, we note higher safety spending as an explanation for our findings but do not consider the net economic effects. We also leave such an analysis for future research.

Table 7 Matched sample of strong and weak corporate culture

Variables	*StrongCulture* = 1		*StrongCulture* = 0		Difference	t-stat
	Observations	Mean	Observations	Mean		
Panel A: Comparison of treatment and control groups						
Fined	3926	0.093	3926	0.122	−0.029	(−4.19)
Fines	3926	2858.956	3926	4881.655	−2022.699	(−2.10)
Numb	3926	0.212	3926	0.248	−0.036	(−1.64)
LnAssets	3926	7.256	3926	7.247	0.009	(0.23)
Cash/Assets	3926	0.236	3926	0.242	−0.006	(−1.30)
CashFlow/Assets	3926	0.095	3926	0.094	0.001	(0.27)
Dividends/Assets	3926	0.013	3926	0.013	0.000	(0.06)
Capex/Assets	3926	0.044	3926	0.043	0.000	(0.40)
Leverage	3926	0.170	3926	0.171	−0.001	(−0.20)
Market/Book	3926	2.122	3926	2.094	0.027	(0.79)
Sales/Assets	3926	1.198	3926	1.195	0.004	(0.21)
PPE/Assets	3926	0.169	3926	0.173	−0.004	(−0.99)
CEOage	3926	3.983	3926	3.983	0.000	(0.12)
CEOgender	3926	0.041	3926	0.043	−0.002	(−0.45)
CEOduality	3926	0.196	3926	0.199	−0.002	(−0.26)
BoardInd	3926	0.791	3926	0.789	0.002	(0.74)
		(1)		(2)		(3)
		Fined		*Fines*		*Numb*
Panel B: Regression results						
StrongCulture		−0.35***		−0.69***		−0.24**
		(−3.01)		(−3.38)		(−2.39)
LnAssets		0.57***		0.67***		0.58***
		(11.13)		(9.03)		(13.34)
Cash/Assets		−4.26***		−6.03***		−4.48***
		(−5.28)		(−5.83)		(−5.95)
CashFlow/Assets		0.74		4.35***		2.11*
		(0.71)		(2.76)		(1.79)
Dividends/Assets		5.40*		−2.21		2.98
		(1.93)		(−0.51)		(0.97)
Capex/Assets		1.98		2.99		2.64*
		(1.12)		(1.40)		(1.82)
Leverage		0.21		0.04		−0.01
		(0.50)		(0.07)		(−0.02)
Market/Book		−0.04		−0.07		−0.07
		(−0.45)		(−0.77)		(−0.93)
Sales/Assets		0.60***		0.45***		0.49***
		(4.37)		(3.00)		(3.95)
PPE/Assets		1.58***		2.06*		1.38**
		(2.87)		(1.94)		(2.44)
CEOage		−0.39		0.13		−0.08
		(−0.76)		(0.17)		(−0.17)

Table 7 (continued)

	(1) *Fined*	(2) *Fines*	(3) *Numb*
CEOgender	−0.41	−0.59*	−0.50*
	(−1.15)	(−1.93)	(−1.87)
CEOduality	0.20	0.06	−0.03
	(1.43)	(0.31)	(−0.25)
BoardInd	0.72	−0.02	0.35
	(1.25)	(−0.03)	(0.66)
Constant	−6.71***	0.88	−5.95***
	(−3.06)	(0.26)	(−2.77)
Fixed effects	Industry, Year	Industry, Year	Industry, Year
Pseudo R-squared	0.316	–	–
Log pseudolikelihood	–	$-4.8*10^{7}$	−3352.8
Observations	7852	7852	7852

This table reports results based on a matched sample. Panel A reports statistics for the the treatment group (*StrongCulture* = 1*)* and the propensity-score matched control group (*StrongCulture* = 0) separately, and differences in means and corresponding t-statistics. Panel B reports regression outputs for the propensity-score matched sample where measures of regulatory fines (*Fined*, *Fines* and *Numb*) are regressed on *StrongCulture* and control variables. Column (1) reports results from logit regressions with the dichotomous dependent variable *Fined*, taking the value 1 for years when the firm has been fined for violating their employees' rights, and 0 otherwise. Column (2) reports results from a Poisson regression with the dependent variable size of fines (*Fines*). Column (3) reports results from a Poisson regression with the dependent variable number of fines (*Numb)*. The measure of corporate culture (*StrongCulture*) is a dichotomous variable taking the value 1 for observations when the *Culture* value is in the top quartile and otherwise 0. Detailed descriptions of the variables are available in Appendix, Table 10. The t-statistics disclosed in the parentheses are based on robust standard errors clustered at the firm-level and coefficients labeled with *, **, and *** are significant at 10%, 5%, and 1% level, respectively

Table 8 Alternative corporate culture measures and workplace safety

	(1) *Fined*	(2) *Fines*	(3) *Numb*
Collaborate	−0.67***	−0.44**	−0.22*
	(−4.06)	(−1.99)	(−1.67)
Create	−0.39**	−0.67**	−0.25
	(−2.12)	(−2.21)	(−1.37)
LnAssets	0.63***	0.64***	0.60***
	(14.91)	(10.48)	(14.05)
Cash/Assets	−3.90***	−3.46***	−2.97***
	(−6.92)	(−4.92)	(−3.99)
CashFlow/Assets	0.84	3.55***	2.95**
	(1.30)	(2.93)	(2.14)
Dividends/Assets	2.47	−8.02	−3.79
	(1.13)	(−1.61)	(−1.20)
Capex/Assets	0.07	3.18	0.92
	(0.06)	(1.33)	(0.74)
Leverage	0.07	0.14	0.49
	(0.24)	(0.33)	(1.19)
Market/Book	−0.03	0.02	−0.06
	(−0.46)	(0.26)	(−0.81)
Sales/Assets	0.58***	0.36***	0.47***
	(5.71)	(2.64)	(4.71)
PPE/Assets	0.80**	0.32	0.71*
	(2.10)	(0.50)	(1.76)
CEOage	0.07	0.38	0.35
	(0.20)	(0.64)	(0.99)
CEOgender	−0.14	−0.44	−0.43*
	(−0.54)	(−1.47)	(−1.78)
CEOduality	0.05	−0.15	−0.14
	(0.51)	(−1.02)	(−1.36)
BoardInd	−0.15	0.06	0.26
	(−0.36)	(0.10)	(0.55)
Constant	−5.42***	3.65	−6.37***
	(−3.20)	(1.39)	(−3.94)
Fixed effects	Industry, Year	Industry, Year	Industry, Year
Pseudo R-squared	0.267	–	–
Log pseudolikelihood	–	$-1.56 * 10^8$	−10111.5
Observations	15796	15796	15796

This table reports regression outputs where measures of regulatory fines (*Fined*, *Fines* and *Numb*) are regressed on *Collaborate, Create* and control variables. Column (1) reports results from logit regressions with the dichotomous dependent variable *Fined*, taking the value 1 for years when the firm has been fined for violating their employees' rights, and 0 otherwise. Column (2) reports results from a Poisson regression with the dependent variable size of fines (*Fines*). Column (3) reports results from a Poisson regression with the dependent variable number of fines (*Numb)*. The measures of corporate culture (*Collaborate* and *Create*) are obtained from the 10-K document using textual analysis and keywords specified in Fiordelisi and Ricci (2014). Detailed descriptions of the variables are available in Appendix, Table 10. The t-statistics disclosed in the parentheses are based on robust standard errors clustered at the firm-level and coefficients labeled with *, **, and *** are significant at 10%, 5%, and 1% level, respectively

Table 9 Corporate culture and alternative workplace safety measures

	(1) *TCR*	(2) *DART*	(3) *TCR*	(4) *DART*
Culture	−0.39***	−7.93***	−0.14*	−1.93
	(−3.20)	(−3.46)	(−1.88)	(−0.79)
Hours/Emp	−0.00***	−0.09***	−0.00***	−0.10***
	(−4.51)	(−2.71)	(−4.91)	(−3.88)
LnAssets	−0.00	3.76	−0.26	2.67
	(−0.02)	(0.90)	(−0.98)	(0.49)
Cash/Assets	11.11***	235.24**	3.79	28.99
	(3.20)	(2.08)	(1.62)	(0.54)
CashFlow/Assets	−4.99*	−229.39**	−0.11	−62.89
	(−1.89)	(−2.07)	(−0.05)	(−0.95)
Dividends/Assets	−4.70	196.22	4.65	74.68
	(−0.35)	(0.55)	(0.40)	(0.23)
Capex/Assets	8.14	−220.17	−9.52	−279.71
	(0.86)	(−0.94)	(−1.65)	(−1.55)
Leverage	1.22	−20.72	2.61	80.45**
	(0.83)	(−0.58)	(1.54)	(2.28)
Market/Book	0.19	6.54	−0.22	0.46
	(0.56)	(0.72)	(−0.95)	(0.07)
Sales/Assets	−0.03	2.21	0.78	25.77
	(−0.08)	(0.16)	(1.50)	(1.43)
PPE/Assets	2.94	212.26***	0.15	65.18
	(1.60)	(3.92)	(0.09)	(1.36)
CEOage	−2.02	−145.73**	−2.39**	−63.18**
	(−1.42)	(−2.25)	(−2.33)	(−2.05)
CEOgender	0.19	−3.82	−0.60	1.68
	(0.23)	(−0.18)	(−0.63)	(0.06)
CEOduality	−0.60*	−16.18	−0.26	0.31
	(−1.92)	(−1.53)	(−0.98)	(0.04)
BoardInd	−5.12***	−128.31**	−3.00	−46.28
	(-2.79)	(-2.09)	(-1.61)	(-0.88)
EstablishmentSize	0.09	10.34***		
	(0.97)	(2.92)		
Strike	3.49***	69.84		
	(2.75)	(1.45)		
Shutdown	0.21	14.16**		
	(0.91)	(1.99)		
Seasonal	0.36	13.62		
	(0.53)	(1.37)		
Disaster	1.00	25.16		
	(1.46)	(1.25)		
Constant	26.56***	877.77***	26.69***	531.70***
	(4.35)	(3.52)	(5.79)	(3.78)
Fixed effects	Industry, State, Year	Industry, State, Year	Industry, State, Year	Industry, State, Year

Table 9 (continued)

	(1) *TCR*	(2) *DART*	(3) *TCR*	(4) *DART*
R-squared	0.324	0.252	0.495	0.432
Observations	39842	39842	1569	1569

This table reports regression outputs where workplace injuries and illnesses (*TCR*) and days away, restricted, or transferred (*DART*) are regressed on *Culture* and control variables. *TCR* is workplace injury and illness cases divided by the number of hours worked multiplied by 200,000. *DART* is the number of days away from work or days with job restrictions or transfers due to workplace injuries and illnesses divided by the number of hours worked multiplied by 200,000. The measure of corporate culture (*Culture)* is created following Li et al. (2021b) by summing the five numerical cultural values *Innovation*, *Integrity*, *Quality*, *Respect*, and *Teamwork*. In Columns (1) and (2), the regressions are estimated with establishment-year observations. Columns (3) and (4) report results for regressions estimated with firm-year observations, where establishment-year observations are transformed to firm-year observations. Detailed descriptions of the variables are available in Appendix, Table 10. The t-statistics disclosed in the parentheses are based on robust standard errors clustered at the firm-level and coefficients labeled with *, **, and *** are significant at 10%, 5%, and 1% level, respectively

Appendix

See Table 10.

Table 10 Variable definitions

Variable	Description	Source
Fined	Dichotomous variable, equal to 1 given that the firm has been fined for employee violations, otherwise 0	Violation tracker
Fines	The total dollar amount of fines for employee violations	Violation tracker
Numb	The number of fines for employee violations	Violation tracker
Culture	Total culture score calculated as the sum of the five cultural dimensions of *Innovation*, *Integrity*, *Quality*, *Respect*, and *Teamwork*	Li et al. (2021b)
Innovation	Weighted-frequency count of innovation-related words (e.g., "brand", "technology", "focus", "great", and "platform") in the Q&A section of earnings calls averaged over a three-year window	Li et al. (2021b)
Integrity	Weighted-frequency count of integrity-related words (e.g., "control", "management", "careful", "honestly", and "regulator") in the Q&A section of earnings calls averaged over a three-year window	Li et al. (2021b)
Quality	Weighted-frequency count of quality-related words (e.g., "customer", "product", "client", "service", and "build") in the Q&A section of earnings calls averaged over a three-year window	Li et al. (2021b)
Respect	Weighted-frequency count of respect-related words (e.g., "people", "team", "company", "hire", and "folk") in the Q&A section of earnings calls averaged over a three-year window	Li et al. (2021b)
Teamwork	Weighted-frequency count of teamwork-related words (e.g., "partner", "relationship", "discussion", "together", and "integrate") in the Q&A section of earnings calls averaged over a three-year window	Li et al. (2021b)
LnAssets	Natural logarithm of a firm's total assets (at) from the preceding year (t − 1)	Compustat
Cash/Assets	Current year (t) cash and cash equivalent (che) divided by total assets (at) from the preceding year (t − 1)	Compustat
CashFlow/Assets	Current year (t) depreciation and amortization (dp) plus income before extraordinary items (ib) divided by total assets (at) from the preceding year (t − 1)	Compustat
Dividends/Assets	Current year (t) ordinary dividends paid (dvc) divided by total assets (at) from the preceding year (t − 1)	Compustat
Capex/Assets	Current year (t) capital expenditures (capx) divided by total assets (at) from the preceding year (t − 1)	Compustat
Leverage	Current year (t) long-term and short-term debt (dltt + dlc) divided by total assets (at) from the preceding year (t − 1)	Compustat
Market/Book	Current year (t) market value of assets divided by total assets (at) from the preceding year (t − 1). Market value of assets equals market value of equity (cshpri × prcc_f) plus total liabilities (lt) plus liquidation value of preferred stock (pstkl) minus deferred tax liabilities (txdb)	Compustat
Sales/Assets	Current year (t) sales (sale) divided by total assets (at) from the preceding year (t − 1)	Compustat
PPE/Assets	Current year (t) net property, plant, and equipment (ppent) divided by total assets (at) from the preceding year (t − 1)	Compustat
CEOage	Natural logarithm of the CEO's age	Execucomp
CEOgender	Dichotomous variable equal to 1 given that the CEO is female, otherwise 0	Execucomp
CEOduality	Dichotomous variable equal to 1 given that the CEO acts as either chairperson or president of the firm, otherwise 0	Execucomp
BoardInd	Number of independent directors divided by number of directors	BoardEx
AbnormalSGA	Abnormal selling, general and administrative expenses estimated following Caskey and Ozel (2017)	Compustat

Table 10 (continued)

Variable	Description	Source
Production/Emp	Current year (t) inventory and cost of goods sold (invt + cogs) divided by number of employees (emp) from the preceding year (t − 1)	Compustat
Revenue/Emp	Current year (t) sales (sale) divided by number of employees (emp) from the preceding year (t − 1)	Compustat
PeopleCulture	People-oriented culture score calculated as the sum of the cultural dimensions of *Integrity*, *Respect*, and *Teamwork*	Li et al. (2021a)
TechCulture	Technology-oriented culture score calculated as the sum of the cultural dimensions of *Innovation* and *Quality*	Li et al. (2021a)
LnFines	Natural logarithm of 1 plus *Fines*	Violation tracker
LnNumb	Natural logarithm of 1 plus *Numb*	Violation tracker
TightnessIndex	The tightness-looseness index is a state-level composite index of nine dimensions. Four dimensions are related to the strength of punishment, two dimensions are related to permissiveness, two dimensions are related to morally constrained behavior, and the final dimension is related to influences from foreigners	Harrington and Gelfand (2014)
StrongCulture	Dichotomous variable equal to 1 given that the *Culture* value is in the top quartile, otherwise 0	Li et al. (2021a)
Collaborate	Collaboration-oriented corporate culture score of a firm obtained from the 10-K filing using textual analysis and keywords (e.g., "cooperate", "human", and "partner") specified in Fiordelisi and Ricci (2014)	EDGAR
Create	Creativity-oriented corporate culture score of a firm obtained from the 10-K filing using textual analysis and keywords (e.g., "dream", "trend", and "pioneer") specified in Fiordelisi and Ricci (2014)	EDGAR
TCR	Number of injury and illness cases divided by the number of hours worked by employees and multiplied by 200,000	OSHA
DART	Number of days away from work or days with job restrictions or transfers due to workplace injuries and illnesses divided by the number of hours worked by employees and multiplied by 200,000	OSHA
Hours/Emp	Hours worked per year divided by number of employees	OSHA
EstablishmentSize	Natural logarithm of average number of employees working in a given establishment during the year	OSHA
Strike	Dichotomous variable, equal to 1 given that the establishment experienced a lockout or strike during the year, otherwise 0	OSHA
Shutdown	Dichotomous variable, equal to 1 given that the establishment experienced layoffs or shutdowns during the year, otherwise 0	OSHA
Seasonal	Dichotomous variable equal to 1 given that the establishment contracts seasonal employees, otherwise 0	OSHA
Disaster	Dichotomous variable equal to 1 given that the establishment experienced a natural disaster or extreme weather conditions during the year, otherwise 0	OSHA

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Declarations

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References

Amernic J, Craig R (2017) CEO speeches and safety culture: British petroleum before the deepwater horizon disaster. Crit Perspect Account 47(1):61–80. https://doi.org/10.1016/j.cpa.2016.11.004

Amin MR, Kim I, Lee S (2021) Local religiosity, workplace safety, and firm value. J Corp Finance 70:102093. https://doi.org/10.1016/j.jcorpfin.2021.102093

U.S. Army (2017). *Contract Safety Handbook*.

Bajaj A, Leonard LNK, Sun L, Xing Z (2023) Corporate social responsibility and annual report reading difficulty. Rev Quant Finance Account 60(4):1393–1428. https://doi.org/10.1007/s11156-023-01132-9

Baskerville RF (2003) Hofstede never studied culture. Account Organ Soc 28(1):1–14. https://doi.org/10.1016/s0361-3682(01)00048-4

Beck M, Woolfson C (1999) Safety culture: a concept too many? Saf Health Pract 17(1):14–16

Beus JM, McCord MA, Zohar D (2016) Workplace safety: a review and research synthesis. Organ Psychol Rev 6(4):352–381. https://doi.org/10.1177/2041386615626243

Cao J, Ellis KM, Li M (2019) Inside the board room: the influence of nationality and cultural diversity on cross-border merger and acquisition outcomes. Rev Quant Finance Account 53(4):1031–1068. https://doi.org/10.1007/s11156-018-0774-x

Caskey J, Ozel NB (2017) Earnings expectations and employee safety. J Account Econ 63(1):121–141. https://doi.org/10.1016/j.jacceco.2016.12.002

Choo A, Grabowski M (2018) Linking workplace safety to operational disruptions: a moderated mediation analysis in commercial vessels. J Bus Logist 39(4):282–298. https://doi.org/10.1111/jbl.12195

Choudhry RM, Fang D, Mohamed S (2007) The nature of safety culture: a survey of the state-of-the-art. Saf Sci 45(10):993–1012. https://doi.org/10.1016/j.ssci.2006.09.003

Christensen DM, Serafeim G, Sikochi A (2022) Why is corporate virtue in the eye of the beholder? The case of ESG ratings. Account Rev 97(1):147–175. https://doi.org/10.2308/TAR-2019-0506

Christian M, Bradley J, Wallace J, Burke M (2009) Workplace safety: a meta-analysis of the roles of person and situation factors. J Appl Psychol 94(5):1103–1127. https://doi.org/10.2308/tar-2019-0506

Cohn J, Wardlaw M (2016) Financing constraints and workplace safety. J Finance 71(5):2017–2058. https://doi.org/10.1111/jofi.12430

Cohn JB, Liu Z, Wardlaw MI (2022) Count (and count-like) data in finance. J Financ Econ 146(2):529–551. https://doi.org/10.1016/j.jfineco.2022.08.004

Crémer J (1993) Corporate culture and shared knowledge. Ind Corp Change 2(3):351–386. https://doi.org/10.1093/icc/2.3.351

Custódio C, Ferreira MA, Matos P (2013) Generalists versus specialists: lifetime work experience and chief executive officer pay. J Financ Econ 108(2):471–492. https://doi.org/10.1016/j.jfineco.2013.01.001

De Jesus-Rivas M, Conlon HA, Burns C (2016) The impact of language and culture diversity in occupational safety. Workplace Health Saf 64(1):24–27. https://doi.org/10.1177/2165079915607872

Denison DR (1984) Bringing corporate culture to the bottom line. Organ Dyn 13(2):5–22. https://doi.org/10.1016/0090-2616(84)90015-9

Denison DR (1990) Corporate culture and organizational effectiveness. Wiley, New York

Di Giuli A, Kostovetsky L (2014) Are red or blue companies more likely to go green? Politics and corporate social responsibility. J Financ Econ 111(1):158–180. https://doi.org/10.1016/j.jfineco.2013.10.002
Edersheim EH (2010) The BP culture's role in the gulf oil crisis. Retrieved November 1, 2023, from https://hbr.org/2010/06/the-bp-cultures-role-in-the-gu
Edmans A (2011) Does the stock market fully value intangibles? Employee satisfaction and equity prices. J Financ Econ 101(3):621–640. https://doi.org/10.1016/j.jfineco.2011.03.021
Fiordelisi F, Ricci O (2014) Corporate culture and CEO turnover. J Corp Finance 28:66–82. https://doi.org/10.1016/j.jcorpfin.2013.11.009
Fung S, Pham VT, Raman KK (2022) Client corruption culture and audit quality: the conditioning effect of the competitive position of the incumbent auditor. Rev Quant Finance Account 59(3):1133–1171. https://doi.org/10.1007/s11156-022-01072-w
Gordon GG, DiTomaso N (1992) Predicting corporate performance from organizational culture. J Manag Stud 29(6):783–798. https://doi.org/10.1111/j.1467-6486.1992.tb00689.x
Graham JR, Grennan J, Harvey CR, Rajgopal S (2022) Corporate culture: evidence from the field. J Financ Econ 146(2):552–593
Guiso L, Sapienza P, Zingales L (2015) The value of corporate culture. J Financ Econ 117(1):60–76. https://doi.org/10.1016/j.jfineco.2014.05.010
Gyekye S, Salminen S (2009) Educational status and organizational safety climate: Does educational attainment influence workers' perceptions of workplace safety? Saf Sci 47(1):20–28. https://doi.org/10.1016/j.ssci.2007.12.007
Haga J, Huhtamäki F, Sundvik D (2019) Long-term orientation and earnings management strategies. J Int Account Res 18(3):97–119. https://doi.org/10.2308/jiar-52501
Haga J, Huhtamäki F, Sundvik D (2022) Ruthless exploiters or ethical guardians of the workforce? Powerful CEOs and their impact on workplace safety and health. J Bus Ethics 177(3):641–663. https://doi.org/10.1007/s10551-021-04740-4
Hambrick DC (2007) Upper echelons theory: an update. Acad Manag Rev 32(2):334–343. https://doi.org/10.5465/amr.2007.24345254
Hambrick DC, Mason PA (1984) Upper echelons: the organization as a reflection of its top managers. Acad Manag Rev 9(2):193–206. https://doi.org/10.5465/amr.1984.4277628
Harrington JR, Gelfand MJ (2014) Tightness–looseness across the 50 united states. Proc Natl Acad Sci 111(22):7990–7995. https://doi.org/10.1073/pnas.1317937111
Harrison JR, Carroll GR (1991) Keeping the faith: a model of cultural transmission in formal organizations. Adm Sci Q 36(4):552–582. https://doi.org/10.2307/2393274
Hasan MM (2022) Corporate culture and bank debt. Finance Res Lett 49:103152. https://doi.org/10.1016/j.frl.2022.103152
Heese J, Pacelli J (2023) Does information technology reduce corporate misconduct? Harvard University
Heese J, Pérez-Cavazos G (2020) When the boss comes to town: the effects of headquarters' visits on facility-level misconduct. Account Rev 95(6):235–261. https://doi.org/10.2308/tar-2019-0068
Heese J, Pérez-Cavazos G, Peter CD (2022) When the local newspaper leaves town: the effects of local newspaper closures on corporate misconduct. J Financ Econ 145(2):445–463. https://doi.org/10.1016/j.jfineco.2021.08.015
Hoi CK, Wu Q, Zhang H (2013) Is corporate social responsibility (CSR) associated with tax avoidance? Evidence from irresponsible CSR activities. Account Rev 88(6):2025–2059. https://doi.org/10.2308/accr-50544
International Labor Organization (2019) Safety and health at the heart of the future of work: building on 100 years of experience. Retrieved November 1, 2023, from https://www.ilo.org/global/topics/safety-and-health-at-work/events-training/events-meetings/world-day-for-safety/WCMS_686645/lang--en/index.htm
Jiang F, Kim KA, Ma Y, Nofsinger JR, Shi B (2019) Corporate culture and investment–cash flow sensitivity. J Bus Ethics 154(2):425–439. https://doi.org/10.1007/s10551-017-3444-3
Kitchell S (1995) Corporate culture, environmental adaptation, and innovation adoption: a qualitative/quantitative approach. J Acad Mark Sci 23(3):195–205. https://doi.org/10.1177/0092070395233004
Kniesner TJ, Leeth JD (2014) Regulating occupational and product risks. In: Machina MJ, Viscusi WK (eds) Handbook of the economics of risk and uncertainty, vol 1. Elsevier, Amsterdam, pp 493–600
Kotter JP, Heskett JL (1992) Corporate culture and performance. Free Press, New York
Kreps DM (1990) Corporate culture and economic theory. In: Alt JE, Shepsle KA (eds) Perspectives on positive political economy. Cambridge University Press, Cambridge
Leigh JP (2011) Economic burden of occupational injury and illness in the United States. Milbank Q 89(4):728–772. https://doi.org/10.1111/j.1468-0009.2011.00648.x

Li K, Liu X, Mai F, Zhang T (2021a) The role of corporate culture in bad times: Evidence from the COVID-19 pandemic. J Financ Quant Anal 56(7):2545–2583. https://doi.org/10.1017/S0022109021000326
Li K, Mai F, Shen R, Yan X (2021b) Measuring corporate culture using machine learning. Rev Financ Stud 34(7):3265–3315. https://doi.org/10.1093/rfs/hhaa079
Liu X (2016) Corruption culture and corporate misconduct. J Financ Econ 122(2):307–327. https://doi.org/10.1016/j.jfineco.2016.06.005
Nash R, Patel A (2019) Instrumental variables analysis and the role of national culture in corporate finance. Financ Manag 48(2):385–416. https://doi.org/10.1111/fima.12248
O'Reilly CA III, Caldwell DF, Chatman JA, Doerr B (2014) The promise and problems of organizational culture: CEO personality, culture, and firm performance. Group Org Manag 39(6):595–625. https://doi.org/10.1177/1059601114550713
O'Reilly CA, Chatman JA (1996) Culture as social control: Corporations, cults, and commitment. In: Staw BM, Cummings LL (eds) Research in organizational behavior: an annual series of analytical essays and critical reviews, vol 18, pp 157–200
Ostrom L, Wilhelmsen C, Daplan B (1993) Assessing safety culture. Nucl Saf 34:163–172
Pagell M, Klassen R, Johnston D, Shevchenko A, Sharma S (2015) Are safety and operational effectiveness contradictory requirements: the roles of routines and relational coordination. J Oper Manag 36:1–14. https://doi.org/10.1016/j.jom.2015.02.002
Paté-Cornell ME (1993) Learning from the piper alpha accident: A postmortem analysis of technical and organizational factors. Risk Anal 13(2):215–232. https://doi.org/10.1111/j.1539-6924.1993.tb01071.x
Pidgeon N (1998) Safety culture: key theoretical issues. Work Stress 12(3):202–216. https://doi.org/10.1080/02678379808256862
Posner B, Kouzes J, Schmidt W (1985) Shared values make a difference: an empirical test of corporate culture. Hum Resour Manag 24(3):293–309. https://doi.org/10.1002/hrm.3930240305
Rosenbaum PR, Rubin DB (1983) The central role of the propensity score in observational studies for causal effects. Biometrika 70(1):41–55. https://doi.org/10.1093/biomet/70.1.41
Shipman JE, Swanquist QT, Whited RL (2017) Propensity score matching in accounting research. Account Rev 92(1):213–244. https://doi.org/10.2308/accr-51449
Smith LC, Smith M, Ashcroft P (2011) Analysis of environmental and economic damages from British Petroleum's Deepwater Horizon oil spill. Albany Law Rev 74(1):563–585. https://doi.org/10.2139/ssrn.1653078
Sørensen JB (2002) The strength of corporate culture and the reliability of firm performance. Adm Sci Q 47(1):70–91. https://doi.org/10.2307/3094891
Stock JH, Yogo M (2005) Testing for weak instruments in linear IV regression. In Identification and inference for econometric models: essays in honor of Thomas Rothenberg (pp 80–108). Cambridge University Press. https://doi.org/10.1017/CBO9780511614491.006
Tedesco J (2013) Eagle Ford pay is high, but work can be fatal. Retrieved November 1, 2023, from http://www.mysanantonio.com/news/energy/article/Eagle-Ford-pay-is-high-but-workcan-be-fatal-4285405.php
Unsal O, Hassan MK (2023) Employee treatment and firm performance: evidence from topic modelling in lawsuit announcements. Rev Quant Finance Account. https://doi.org/10.1007/s11156-023-01168-x
Vaughan D (1999) The dark side of organizations: mistake, misconduct, and disaster. Ann Rev Sociol 25(1):271–305. https://doi.org/10.1146/annurev.soc.25.1.271
Viscusi WK (2010) The heterogeneity of the value of statistical life: introduction and overview. J Risk Uncertain 40:1–13. https://doi.org/10.1007/s11166-009-9083-z
Willmott H (1993) Strength is ignorance; slavery is freedom: managing culture in modern organizations. J Manag Stud 30(4):515–552. https://doi.org/10.1111/j.1467-6486.1993.tb00315.x
Wokutch RE (1990) Corporate social responsibility Japanese style. Acad Manag Perspect 4(2):56–74. https://doi.org/10.5465/ame.1990.4274797
Wooldridge J (2002) Econometric analysis of cross section and panel data. Massachusetts Institute of Technology Press, Cambridge
Wu X, Li Y, Yu Y (2023) CEO inside debt and employee workplace safety. J Bus Ethics 182:159–175. https://doi.org/10.1007/s10551-021-05033-6
Zaman R, Atawnah N, Baghdadi GA, Liu J (2021) Fiduciary duty or loyalty? Evidence from co-opted boards and corporate misconduct. J Corp Finance 70:102066. https://doi.org/10.1016/j.jcorpfin.2021.102066
Zingales L (2015) The "cultural revolution" in finance. J Financ Econ 117(1):1–4. https://doi.org/10.1016/j.jfineco.2015.05.006