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In loving memory of my grandmother, holding her own story of inspiration

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CONTENTS

1. INTRODUCTION 1

2. THE ROLE OF CORPORATE CULTURE IN CORPORATIONS 6

2.1 Corporate culture and workplace safety 6

2.3 Corporate culture and tax planning 7

2.4 Corporate culture and trade credit 8

3. SUMMARY OF THE ESSAYS 10

3.1 Nothing to fear: strong corporate culture and workplace safety 10

3.2 Corporate culture and tax planning 11

3.3 Corporate culture and trade credit 11

4. CONTRIBUTION 13

PART B: THE ESSAYS 24

PART A: BACKGROUND, THEORY AND FINDINGS

1. INTRODUCTION

Economists have traditionally used property rights theory and agency theory to rationalize and explain corporate outcomes. In this framework, the firm is predominantly portrayed as a venue with various competing interests in continuous conflict, where order only emerges because of binding, enforceable contracts (Ross, 1973; Jensen and Meckling, 1976; Demsetz, 1988). The widespread influence of this line of thought cannot be overemphasized, and the principal-agent relationship has profoundly shaped our perspective on both managerial and corporate behavior. However, both property rights theory and agency theory marginalize that managers are boundedly rational individuals who navigate a very complex and uncertain environment. This outlook suggests that the neo-classical interpretation of the nature of the firm is incomplete. Not only because it marginalizes the limits of bounded rationality but also because it bypasses the inherent capability for human collaboration, driven by social norms that operate beyond the confines of the legal system (e.g., Fehr, Fischbacher and Gächter, 2002; Fowler and Christakis, 2010; Henrich and Muthukrishna, 2021).

While the characterization of the firm as a nexus of contracts has enhanced our understanding of managerial and corporate behavior, it is also relevant to acknowledge that agency theory bypasses that most people are hired on a discretionary basis, with nothing more than a written offer which outlines the basic terms of their professional obligations (Rothstein, Knapp and Liebman, 1987). To equate the nature of employment with rigid contracts may thus be a misrepresentation that cloaks socio-organizational factors, which could help us disentangle why seemingly similar firms differ in performance. While traditional economic theory discards behavioral aspects and persistently links outcome differences across firms to production inputs, a growing number of empirical studies suggest that much of the output variation can be attributed to the firm's inner workings (Syverson, 2011; Backus, 2020). This implies that the social nature of the firm deserves more attention, and mental constructs such as corporate culture should be decoded and studied to advance our understanding of the nature of the firm.

However, there is no single true definition of culture, and like any other social construction, corporate culture embodies a variety of behaviors that assist in structuring the perception of reality (Levintin, 1973). Theory is thus in a nascent stage, and the mathematical representations of corporate culture are still evolving. A pioneering study in this context is Crémer (1993), who collapses the multilayered construct of culture into a singular entity defined as the firm's "collective stock of knowledge." Another significant contribution is Van den Steen (2010), who models and defines corporate culture as "collectively shared beliefs" regarding the proper way of doing things. While both Crémer (1993) and Van den Steen (2010) decompose corporate culture into a singular construct, there are also more recent attempts to retain the multilayered nature of corporate culture by imposing weights on different cultural elements (Gorton and Zentefis, 2020; Gorton and Zentefis, 2023). This mathematical interpretation is helpful since it provides a conceptual framework that eludes the constant quest for a fixed and single definition of corporate culture.

In addition to definition-related challenges, corporate culture is also surrounded by measurement issues, which may explain why much empirical progress has taken place outside the field of economics. The initial method of studying corporate culture involved fieldwork, drawing upon methods used to evaluate societal culture from anthropology (Minkov and Hofstede, 2014). While societal culture and corporate culture are closely related, it is helpful to think of them as separate constructs since they influence corporate policies through their own unique mechanisms (Weber, Shenkar, and Raveh, 1996). Societal culture, or what Hofstede (1980) labeled as "the collective programming of the mind", incorporates civic norms that also influence the broader business environment and expectations from corporate stakeholders. Corporate culture, on the other hand, refers to a unique set of firm-specific values that dictates how employees interact and make decisions within the boundaries of the firm. Even though corporate culture is influenced by societal culture through the beliefs and values of internal stakeholders, it is not merely a reflection of such values but an evolution of them (Bakersville, 2003). This evolutionary assimilation, shaped by the unique way that a firm adjusts to its contracting environment, makes corporate culture a distinct construct that warrants independent examination.

To further explore corporate culture as a social construct, researchers started to undertake small-scale surveys of rank-and-file employees (Denison, 1984; O'Reilly et al., 1991; Cameron et al., 2006). Most of these early attempts are, however, limited in scope and do not always distinguish between the potential mechanisms through which cultural values, norms, and beliefs may operate (Chatman and O'Reilly, 2016). More recent fieldwork tends to embrace the underlying assumption that corporate culture is consciously designed, and researchers have thus shifted focus to large-scale surveys of executives to obtain the tone at the top (Licht and Adams, 2019; Graham et al., 2022). While these studies have helped to substantiate and refute several anecdotes about corporate culture, they are not without limitations. Both surveys and interviews may influence respondents through framing, and potential measurement errors may arise because survey and interview questions constrain the respondents' freedom of expression. Selection bias is another problem, and causal inference is generally not feasible in studies based on a single cross-sectional survey questionnaire. In response to these challenges, scholars have explored alternative methods that draw upon metrics derived from societal and behavioral norms (Grinblatt and Keloharju, 2001; Davidson, Dey and Smith, 2015; Pan et al., 2020), network-based calculations (Jeffers and Lee, 2019; Cho et al., 2021) and experimental designs (Weber and Camerer 2003; Sandvik et al., 2020;). However, this line of research is usually limited to examining time-invariant elements of culture (Guiso, Sapienza, and Zingales, 2006), and even though corporate culture is a slow-moving and path-dependent construct, it is never static.

This obstacle is addressed in a related stream of studies, where researchers exploit recent advances in natural language processing to obtain time-varying cultural characteristics from publicly available corporate filings (Graham et al., 2022). The intuition behind this approach is based on the idea that the words expressed by management in public disclosures are meaningful cultural artifacts that are representative of a firm's underlying values and norms (Kramsch and Widdowson, 1998; Lazear, 1999; Levinson, 2003; Schein, 2010). This analytical technique has been applied in the finance and

management literature to extract different elements of corporate culture from financial statements (Fiordelisi and Ricci, 2014), earnings call transcripts (Li et al., 2021), and analyst reports (Bellstam, Bhagat, and Cookson, 2021). While the content in such disclosures may suffer from impression management, there is a growing body of research that proposes that textual analysis can be used to extract various elements of corporate culture from corporate filings (e.g., Audi, Loughran, and McDonald, 2016; Garcia, Harithsa, and Owusu, 2021; Adams, Akyol, and Grosjean, 2021). Building on this literature, I present three essays designed to investigate the financial and non-financial implications of corporate culture through the lens of various stakeholders.

In the first essay, Jesper Haga, Fredrik Huhtamäki, Dennis Sundvik, and I focus on employees and examine the link between corporate culture and workplace safety. Occupational health and safety constitute a cornerstone of corporate social responsibility, and safety-related violations are always associated with substantial societal costs and human suffering. However, when firms devote supplementary means to improve safety at the workplace, it may appear as if they are reallocating resources from shareholders to the workforce. Still, such expenditures have been demonstrated to accommodate the interests of both shareholders and stakeholders, particularly when safety-related spending leads to employee satisfaction. This is established by Edmans (2011), who discovered that employee satisfaction is positively related to long-run stock returns and accounting profitability. Unsal and Hassan (2023) corroborate this finding and show that employee litigation is linked to lower financial performance. High frequencies of workplace injuries and illnesses are also linked to organizational disturbances (Choo and Gabrowski, 2018). Considering that such disturbances are costly and adversely affect shareholders' interests, higher workplace safety should be expected in firms with strong corporate cultures where shareholder value is recognized to be of elevated importance (e.g., Sørensen, 2002; Guiso et al., 2015; Li et al., 2021; Graham et al., 2022).

To test this conjecture, we combine a machine learning based measure of strong corporate culture by Li et al. (2021) with data on employee- and safety-related violations from the Violation Tracker database, produced by the Corporate Research Project of Good Jobs First. Our final sample covers 16,242 firm-year observations from 1,747 firms across the period 2002-2018. Consistent with our prediction, we discover that firms with strong corporate cultures record lower regulatory fines, are less prone to be penalized, and sustain fewer violations. Our findings are robust to several tests, addressing potential measurement errors in our variables of interest, endogeneity concerns, and biases arising from functional form misspecification. Within the same essay, we examine establishment-level data from the United States (U.S.) Occupational Safety and Health Administration (OSHA) and find lower illness and injury rates in firms with stronger corporate cultures. We also identify a potential economic channel by connecting firms with a strong corporate culture to safety-related spending. We note that such expenditures seem particularly prominent in firms with technology-oriented corporate cultures.

In the second essay, Mansoor Afzali and I focus on shareholders and study the relationship between corporate culture and tax planning. Crocker and Slemrod (2005) propose that agency frictions between management and shareholders may explain variations in corporate tax planning. This notion has fueled a rich stream of literature that focuses on how individual managers (Chyz, 2013; Koester, Shevlin, and Wangerin, 2017), managerial compensation (Desai and Dharmapala, 2006; Rego and Wilson, 2012), and corporate governance mechanisms (Badertscher et al., 2013; Armstrong et al., 2015) affect tax decisions. However, agency problems emerge from differences in objectives and such differences are by design less severe in corporate environments with higher levels of trust and reciprocity (Van den Steen, 2010). Considering that cultural norms and incentive contracts may affect agency problems differently (Song and Thakor, 2019) and the particular importance of trust and reciprocity in the context of corporate reporting (Garrett, Hoitash, and Prawitt, 2014), we hypothesize that corporate culture has implications for corporate tax planning.

To test this hypothesis, we use a sample of 42,640 U.S. firm-year observations across the period 1994-2019. Following Fiordelisi and Ricci (2014), we employ the competing values framework and natural language processing to estimate two dimensions of corporate culture from 10-K reports available in the Securities and Exchange Commission's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) database. We merge this data with accounting data from Compustat and examine the association between corporate culture and tax planning. We find that firms with control-oriented (collaboration-oriented) corporate cultures record higher (lower) effective tax rates over short and long time horizons. These findings are statistically significant and robust to alternative specifications, addressing endogeneity concerns and biases arising from functional form misspecification. We also note that firms with collaboration-oriented corporate cultures achieve tax savings by engaging in tax-sheltering activities and that such savings positively affect firm value. We find no evidence of such tax-sheltering behavior in firms with control-oriented cultures.

In the third essay, I focus on how corporate values shape the role of suppliers and examine the relationship between corporate culture and trade credit policies. Trade credit is a fundamental practice in modern economies and constitutes an uncollateralized source of financing, nearly three times the size of bank credit on the aggregate balance sheet of nonfinancial firms in the U.S. (Barrot., 2016). Financial theory identifies several motivations for trade credit provision (e.g., Ferris, 1981; Brennan et al., 1988; Daripa and Nilsen, 2011) and subsequent empirical studies have diligently examined how these motives relate to various firm characteristics (e.g., Fabbri and Menichini, 2010; Abdulla et al., 2020) and societal norms in the firm's operating environment (e.g., Wu et al., 2014; El Ghoul and Zheng, 2016; Mättö and Niskanen, 2019). However, the literature in accounting and finance is far less refined in terms of how time-varying social norms within corporations influence trade credit policies. To address this research gap, I investigate whether trade credit policies vary across firms with different cultural orientations.

I explore a U.S. sample of 79,107 firm-year observations across the period 1994-2019 by combining accounting data from Compustat with cultural data derived from 10-K reports filed in the Securities and Exchange Commission's EDGAR database. Drawing upon Fiordelisi and Ricci (2014) and the antithetical dynamics of the competing values framework, I find that firms whose corporate culture leans towards stability and control extend more trade credit to customers. The opposite pattern is partly observed among firms whose corporate culture emphasizes flexibility and discretion. These findings are robust to alternative setups, addressing endogeneity concerns and biases arising from functional form misspecification. I also document that the link between corporate culture and trade credit policies varies under different economic circumstances and that such policies have implications for firm performance.

A central theme across all three essays is the use of accounting information to canvas the role of corporate culture in different corporate settings. Each essay makes a separate but distinct contribution to a contemporary stream of research that exploits natural language processing to analyze how corporate culture influences policy choices and corporate behavior in wider cross-sectional settings (Audi, Loughran, and McDonald, 2016; Liu, 2016; Li et al., 2021). The principal contribution of this dissertation is, however, tied to the collective evidence, which suggests that corporate culture influences workplace safety, tax planning, and trade credit policies in U.S. firms. These findings underscore that corporate culture has both financial and non-financial implications for several primary stakeholders. Prior studies in this field have predominantly focused on the financial effects of corporate culture and have thus not always emphasized the implications for stakeholders beyond corporate shareholders.

2. THE ROLE OF CORPORATE CULTURE IN CORPORATIONS

Understanding the nature of firms has animated economists ever since Ronald Coase first questioned why such entities emerge in an economic system structured around the price mechanism. The subsequent economic literature has then supplied a useful explanation by integrating agency theory with property rights theory (e.g., Demsetz, 1967; Ross, 1973; Jensen and Meckling, 1976; Williamson, 1979; Grossman and Hart, 1986; Demsetz, 1988; Hart and Moore, 1990). While the premise of this framework has helped to explain corporate outcomes, by specifying how property rights influence corporate behavior within the realm of agency conflicts, it marginalizes much of the practical realities of firms' inner workings (e.g., DiMaggio and Zukin, 1990; Dequech, 2003; Ashforth and Anand, 2003).

Agency conflicts, as proposed by Jensen and Meckling (1976), orbit around ownership versus control and focus on the information asymmetry that arises between corporate stakeholders and managers who act on their behalf in modern corporations. This relationship is subject to moral hazard since corporate stakeholders cannot ensure that managers always act in their best interests. As an antidote to this dilemma, agency theorists typically resort to formal corporate governance mechanisms and emphasize the importance of aligning incentive schemes and supervising managerial behavior. However, recent empirical evidence shows that myopic activities and inadequate risk management tend to be a salient organizational feature rather than a byproduct of misaligned compensation schemes and a few opportunistic managers (e.g., Fahlenbrach et al., 2012; Ellul and Yerramilli, 2013; Cheng et al., 2015). These findings suggest that the neo-classical resolution to agency conflicts fails to fully incorporate the complexity of the cognitive and cultural landscape that managers and board members navigate (e.g., DiMaggio and Zukin, 1990; Dequech, 2003; Ashforth and Anand, 2003).

This background stresses the importance of understanding how social aspects of the firm relate to principal-agent conflicts. A compelling theory in this regard is put forth by Van den Steen (2010), who underscores that agency problems arise from differences in objectives and demonstrates how homogeneous corporate beliefs can mitigate moral hazard in ways that incentive contracts cannot. Similarly, Song and Thakor (2019) show that corporate culture constitutes an implicit control mechanism that may reduce the need for managerial monitoring. Edmans (2011) validates this line of reasoning by empirically demonstrating that implicit corporate governance mechanisms can bridge the gap between stakeholder-oriented objectives and profit-oriented concerns in publicly listed companies. This outlook provides a role for socio-organizational factors in economic theory and positions corporate culture at the heart of corporate policy choices involving ethical considerations and risk-taking.

2.1 Corporate culture and workplace safety

All firms face natural incentives to uphold high safety standards since breaches in workplace safety are associated with direct economic costs in terms of regulatory sanctions (Kniesner and Leeth, 2014) and indirect costs materialized through insurance- and compensation premiums (Viscusi, 2010; Caskey and Ozel, 2017). Inferior safety

records can also incur reputational costs (Smith et al., 2011), and rating agencies issuing Environmental, Social, and corporate Governance (ESG) scores often include safety-oriented aspects in their assessments (Christensen et al., 2022). Nonetheless, Bird et al. (2007) show that markets do not always reward good corporate citizenship, and when firms start to allocate significant means to improve occupational health and safety, it may appear as if they are reallocating wealth from shareholders to the workforce. Accordingly, it would be reasonable, at least from an agency perspective, to expect lower safety standards in firms where shareholder value is of elevated significance.

The strong culture hypothesis suggests that strongly and widely held corporate beliefs can boost financial performance in relation to the intensity of their materialization (e.g., Denison, 1984; Gordon and DiTomaso, 1992; Kotter and Heskett, 1992; Sørensen, 2002). Recent empirical evidence corroborates this notion by documenting a prominent relationship between strong corporate culture and firm value (e.g., Guiso et al., 2015; Li et al., 2021; Graham et al., 2022). Based on this evidence, shareholders appear to be the prime beneficiaries of strong corporate communality. A premise which, according to agency theory, could imply that firms with a strong corporate culture are more reluctant to allocate resources to employee well-being. This line of reasoning finds some support in a growing body of studies, which documents how incentives derived from capital markets can adversely affect workplace safety (Cohn and Wardlaw, 2016; Caskey and Ozel, 2017; Bradley et al., 2021).

However, Van den Steen (2010) shows that corporate culture, modeled as an informal corporate governance mechanism, can mitigate differences in objectives between shareholders and other corporate stakeholders. Edmans (2011) validates this notion empirically by showing that elevated concerns for the labor force can benefit shareholders through long-run stock returns. Similar results are reported by Fauver et al. (2018), who also conclude that employee-friendly practices contribute to better firm performance. This venue signals that strong corporate communality may play an important part, beyond the confines of formal corporate governance mechanisms, in resolving agency conflicts between shareholders and other corporate stakeholders. This outlook underscores that corporate culture deserves more attention within the realm of ethical decision-making, where societal and economic interests often collide.

2.3 Corporate culture and tax planning

The field of public economics suggests that personal tax planning is influenced by extrinsic motives, such as the rate of taxation, the likelihood of detection, and potential repercussions, as well as intrinsic motivations like risk aversion and civic virtue. While these determinants are of similar importance to corporate tax planning, Crocker and Slemrod (2005) underline several additional issues that arise due to the separation of ownership from control. Yet, if conventional economic theory holds, shareholders expect managers to prioritize the bottom line and engage in tax-minimizing activities as long as the marginal benefits outweigh the marginal costs (Scholes et al., 2009). Tax planning is thus not in itself a manifestation of agency problems, but the separation of ownership from control can spur corporate tax decisions that reflect the financial interests of the managers rather than the shareholders.

As a resolution to managerial rent extraction, Jensen and Meckling (1976) focus on formal corporate governance mechanisms and advocate for a combination of aligned incentives and managerial supervision. However, more recent theoretical work in corporate finance underscores that corporate culture may play an important part, which transcends beyond the scope of formal corporate governance mechanisms, in alleviating principal-agent problems (Van den Steen, 2010; Song and Thakor, 2019; Gorton and Zentefis, 2023). These studies highlight that corporate culture constitutes an implicit control mechanism that may restrain myopic behavior, reduce the need for managerial monitoring, and encourage knowledge exchange between corporate stakeholders. Within this conceptual framework, it is important to note that corporate culture does not merely influence how knowledge is used by management; it also shapes how knowledge is discovered and exchanged among members of an organization (Cremer, 1993).

The link between knowledge management and corporate culture is particularly useful for analyzing tax behavior since tax planning is a knowledge-intensive corporate activity that requires substantial cooperation across conventional lines of authority (Hasseldine, Holland, and van der Rijt, 2012). This notion finds further support in Cremer (1993), who introduces a model where culture serves as a substitute for both costly communication and contracting. Corporate culture may thus influence intrinsic tax motives by shaping how knowledge is discovered, exchanged, and managed in an organization. These complementary perspectives lend support to the idea that corporate culture could constitute a missing piece in the tax dispersion puzzle and may thus help explain why seemingly similar firms exhibit substantial variation in reported tax burdens. This variation is not well understood within the confines of neo-classical economics and is often argued to originate from the interaction of several firm-specific factors related to the firm's internal workings (Hanlon and Heitzman, 2010).

2.4 Corporate culture and trade credit

Trade credit provision or delayed payments for intermediate goods is essentially an organizational design choice to internalize an activity (i.e., manage credit risks) rather than relying on the market (i.e., outsource credit risks). Conventional theories of the firm suggest that such decisions are determined by how the effects of transaction-specific investments and transaction costs relate to the firm’s organizational structure (Williamson, 1985). As a result, trade credit provision should be expected when the supplier has a high level of specialized investment at stake, as well as in scenarios with high information asymmetry between the supplier and customer (Ng et al., 1999; Fabbri and Klapper, 2016; Chod et al., 2019). The literature in finance also considers other conventional motives such as economies of scale, price discrimination, and liquidity as potential explanations for interfirm financing (e.g., Schwartz, 1974; Mian and Smith, 1992).

Within the conventional boundaries of the firm, corporate culture is of negligible economic importance. Firms with comparable production inputs are expected to adopt a similar set of corporate policies when they face similar market conditions. However, recent survey evidence by Graham et al. (2022) indicates that a majority of U.S. executives believe that a firm’s culture shapes risk preferences in policy choices.

Similarly, Akerlof (2007) elaborates on how firms adopt different corporate policies because of endogenously generated norms that delineate the firm's preferred course of action. These findings align with Kreps (1990), who demonstrates that corporate culture can serve as a substitute for costly contracting by specifying the appropriate course of action in the event of unforeseen contingencies. A firm's culture may thus be perceived as a set of shared expectations, which provides a mechanism for decision-making in competitive situations with multiple equilibria (Hermalin, 2001).

These complementary perspectives are useful in the context of interfirm financing since the literature documents substantial variation in how firms structure their trade credit policies (Nadiri, 1969; Ng et al., 1999; Wilner, 2000; Daripa and Nilsen, 2011; Chod et al., 2019). This variation is not only insufficiently understood but may be idiosyncratic and ultimately shaped in the presence of multiple equilibria. Hermalin (1994) shows that competitive market forces can introduce situations where it is not an equilibrium for firms within the same industry or market to adopt similar strategies or policy choices. Under such circumstances, culture starts to matter since corporate values and norms may constitute a mechanism that defines the "right" course of action when employees face unforeseen contingencies (Kreps, 1990; Hermalin, 2001). This venue provides a role for corporate culture in the context of interfirm financing and suggests that implicit values and norms can help explain why seemingly similar firms extend varying degrees of trade credit.

3. SUMMARY OF THE ESSAYS

This doctoral dissertation consists of three separate essays that utilize accounting information to analyze the financial and non-financial implications of corporate culture through the lens of various stakeholders.

Each essay follows a similar structure and builds on O'Reilly and Chatman's (1996) definition of corporate culture as a set of "firmly held values and norms that are widely shared within an organization." This definition is useful for several reasons. First, it is similar to the ones used in traditional economic models that incorporate notions of implicit contracts (e.g., Akerlof and Kranton, 2005; Tabellini, 2008; Bénabou and Tirole, 2011; Guiso, Sapienza, and Zingales, 2015). Second, the value component of corporate culture is relatively straightforward to measure and does not impose stringent conditions on the operational construct in use. Building on O'Reilly and Chatman (1996) is also helpful for contextualization and allows for the inclusion of more detailed definitions of corporate culture that rationalize the usefulness of a particular construct in a specific setting.

Each observational study in this dissertation is also exposed to the dual challenge of measurement and identification and employs conventional methodologies to mitigate potential bias from measurement errors and correlated omitted variables (e.g., triangulation, alternative fixed effects models, propensity score matching, and instrumental variable regressions). These methods are carefully selected to accommodate the persistent and slow-moving nature of corporate culture and are thus capable of producing unbiased estimates in setups where the variable of interest is unlikely to exhibit prompt changes to exogenous shocks. While alternative identification strategies, such as natural experiments, would offer more transparent and straightforward assumptions, they are presumably more helpful when the variable of interest is expected to exhibit sharp discontinuities to an unexpected event.

This section provides a brief summary of the following essays with an emphasis on data, methodology, and main findings:

Essay 1: Nothing to fear: strong corporate culture and workplace safety

Essay 2: Corporate culture and tax planning

Essay 3: Corporate culture and trade credit

3.1 Nothing to fear: strong corporate culture and workplace safety

The purpose of the first essay is to better understand the link between corporate culture and workplace safety. In response to this inquiry, Jesper Haga, Fredrik Huhtamäki, Dennis Sundvik, and I focus on how strong corporate culture influences occupational health and safety. Using data derived from a semi-supervised machine learning methodology by Li et al. (2021), we collapse the multidimensional concept of corporate

culture and quantify the relative strength of firm-level culture across a wide cross-section of firms. We merge this cultural dataset obtained from earnings call transcripts with information on employee- and safety-related violations from the Violation Tracker database provided by the Corporate Research Project of Good Jobs First and accounting data from Compustat. Our final sample covers 16,242 firm-year observations from 1,747 publicly listed US firms across the period 2002-2018.

Based on this data sample, we discover that firms with strong corporate cultures record lower regulatory fines, are less prone to be penalized, and sustain a lower number of safety-related violations. These findings cannot be explained by formal corporate governance mechanisms, potential measurement errors in our variables of interest, or biases arising from functional form misspecification. They are also robust to instrumental variable regressions addressing endogeneity. Within the same essay, we examine establishment-level data from the U.S. OSHA and find lower illness and injury rates in firms with stronger corporate cultures. We also identify a potential economic channel by connecting firms with a strong corporate culture to safety-related spending. Such expenditures seem to be particularly prominent in firms with technology-oriented cultures.

3.2 Corporate culture and tax planning

The second essay seeks to understand how corporate values and norms affect knowledge-intensive corporate activities. To study this issue, Mansoor Afzali and I focus on how corporate values and norms influence corporate tax planning. Drawing upon the competing values framework and natural language processing (Fiordelisi and Ricci, 2014), we quantify Quinn and Rohrbaugh's (1983) internal dimensions of corporate culture based on the textual content of 10-K filings obtained from the Securities and Exchange Commission's EDGAR database. We merge this data with tax information from Compustat and construct several measures of corporate tax planning. Our final sample consists of 42,640 firm-year observations of publicly listed U.S. firms during the period 1994-2019.

Based on this data material, we find that firms with control-oriented (collaboration-oriented) corporate cultures record higher (lower) tax burdens over short and long time horizons. These findings cannot be explained by corporate governance mechanisms, biases arising from functional form misspecification, or time-invariant firm-level heterogeneity. They are also robust to instrumental variable regressions addressing endogeneity. In additional analyses, we also document evidence suggesting that firms with collaboration-oriented corporate cultures achieve tax savings by engaging in tax-sheltering activities and that such savings positively affect firm value. We find no evidence of tax-sheltering behavior in firms with control-oriented cultures.

3.3 Corporate culture and trade credit

The objective of the third essay is to better understand how corporate culture shapes the role of the supplier in the context of interfirm financing. To shed some light on this issue, I examine how corporate values and norms influence trade credit provision. Building on the competing values framework and natural language processing (Fiordelisi and Ricci,

2014), I extract Quinn and Rohrbaugh's (1983) dimensions of corporate culture from the textual content of 10-K filings available at the U.S. Securities and Exchange Commission's EDGAR database. I match this information with three alternative measures of trade credit provision derived from the Compustat database. My final sample consists of 79,107 firm-year observations of publicly listed US firms across the period 1994-2019.

Based on this data, I find that firms whose corporate culture lean towards stability and control extend more trade credit to customers, while the opposite pattern partly applies to firms whose corporate culture emphasizes flexibility and discretion. These findings cannot be explained by corporate governance mechanisms, observable differences in firm characteristics, or time-invariant firm-level heterogeneity. They are also robust to instrumental variable regressions addressing endogeneity concerns. In additional analyses, I encounter evidence suggesting that control- and competition-oriented firms extend trade credit during different economic circumstances and that such policies have implications for firm performance. More specifically, I find that firms with control-oriented cultures are more inclined to extend trade credit when they experience financial constraints or lower levels of demand. The reversed pattern is evident for firms with competition-oriented cultures, which appear to extend more trade credit when demand is high and financial constraints are low. I also document that a firm's cultural orientation could be an important determinant for the performance implications of different trade credit strategies.

4. CONTRIBUTION

This dissertation adds to the existing body of knowledge by studying the role of corporate culture in accounting and finance through the lens of various stakeholders. The overarching contribution boils down to the empirical evidence on how corporate culture influences workplace safety, tax planning, and interfirm financing in publicly listed firms. Each one of the three essays adds to the existing literature in the following way.

Essay 1 analyzes the link between corporate culture and workplace safety. Jesper Haga, Fredrik Huhtamäki, Dennis Sundvik, and I use a similar approach as in prior business studies to show that firms with strong corporate values and norms are negatively associated with occupational safety and health violations, as well as workplace injuries and illnesses. These insights inform practice and the broader society of the positive non-financial effects of strong corporate culture, which constitutes an implicit governance mechanism that has predominantly been shown to benefit shareholders. We also contribute to an emerging string of studies documenting how corporate culture influences decision-making and commitment to corporate social responsibility in wider cross-sectional settings. This field is characterized by mixed conclusions, and much of the previous findings are based on metrics derived from time-invariant aspects of societal culture or commercial black box ESG scores (e.g., Hoi et al., 2013; Lakshman et al., 2014; Di Giuli and Kostovetsky, 2014). We add to this literature by linking time-varying elements of corporate culture to actual outcomes of corporate social responsibility. These findings are informative for practice and offer actionable insights into how cultural initiatives in corporations can align financial objectives with broader societal goals.

Essay 2 examines how corporate culture affects tax planning and exposes a link between implicit organizational features and recorded tax rates. More specifically, Mansoor Afzali and I show that firms with control-oriented (collaboration-oriented) corporate cultures are associated with higher (lower) tax burdens. These findings deviate from prior research, which documents a compelling relationship between control-oriented corporate governance characteristics and low tax burdens (e.g., Gallemore and Labro, 2015; Bauer, 2015; Hasan et al., 2021). This juxtaposition contributes with further nuance to the tax literature and underscores that implicit and explicit forms of structural control may influence corporate tax planning differently. We also contribute to an emerging stream of research, which links corporate tax differences to social mechanisms rather than production inputs. While other studies in this field emphasize the importance of societal culture (Kanagaretnam et al., 2017; Hasan et al., 2017), we contribute with new insights into how corporate culture affects shareholders in the context of tax planning. These findings are informative for policymakers and provide some support for systems thinking in the context of tax regulation.

Essay 3 focuses on how corporate culture influences trade credit policies and contributes to an established line of research that has documented various determinants of interfirm financing (e.g., Ng et al., 1999; Molina and Preve, 2009; Chod et al., 2019). Much of the existing research in this area is centered around the implications of tangible firm characteristics (e.g., Fabbri and Menichini, 2010; Fabbri and Klapper, 2016; Abdulla et

al., 2020) and societal norms in the firm's operating environment. (e.g., Wu et al., 2014; El Ghoul and Zheng, 2016; Mättö and Niskanen, 2019). However, there is surprisingly little evidence on how social norms within corporations influence trade credit policies. I address this research gap by showing that corporate culture influences the role of the supplier in trade credit arrangements. This finding caters to an emerging narrative in corporate finance, which links outcome differences across firms to internal social mechanisms rather than production factors. While other studies in this field emphasize how corporate culture affects shareholders (Guiso, Sapienza, and Zingales, 2015), creditors (Nguyen, Nguyen, and Sila, 2019), and employees (Haga et al., 2024), I contribute with new insights on how implicit corporate values and norms affect customers in the context of interfirm financing. These findings are informative for policymakers and provide some support for macro-economic policies that preserve the financial resilience of supply chains by addressing systematic patterns in corporate behavior.

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PART B: THE ESSAYS

ESSAY 1

Haga, J., Huhtamäki, F., Sundvik, D., & Thor, T. (2024). Nothing to fear: Strong corporate culture and workplace safety. *Review of Quantitative Finance and Accounting*, 1-32.

ESSAY 2

Afzali, M., & Thor, T. (2024). Corporate culture and tax planning. *Review of Quantitative Finance and Accounting*, 1-38.

ESSAY 3

Thor, T. (2024). Corporate culture and trade credit.

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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) *Fined*	(2) *Fines*	(3) *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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ORIGINAL RESEARCH

Corporate culture and tax planning

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Abstract
In this paper, we study the relationship between corporate culture and tax planning. Using the competing values framework and natural language processing techniques, we document that firms with collaboration-oriented (control-oriented) corporate cultures are associated with lower (higher) effective tax rates. We further find that firms with collaboration-oriented corporate cultures achieve these tax savings by engaging in tax-sheltering activities and that such savings positively affect firm value. While firms with salient control-oriented characteristics have previously been recognized to benefit from small tax burdens, we contribute with new evidence suggesting that intra-organizational reciprocity also promote tax savings that ultimately benefit shareholders.

Keywords Corporate culture · Competing values framework · Text analysis · Tax planning · Tax sheltering · Firm value

JEL Classification H26 · M14 · M41

1 Introduction

In this paper, we study the relationship between corporate culture and corporate tax planning. While research on the determinants of tax planning is a mature topic in the accounting literature, it is relevant to acknowledge that many of these studies focus on how observable corporate governance mechanisms and managerial characteristics influence tax behavior. We pursue a different route and posit that implicit corporate values and norms influence tax planning. The rationale behind this path is rooted in the management literature that has long argued that corporate culture profoundly affects intra-organizational efficiency (Gorden et al. 1984; Wilkins and Ouchi 1983; Schein 2010).

Drawing upon Quinn and Rohrbaugh (1983), we conceptualize corporate culture through the lens of the competing values framework (CVF). The CVF allows researchers

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to quantify four dimensions of corporate culture: the internally oriented dimensions of *control* and *collaborate,* along with the externally oriented dimensions of *create* and *compete*. We connect the cultural dimensions described in the CVF to knowledge management and argue that a firm's cultural orientation affects how its employees discover, exchange, and use knowledge across different areas of the firm. We limit our analysis to the internally oriented dimensions of corporate culture since we are primarily interested in the polarity between discretion and control and its implications for how decision rights are allocated across an organization. As a result, we direct our attention to the bureaucratic (informal) chain of command in control-oriented (collaboration-oriented) firms and link those cultural characteristics to corporate tax planning.

At the same time, we follow Jensen and Meckling (2009) and acknowledge that the allocation of decision rights also serves as an internal social control system that has implications for managerial behavior. We incorporate this perspective and recognize that a firm's cultural orientation does not merely influence how contextual knowledge is discovered and exchanged in an organization; it may also determine how such knowledge is used by top management. We extend this argument and relate this line of thought to the centralized (decentralized) decision structure of control-oriented (collaboration-oriented) cultures and acknowledge that those distinguishing organizational features may have implications for corporate tax planning. This holistic view of corporate culture engages two conflicting theories on corporate tax planning, suggesting that our findings could be driven by intra-organizational reciprocity or opportunistic rent-seeking. This venue constitutes the starting point for our empirical investigation, which aims to resolve how corporate culture influences corporate tax planning.

Understanding whether and how corporate culture influences tax planning is significant since the tax literature recognizes substantial variation in firms' reported tax burden (Dyreng et al. 2008). This variation is not only inadequately understood but may also be idiosyncratic and thus determined by the interaction of several firm-specific factors related to the firm's internal workings (Hanlon and Heitzman 2010). The accounting literature has thus far linked tax planning to several firm characteristics that influence intra-organizational procedures, such as internal control quality (Bauer 2016), internal information quality (Gallemore and Labro 2015), and organizational capital (Hasan et al. 2021). The knowledge management literature has long argued that several of these firm characteristics, which embody different aspects of the firm's inner workings, reflect a firm's corporate culture. Therefore, it is relevant to draw further attention to how corporate culture, the underlying social construct that shapes a firm's internal code of conduct, influences corporate tax planning. This path does not only contribute to a more thorough understanding of the underlying social mechanisms of the firm but may also unveil why seemingly similar firms engage in varying degrees of tax planning activities.

In our main statistical analysis, we combine Fiordelisi and Ricci's (2014) measure, which captures internally oriented dimensions of corporate culture through textual analysis of the 10-K report, with two well-established measures of corporate tax behavior—cash- and GAAP effective tax rates. We further control for several firm characteristics that may influence tax outcomes and include industry and year-fixed effects. Using a large sample of 42,640 firm-year observations over the time-period 1994–2019, we observe that firms with control-oriented (collaboration-oriented) cultures are associated with a higher (lower) tax burden. The results are robust to alternative long-run measures of tax planning, which mitigate our concerns regarding potential measurement errors. To address potential endogeneity problems, we first turn to propensity-score matching to control for observable

differences in firm characteristics. The outcome of this procedure does not alter our main inferences.

To further strengthen our identification strategy and alleviate the endogeneity concerns arising from omitted variable bias, we turn to a two-stage least squares instrumental variable (IV) regression. In the first stage of the IV regression, we use two instruments – the median culture score for all firms in the same industry and the firm's closeness centrality. Our second-stage results remain consistent with our baseline findings. Furthermore, we re-estimate our baseline model with alternative fixed effects to exclude that our analysis omits some tax planning determinant that is correlated with our other variables. The outcome of this exercise reveals that our baseline results are robust to industry-year interacted and firm fixed effects and do not alter our main inferences. Our results are also robust to the inclusion of additional corporate governance controls.

In additional analyses, we examine whether the differences in tax outcomes between collaboration and control-oriented cultures originate from less benign forms of tax planning. To investigate the legitimacy of this conjecture, we use four proxies that potentially reflect less conservative tax positions. This analysis reveals that collaboration-oriented cultures are more prone to engage in corporate tax sheltering activities and could constitute a firm-specific characteristic associated with aggressive corporate reporting. Once we establish that collaboration-oriented (control-oriented) firms avoid more (less) tax, we gauge how shareholders value tax planning conditional on a firm's cultural orientation. This analysis aims to resolve whether the differences in tax outcomes between control- and collaboration-oriented firms are driven by intra-organizational reciprocity or opportunistic rent-seeking behavior. We find some evidence that tax planning in collaboration-oriented firms has a positive effect on firm value, which implies that shareholders view tax planning in such firms as a value-enhancing activity.

We contribute to the existing literature in several distinct ways. First, we add to the literature on corporate culture by studying how firm-level culture affects intra-organizational knowledge flows and, ultimately, corporate tax planning. Prior research in this field relates corporate culture to firm performance (Edmans 2012; Guiso et al. 2015; Nguyen et al. 2018), financial reporting risk (Davidson et al. 2015), corporate investment policies (Pan et al. 2017), risk-taking (Nguyen et al. 2019) and operational efficiency (Li et al. 2021). Our contribution lies in showing that variations in corporate culture also have implications for intra-organizational reciprocity across conventional lines of authority by cross-sectionally examining its impact on corporate tax planning.

Second, we extend the literature on the determinants of corporate tax planning. Related prior research shows that corporate tax outcomes are influenced by firm characteristics (Badertscher et al. 2013; Armstrong et al. 2015; Khan et al. 2017), executive characteristics (Dyreng et al. 2010; Chyz 2013; Koester et al. 2017) and executive compensation (Desai and Dharmapala 2006; Phillips 2003; Rego and Wilson 2012). However, Hanlon and Heitzman (2010) emphasize that corporate tax behavior is likely to be explained by the interaction of several firm-specific factors. We field this notion and provide evidence that a firm's cultural orientation, which embodies a wide range of firm-specific features, influences corporate tax decisions. In doing so, we also encounter new cross-sectional insights regarding how the distribution of decision rights may influence corporate tax planning practices. These findings respond to Shackelford and Shevlin's (2001) call to improve our understanding of corporate tax planning by establishing a link to the management accounting literature's emphasis on the firm's inner workings.

The remainder of the paper is organized as follows: Sect. 2 discusses related literature and develops the study's main hypotheses. Section 3 presents the research design, and

Sect. 4 summarizes sample selection and data. Empirical results are reported in Sects. 5 and 6. Section 7 concludes the study.

2 Related literature and hypothesis development

2.1 Tax planning

Corporate tax planning involves all transactions and arrangements which intended aim is to decrease a firm's tax liabilities (Dyreng et al. 2008). Traditional economic theory perceives tax planning as a value-enhancing activity and predicts that rational managers will engage in tax planning activities if the marginal benefits outweigh the marginal costs (Scholes et al. 2009). This prediction is based on the notion that corporate tax savings generate positive cash flows, directly or indirectly benefiting both shareholders and managers (Phillips 2003). In contrast, the agency perspective of tax planning points out that opportunistic managers can exploit tax planning as a tool for resource diversion to promote their self-interests (Desai and Dharmapala 2006; Desai et al. 2007). Despite the conflicting stance on the underlying incentives behind tax planning activities, it is evident that both theoretical perspectives establish and portray the central role tax considerations play in corporate decision-making.

This theoretical foundation has spurred empirical research to observe how external expectations from capital markets (Cheng et al. 2012; Chen and Lin 2017; Ayers et al. 2018) and other corporate stakeholders (Chyz et al. 2013; Wilde 2017; Dyreng et al. 2016) influence corporate tax outcomes. The tax literature has also emphasized the importance of external monitoring (McGuire et al. 2012; Kubick et al. 2017; Armstrong et al. 2019) and corporate governance (Badertscher et al. 2013; Armstrong et al. 2015; Khan et al. 2017), by portraying how external- and internal control mechanisms affect corporate tax planning. The importance of internal control mechanisms is further acknowledged by Slemrod (2004) and Chen and Chu (2005), who propose that agency frictions between management and shareholders can explain variations in tax planning. While this literature offers substantial insights into corporate tax planning and how internal control mechanisms influence agency frictions, it provides fewer insights about how such frictions emerge in the first place.

This omission has fueled another stream of research, which focuses on whether and how individual managers influence corporate tax planning. This empirical trajectory is intuitive, and it is reasonable to expect that tax planning exhibits substantial managerial effects since tax considerations ultimately boil down to individual preferences (Bertrand and Schoar 2003). Chyz (2013) presents evidence consistent with this view by demonstrating how managers' personal tax attitude impacts corporate tax sheltering activities. His findings align with Dyreng et al. (2010), who conclude that executives previously employed by tax-aggressive firms import the same aggressiveness to their new employer. Koester et al. (2017) elevate this stream of research even further by demonstrating that executives with superior ability to manage corporate resources also engage in more tax planning activities. Other studies have also embraced the managerial compensation perspective and discovered that equity risk- and compensation-based incentives substantially influence tax planning decisions (Desai and Dharmapala 2006; Phillips 2003; Rego and Wilson 2012). While this literature improves our understanding of how managers influence tax decisions, it does not entirely disentangle whether such managerial effects are driven by individual qualities or

the corporate environment in which the manager operates. Our study attempts to shed further light on this matter by examining how implicit corporate values and norms derived from corporate culture can influence tax planning activities.

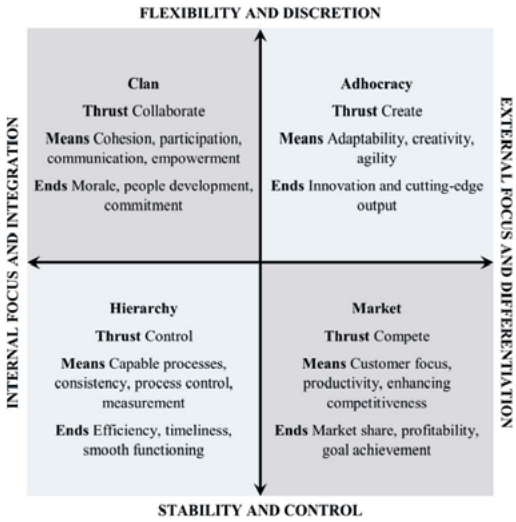
2.2 Corporate culture

Prior literature labels corporate culture as a social construct that incorporates firmly held values and norms shared within an organization (O'Reilly and Chatman 1996; Graham et al. 2022). These values and norms can also be considered as implicit contracts that ultimately shape organizational behavior (Bénabou and Tirole 2011; Tabellini 2008). Studies have thus intuitively connected corporate culture to organizational efficiency (Gorden et al. 1984; Wilkins and Ouchi 1983; Schein 2010), workplace safety (Haga et al. 2024), as well as other knowledge-intensive activities such as corporate innovation (Wang et al. 2021) and financial reporting (Bhandari et al. 2022; Fung et al. 2022; Afzali 2023). But corporate culture is an abstract concept, and a necessary first action for our study is to conceptualize culture sufficiently so that it is possible to identify whether it influences tax planning. We follow Fiordelisi and Ricci (2014) and utilize an empirical path proposed by Cameron et al. (2006), which builds upon Quinn and Rohrbaugh's (1983) competing values framework (CVF). This framework differentiates from other taxonomies in the management literature (e.g., Schein 1990; Hofstede 1991; O'Reilly et al. 1991) since it intuitively ties together with the basic ideas of Nonaka's (1991) model of knowledge creation within organizations. Linking knowledge creation within organizations to corporate culture provides a unique venue for analyzing how social processes influence knowledge-intensive organizational activities. This venue aligns with the purpose of this paper and provides a neat foundation for exploring how corporate culture affects corporate tax planning.

The CVF classifies corporate culture into four coexisting cultural dimensions: control, collaborate, create, and compete. These dimensions compete for a company's limited resources, and each of these competing values is associated with different value drivers, which incorporate the means for value creation in each dimension. We follow Nonaka (1991) and further acknowledge that the means for value creation also shape how knowledge is discovered and exchanged within an organization. These features are summarized in Fig. 1 and distinguish the primary drivers of value creation in each cultural dimension.

A similar view is evident in De Long and Fahey (2000), who suggest that corporate culture sets the stage for social interactions, which indirectly dictates the level of intra-organizational trust and reciprocity within an organization. Garrett et al. (2014) establish the importance of intra-organizational trust and reciprocity in corporate reporting and outline how employees' trust in management promotes vertical knowledge exchange, which results in better estimates, judgments, and evaluations. Nonetheless, corporate culture influences more than just employees' trust in management; it also serves as an implicit social control system that has implications for managerial behavior (O'Reilly and Chatman 1996). We incorporate these findings and acknowledge that a firm's cultural orientation does not merely influence how knowledge is discovered and exchanged. It may also shape how knowledge is used by top management.

Another appealing aspect of the CVF is that it allows researchers to differentiate between internally- and externally oriented dimensions of corporate culture. We restrict our analysis to internally oriented dimensions of corporate culture since we are primarily interested in how the internal polarity between discretion and control impacts tax planning. This tradeoff is particularly interesting since it overlaps with Jensen and



Note: This figure depicts the four cultural dimensions in Cameron et al. (2006). The figure is adapted from Hartnell et al. (2011, p. 679).

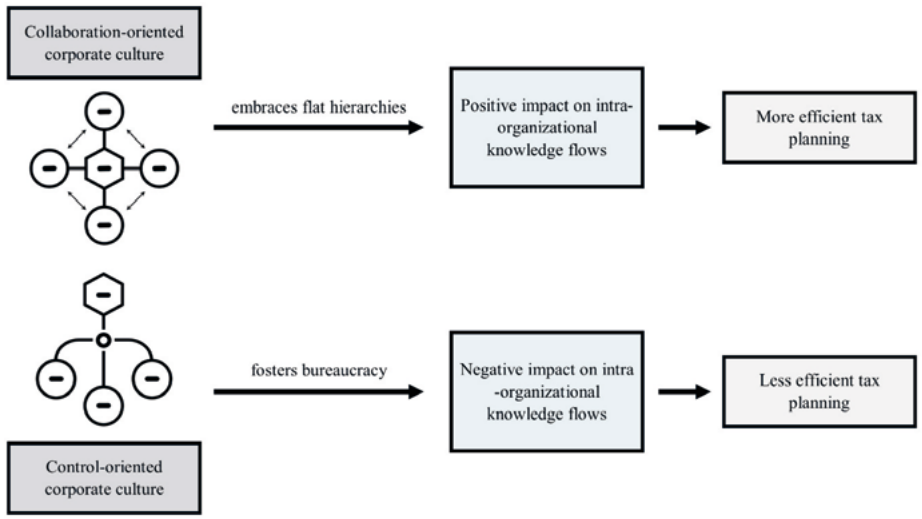
Culture type	
Control-oriented (*CONTROL*)	boss*, bureauc*, cautio*, chief*, conflict*, conservat*, control*, detail*, document*, efficien*, error*, expectat*, fail*, inform*, logic*, method*, monit*, norm*, outcom*, procedur*, regular*, solv*, standard*, uniform*
Collaboration-oriented (*COLLABORATE*)	capab*, certain*, cohes*, collab*, collectiv*, commit*, consens*, cooperat*, coordin*, cultur*, decentr*, employ*, empower*, engag*, facilitator*, help*, hir*, human*, interper*, involv*, life*, loyal*, mentor*, mutual*, parent*, particip*, partner*, people*, relation*, retain*, reten*, skill*, social*, team*, train*, workgroup*

Note: This panel presents the bag of words associated with each internally oriented corporate culture dimension. The bag of words is adapted from Fiordelisi and Ricci (2014).

Fig. 1 The competing values framework

Meckling's (2009) theoretical remarks regarding the optimal distribution of decision rights. The authors posit that the organizational decision structure constitutes the firm's natural response to the limits of bounded rationality. The allocation of decision rights (i.e., the firm's organizational decision structure) is therefore perceived as the result of a trade-off between the opportunity cost of not granting decision rights to those with specific knowledge (i.e., the cost of maintaining control) and the agency costs associated with transferring the decision rights to those with specific knowledge (i.e., the cost of providing discretion).

This trade-off between centralized and decentralized decision structures is equally evident in the CVF and separates control-oriented corporate cultures from collaboration-oriented corporate cultures. We draw upon these overlaps and suggest that collaboration and control-oriented firms portray two dichotomous strategies to address the limits of bounded rationality. Collaboration-oriented firms address knowledge-intensive corporate procedures by shifting decision rights to the individuals who possess the relevant knowledge, while control-oriented firms prefer to transfer the knowledge pertinent to individuals who possess the decision rights. In line with decision rights theory, we expect collaboration-oriented firms to benefit from lower knowledge-transmission costs at the expense of higher agency costs, which surface when decision rights are delegated further down in the corporate hierarchy (Hart and Moore 2005; Hart and Holmstrom 2010). Along similar lines, we expect control-oriented firms to benefit from lower coordination costs and suffer from higher knowledge-transmission



Note: This figure shows how internally oriented corporate cultural dimensions of control and collaboration affect corporate tax planning. The figure summarizes the economic channel via which corporate cultures of control and collaboration deteriorate and improve the efficiency of corporate tax planning, respectively.

Fig. 2 Corporate culture and tax planning: economic channel

costs. We further posit that the dichotomous character of these strategies provides an indirect empirical path to analyze how the distribution of decision rights can influence different knowledge-intensive corporate activities.

It is, however, unclear whether the benefits of centralizing decision rights are more significant than the benefits of decentralizing decision rights in the context of tax planning. Stein (2002) provides some guidance in this context and theorizes that the optimal allocation of decision rights for any corporate activity is contingent on the nature of the knowledge required for that specific activity. More specifically, Stein (2002) entertains the idea that decentralized decision structures are advantageous when the required knowledge is tacit and centralized decision structures are preferable when the required knowledge is explicit. We build on this venue and assume that knowledge transmission costs are determined by the type of knowledge that is required to be obtained and exchanged. Knowledge can thus be perceived along a continuum where one end is explicit, and the other is tacit. Explicit knowledge can be accumulated and transferred at a relatively low cost, while tacit knowledge of the more idiosyncratic character is more difficult to aggregate and, thus, more costly to transfer. Intuitively, the knowledge required for corporate tax decisions could be characterized along the same continuum. More general tax knowledge is perceived as relatively explicit since tax accounting is derived from a body of generalizable principles that often correspond to financial accounting precepts. However, much knowledge required for corporate tax decisions is de facto tacit and originates from unique insights about contextual circumstances that warrant deviations from more conventional tax practices. We incorporate these arguments and conjecture that certain features of a firm's corporate culture could potentially influence the estimates, judgments, and evaluations on which tax decisions are based. Figure 2 summarizes our hypothesis development.

2.3 Hypotheses development

Firms with control-oriented corporate cultures are typically characterized by centralized decision structures, standardized rules and procedures, and well-defined responsibilities (Cameron et al. 2006). Such organizational patterns can be traced back to the idealized image of "bureaucracy" in Max Weber's (1947) early work on modern organizational management. Tax departments of control-oriented firms are thus likely characterized by rationalized authority, which may help map the overall costs and benefits of a firm's tax planning arrangements. The accounting literature has also linked firms characterized by control-oriented organizational features, such as internal information quality (Gallemore and Labro 2015), internal control quality (Bauer 2016), and organizational capital (Hasan et al. 2021), to low tax burdens. Nonetheless, we follow the intuition of Reitzig and Maciejovsky (2015) and take an agnostic view to whether control-oriented corporate cultures create enough intra-organizational trust and reciprocity to facilitate sufficient vertical knowledge exchange within an organization to unveil the costs and benefits of low tax strategies efficiently.

Instead, we assume that knowledge transfer costs are intrinsically high in firms with hierarchical decision structures (Christie et al. 2003; Jensen and Meckling 2009). The implications of this assumption are expected to be particularly prominent for the corporate tax function, since tax departments usually operate at the corporate level but are required to integrate more general tax knowledge with contextual insights from other operating units (Robinson et al. 2010). Accordingly, several factors could prevent tax departments in control-oriented firms from pursuing low-tax strategies. For example, suppose the demand for labor or materials raises operating costs when locating a service in a low-tax jurisdiction. In that case, any tax savings made on that arrangement could be eroded by implicit taxes related to the economic conditions in that jurisdiction. Managers at lower levels of the corporate hierarchy are often aware of such context-specific implications of income shifting but may face difficulties in forwarding such knowledge to tax departments in firms characterized by formal decision structures. Even simple forms of income shifting require careful consideration of the potential economic impact on the firm's operating procedures, and without synchronized intra-organizational knowledge exchange, low-tax strategies risk damaging the bottom line. We conjecture that the bureaucratic nature of control-oriented firms inhibits the corporate tax department from developing an informed understanding of the aggregated economic implications of potential tax minimization strategies. This skepticism finds further support in the knowledge management literature, which has documented a negative relationship between intra-organizational knowledge exchange and hierarchal decision structures (Csaszar 2012; Reitzig and Maciejovsky 2015). Bureaucracy could thus constitute a firm-specific characteristic that increases the level of outcome uncertainty associated with low tax strategies and may thus induce a preference for more conservative tax practices in firms with control-oriented cultures. Therefore, we propose the following hypothesis:

H1a *Firms with control-oriented cultures are associated with larger tax burdens.*

In contrast, firms with collaboration-oriented corporate cultures are different, i.e., they do not rely on formalized communication channels and a clear chain of command. Instead, they typically embrace informal knowledge exchange and participative decision-making (Cameron et al. 2006). Survey evidence suggests that participative decision-making and

informal knowledge exchange boost intra-organizational trust and reciprocity, which promote cross-functional interactions in an organization (Bock et al. 2005). We build on this evidence and argue that decentralized decision structures intrinsically reduce knowledge-sharing barriers across the firm and between the corporate tax department and the firm's business units. Reducing such barriers may promote synchronized knowledge exchange between the tax department and the firm's business units, which expands the tax department's holistic understanding of the aggregated economic implications of low tax positions. This line of reasoning corresponds with Galbraith (1974), who suggests that one of two efficient ways to address knowledge-intensive corporate procedures is to employ lateral decision structures that transcend conventional lines of authority. With the above in mind, we posit that tax departments in collaboration-oriented firms efficiently manage to synthesize their stock of knowledge with contextual insights from operating managers. This firm-specific characteristic reduces the level of outcome uncertainty associated with low tax strategies and may thus result in a preference for less conservative tax strategies. Therefore, we propose the following hypothesis:

H1b *Firms with collaboration-oriented cultures are associated with smaller tax burdens.*

Intuitively, we predict similar outcomes for more refined tax planning forms, such as corporate tax shelters. Setting up sophisticated tax shelters is a costly knowledge-intensive corporate activity that requires substantial resources and synchronized reciprocity between the corporate tax department and business units operating across a diverse set of jurisdictions (Robinson et al. 2010). Suppose tax departments of control-oriented firms face difficulties in assessing the aggregated economic implications of less refined tax strategies. In that case, the marginal benefit of setting up more sophisticated tax shelters is likely offset by the marginal cost of implementing those strategies. Conversely, tax departments of collaboration-oriented firms may benefit from extended tacit knowledge, which could reduce the outcome uncertainty associated with more refined tax sheltering activities.

However, it is relevant to draw attention to the recent empirical evidence by Bhandari et al. (2022), who document that collaboration-oriented firms are associated with lower financial reporting quality. These findings are relevant to our context since other studies have established a close link between aggressive tax and financial reporting (Frank et al. 2009). Bhandari et al. (2022) draw upon experimental (Jollineau et al. 2012) and archival (Bruynseels and Cardinaels 2014) evidence and argue that the close "friendship-like" bond between management and employees in collaboration-oriented firms compromises traditional control mechanisms. This line of reasoning relates to Freeman's (1972) famous essay "The tyranny of structurelessness", which recognizes that traditional power structures and formal decision rights get replaced by more implicit forms of authority in non-hierarchal organizations. She further outlines the "dark side" of this phenomenon and describes how concealed power structures and nebulous decision rights can shield implicitly powerful cliques from accountability.

If Freeman's observations are equally material in corporate contexts and collaboration-oriented firms are characterized by inadequate control mechanisms, it is relevant to draw attention to potential agency problems. But predicting how agency problems influence corporate tax behavior contingent on corporate governance properties is ambiguous. Primarily because of the unorthodox rationale behind Desai and Dharmapala's (2006) agency theory, which in essence, suggests that managers of firms with weak (strong) corporate governance mechanisms face countervailing (reinforcing) incentives to engage in sophisticated

forms of tax planning. These incentives surface due to the existence of complementarities between tax-sheltering activities and managerial rent extraction. The nature of this interrelationship suggests that weak (strong) corporate governance mechanisms decrease (increase) the marginal benefit of using tax sheltering schemes to conceal resource diversion due to the existence (absence) of less costly alternatives.[1] Considering these conflicting theoretical arguments, we outline above; it would be arbitrary to establish a directional prediction regarding the relationship between collaboration-oriented firms and the use of tax shelters. Therefore, we propose the following non-directional hypothesis.

H2a *There is an association between firms with collaboration-oriented corporate cultures and tax shelter behavior.*

The antithesis of Freeman's pioneering remarks from the 1970s is that the bureaucratic nature of control-oriented firms could constitute a natural shield against more implicit forms of toxic authority. We build on this venue and conjecture that decision-making based on standardized procedures and rigid quality control is less likely to be influenced by self-serving agendas. Bureaucracy per se could thus be perceived as an additional layer of implicit control that contributes to better corporate governance. We incorporate these thoughts in Desai and Dharmapala's (2006) framework, who theorize that managers of firms with strong corporate governance face augmented incentives to engage in more sophisticated tax planning. Considering the mixed evidence and the ambiguity regarding the strength of formal corporate governance mechanisms in control-oriented firms, the establishment of a directional prediction regarding the relationship between control-oriented firms and tax shelters would be arbitrary. Therefore, we formulate the following non-directional hypothesis:

H2b *There is an association between firms with control-oriented corporate cultures and tax shelter behavior.*

3 Research design

3.1 Measuring corporate culture

Previous empirical studies have attempted to capture corporate culture in different ways. Several of these attempts have focused on metrics of human relations (Guiso et al. 2015) or the cultural background of executives (Pan et al. 2017). Many of these approaches are, however, limited in scope since corporate culture is a multifaceted construct that transcends beyond cultural heritage, human relations, and norms governing corporate social responsibility. More recently, however, computer-based textual analysis has emerged as a useful tool for unveiling and quantifying previously unobservable constructs (Graham et al. 2022). Textual analysis is an objective and systematic method that can be used to analyze

[1] Designing, administrating, and implementing sophisticated tax planning schemes are costly and knowledge-intensive corporate activities requiring substantial economic resources (Hasseldine et al. 2012). Sophisticated tax sheltering schemes can also be subject to substantial penalties when deemed unlawful by the Internal Revenue Service (IRS). News about such fines, back taxes and future tax outlays is also associated with additional reputational cost (Hanlon and Slemrod 2009).

characteristic nuances in written documents (Stone et al. 1966). This technique has been extensively applied in the finance and management literature to extract the semantic content from publicly available corporate documents, such as annual reports (Loughran and McDonald 2011), earnings call transcripts (Li et al. 2021), and CSR reports (Du and Yu 2021).

Our paper's objective is to identify variations in corporate culture through the lens of the cultural dimensions described in CVF. Accordingly, we follow Fiordelisi and Ricci (2014) and use textual analysis to quantify Cameron et al.'s (2006) cultural dimensions through 10-K reports. The rationale behind this approach is based on the idea that words and expressions used in corporate documents are an extension of a firm's values and norms. If this notion is accurate, then it is possible to capture a firm's cultural orientation through the words expressed by management in financial documents (Kramsch and Widdowson 1998; Lazear 1999; Levinson 2003; Schein 2010). To avoid subjectivity, we follow the procedure in Fiordelisi and Ricci (2014) and use their bag of words for each cultural dimension. However, our analysis is restricted to internally oriented cultures and the exact synonyms used to capture these dimensions are provided in Fig. 1.

We estimate these two cultural dimensions by counting the number of times that the set of synonyms assigned to those dimensions occurs in the 10-K annual reports for each listed U.S. firm between 1994 and 2019. For example, words like 'cooperate', 'human', and 'partner' are associated with a collaboration culture, and a relatively high frequency of such words in a 10-K report would suggest that a firm has a collaboration-oriented culture. In contrast, words like 'monitor', 'competence', and 'long-term' are associated with a control culture, and a relatively high frequency of such words in a 10-K report would suggest that a firm has a control-oriented culture. We then construct our two cultural variables, *COLLABORATE* and *CONTROL*, by dividing the count of the cultural synonyms by the total number of words.

3.2 Measuring tax planning

Our broad definition of tax planning derived from (Dyreng et al. 2010) directs our main analyses toward two widely used measures of corporate tax planning. Our first measure, the effective tax rate under GAAP (*GAAP ETR*), captures tax planning that reduces tax expenses for financial reporting purposes. *GAAP ETR* is computed as the total income-tax expense scaled by pre-tax income adjusted for special items. Our second measure, cash effective tax rate (*CASH ETR),* reflects tax planning that reduces actual taxes paid in a year. *CASH ETR* is computed as the total income taxes paid scaled by pre-tax income adjusted for special items.

However, the tax literature also stresses that 1-year proxies of effective tax rates contain noise from temporary corporate events and do not necessarily reflect a firm's tax behavior over time (Dyreng et al. 2008). To alleviate this concern and mitigate potential measurement errors, we include accumulated metrics, ranging over 3 years for *GAAP ETR* and *CASH ETR,* as a robustness test in our analysis. Measuring effective tax rates over a longer time-period adds an additional dimension to our study since it provides further insights into whether a certain type of firm is subject to lower tax burdens year after year. Even though this paper focuses on tax planning and not less benign corporate tax sheltering forms, we provide some corroborating evidence based on these practices. We discuss these results further in Sect. 6.

3.3 OLS model

We estimate the following OLS model to examine the association between corporate culture and tax planning:

$$TaxPlanning_{it} = \beta_0 + \beta_1 CultureType_{it} + \beta_n Controls + \varepsilon_{it} \quad (1)$$

where *TaxPlanning* represents one of our two measures of tax planning, *GAAP ETR* or *CASH ETR*, as defined previously. *CultureType* constitutes one of our two measures of corporate culture: *COLLABORATE* or *CONTROL*.[2] We expect corporate culture to vary across industries and time, so we estimate our baseline regression with industry- and year-fixed effects to reduce any potential bias caused by correlated omitted variables. We further emphasize that our sample consists of multiple observations of the same firm over time, so we use robust standard errors clustered at the firm level to offset the impact of serial dependence.

We also include several control variables linked to tax planning by previous studies (e.g., Chen et al. 2010; Dyreng et al. 2008; Chen and Lin 2017; Rego 2003). We use firm size (*SIZE*) and growth (*MTB*) to capture firm fundamentals and return on assets (*ROA*) to control for firm profitability. We include property, plant, and equipment (PP&E) (*TANG*) and intangible assets (*INTAN*) because tax and accounting regulations associated with PP&E and intangible assets can affect a firm's tax level. Financial leverage (*LEV*) constitutes a potential debt tax shield that may either reduce the incentives for incremental tax planning (Graham 2000) or encourage firms to avoid taxes to increase cash holdings (*CASH*) to pay off debt (Graham and Tucker 2006; Badertscher et al. 2013). Further, we control for the presence of net operating loss carry forward (*NOL*) at the beginning of the year, and the annual change in net operating loss carry forward (*ΔNOL*). The existence of an NOL or a decrease in NOL indicates that a firm can use the loss carry forward to reduce its tax liability (Chen et al. 2010; McGuire et al. 2012). Finally, we include equity income (*EQUITY*) since it mechanically lowers a firm's effective tax rate (Huang et al. 2016) and foreign income (*FOREIGN*) since foreign operations provide more opportunities to avoid tax (Rego 2003). We provide more detailed variable definitions in "Appendix 1".

4 Sample selection and data

4.1 Sample construction

We follow the procedure in Loughran and McDonald (2011) and download all available 10-K reports from the Securities and Exchange Commission's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) database during the time-period 1994–2019. We include one report for each fiscal year and apply textual analysis to that document to quantify the cultural dimensions. Our textual analysis is based on the dictionary method, which requires the 10-K report to be parsed into vectors of words and word counts. We exclude tables and figures from this

[2] Following previous studies using Fiordelisi and Ricci's (2014) measure of corporate culture, we also estimate Eq. (1) with all four dimensions of corporate culture (control, collaborate, create, and compete). The (untabulated) results of these regressions are comparable with our baseline approach and does not influence our inferences.

procedure and calculate the word frequency for each cultural dimension (listed in Fig. 1) relative to the total number of words in the 10-K document to create our cultural variables. Next, we turn to Compustat for financial data, and our initial sample includes all publicly listed companies incorporated in the US from 1994 to 2019. We exclude financial industries (SIC 6000–6999) and observations with missing data on our dependent variable (tax planning proxies), independent variables (collaboration and control cultures), and other firm-level control variables. This procedure yields a final sample of 42,640 firm-year observations for our baseline regression. To reduce the effects of outliers, we winsorize all continuous variables, except our measures of corporate culture, at the 1st and 99th percentile.

4.2 Descriptive statistics

Table 1 presents summary statistics for all variables. The mean (median) for our first dependent variable *GAAP ETR* is 0.295 (0.329), and the corresponding mean (median) for our second dependent variable *CASH ETR* is 0.234 (0.228). These statistics align with recent tax planning studies, such as Chen and Lin (2017) and Hasan et al. (2021). Our long-run measures of effective tax are in a similar range, *GAAP ETR (3 years)* has a mean (median) of 0.262 (0.317), and *CASH ETR (3 years)* has a mean (median) of 0.231 (0.243). The variables of interest, *CONTROL* and *COLLABORATE* have a mean (median) of 1.571 (1.566) and 1.957 (1.690), respectively. These statistics are similar to those reported in Fiordelisi & Ricci (2014). The mean statistics also reveal that our sample firms consist of moderately leveraged (average *LEVRAGE* = 0.214) firms with high profitability (average *ROA* = 0.191), and liquidity (average *CASH* = 0.202). Further, on average, firms have 32.1% tangible assets and 19.7% intangible assets. Other firm characteristics are also in the range of those reported in prior studies.

Table 2 provides univariate tests for the sample, divided into two groups based on high and low values of the cultural dimensions, *COLLABORATE* and *CONTROL*. These values are derived from the SIC two-digit industry-adjusted culture values where high (low) represents firm-year observations in the top (bottom) tercile of each cultural dimension in a given year. These tests reveal that firms in the top tercile of the control dimension are associated with higher effective tax rates than firms in the bottom tercile. The results are statistically significant at the 1% level across all our tax planning metrics and provide some preliminary support for *H1a*. A similar but reversed pattern applies to our other cultural variable, where firms in the top tercile of the industry-adjusted collaboration dimension are associated with lower GAAP effective tax rates than firms at the bottom counterpart. These differences are significant at the 1% statistical level and provide some preliminary support for *H1b*. Even though our univariate tests suggest that corporate culture is associated with corporate tax outcomes, it is necessary to draw attention to several other statistically significant differences in firm characteristics between these groups. We address these differences in our multivariate setting, potentially controlling for any confounding effects of the control variables in Table 2.

5 OLS regression results

5.1 Baseline results

In *H1a* (*H1b*), we predict that firms with control-oriented (collaboration-oriented) cultures are associated with larger (smaller) tax burdens. We estimate Eq. (1) cross-sectionally to test these hypotheses using 42,640 observations from 1994 to 2019. The results for the

Table 1 Descriptive statistics

	Observations	Mean	SD	P25	Median	P75
Tax planning variables						
GAAP ETR	42,640	0.295	0.136	0.220	0.329	0.380
CASH ETR	42,640	0.234	0.168	0.095	0.228	0.339
GAAP ETR (3 years)	40,635	0.262	0.244	0.203	0.317	0.372
CASH ETR (3 years)	39,175	0.231	0.188	0.118	0.243	0.334
Other tax planning variables						
SHELTERScore	39,440	1.334	2.058	−0.147	1.273	2.797
SHELTER	39,440	0.250	0.433	0.000	0.000	1.000
DTAX	26,314	0.055	0.089	0.006	0.050	0.096
TAX HAVEN	26,845	0.497	0.500	0.000	0.000	1.000
Corporate culture measures						
CONTROL	42,640	1.571	0.423	1.267	1.566	1.853
COLLABORATE	42,640	1.957	0.865	1.399	1.690	2.209
Instrumental variables						
MEDIAN CONTROL	24,033	1.707	0.213	1.597	1.735	1.855
MEDIAN COLLABORATE	24,033	1.723	0.301	1.554	1.666	1.847
CLOSENESS	24,033	0.142	0.073	0.136	0.167	0.188
Firm-level controls						
SIZE	42,640	6.148	2.182	4.650	6.249	7.636
MTB	42,640	3.016	3.764	1.336	2.135	3.548
LEVERAGE	42,640	0.214	0.198	0.023	0.186	0.340
CASH	42,640	0.202	0.281	0.028	0.097	0.265
NOL	42,640	0.395	0.489	0.000	0.000	1.000
ΔNOL	42,640	−0.002	0.071	0.000	0.000	0.000
ROA	42,640	0.191	0.120	0.115	0.164	0.234
EQUITY	42,640	0.001	0.005	0.000	0.000	0.000
TANG	42,640	0.321	0.287	0.105	0.229	0.451
INTANG	42,640	0.197	0.249	0.007	0.099	0.299
FOREIGN	42,640	0.017	0.037	0.000	0.000	0.017
TOBINQ	42,433	2.026	1.403	1.188	1.578	2.309
CAPEX	42,433	0.071	0.085	0.022	0.044	0.085
R&D	42,433	0.073	6.327	0.000	0.000	0.031
Corporate governance controls						
BSIZE	21,853	8.384	2.268	7.000	8.000	10.000
BINDEP	21,853	0.730	0.156	0.625	0.750	0.857
DUALITY	21,853	0.493	0.500	0.000	0.000	1.000
PCTFEMALE	21,853	0.102	0.108	0.000	0.100	0.167
BIG4	21,853	0.792	0.406	1.000	1.000	1.000
ABILITY	21,853	0.008	0.133	−0.073	−0.025	0.046

This table reports descriptive statistics for all variables in the study covering the sample period 1994–2019. All variables are defined in "Appendix 1"

Table 2 Univariate results

Panel A: Univariate analysis based on control-oriented corporate cultures

	High *CONTROL*	Low *CONTROL*	Difference	*t*-statistic
Tax planning variables				
GAAP ETR	0.303	0.288	0.014***	8.99
CASH ETR	0.241	0.229	0.012***	5.88
GAAP ETR (3 years)	0.274	0.251	0.023***	7.55
CASH ETR (3 years)	0.240	0.225	0.015***	6.47
Other Tax planning variables				
SHELTERScore	0.897	1.695	−0.798***	−31.68
SHELTER	0.183	0.316	−0.133***	−25.32
DTAX	0.054	0.056	−0.003*	−1.94
TAX HAVEN	0.398	0.585	−0.188***	−25.34
Instrumental variables				
MEDIAN CONTROL	1.721	1.700	0.021***	6.17
CLOSENESS	0.122	0.158	−0.036***	−31.83
Firm-level controls				
SIZE	5.677	6.530	−0.853***	−33.09
MTB	3.097	2.894	0.203***	4.57
LEVERAGE	0.173	0.254	−0.081***	−34.92
CASHFLOW	0.230	0.178	0.052***	15.65
NOL	0.334	0.450	−0.116***	−20.20
ΔNOL	−0.003	−0.000	−0.003***	−3.31
ROA	0.203	0.179	0.024***	16.78
EQUITY	0.001	0.001	−0.001***	−10.55
TANG	0.312	0.319	−0.007**	−2.12
INTANG	0.170	0.224	−0.054***	−18.30
FOREIGN	0.012	0.021	−0.008***	−19.24
TOBINQ	2.165	1.892	0.273***	16.31
CAPEX	0.074	0.068	0.006***	6.04
R&D	0.149	0.036	0.113	1.23
Corporate governance controls				
BSIZE	8.109	8.687	−0.578***	−15.23
BINDEP	0.718	0.739	−0.021***	−7.95
DUALITY	0.511	0.473	0.038***	4.56
PCTFEMALE	0.097	0.109	−0.012***	−6.80
BIG4	0.717	0.854	−0.137***	−20.44
ABILITY	0.015	0.001	0.014***	6.21

Panel B: Univariate analysis based on collaboration-oriented corporate cultures

	High *COLLABO-RATE*	Low *COLLABO-RATE*	Difference	*t*-statistic
Tax planning variables				
GAAP ETR	0.289	0.301	−0.012***	−7.35
CASH ETR	0.232	0.235	−0.002	−1.16
GAAP ETR (3 years)	0.260	0.268	−0.008***	−2.59

Table 2 (continued)

Panel B: Univariate analysis based on collaboration-oriented corporate cultures

	High *COLLABORATE*	Low *COLLABORATE*	Difference	*t*-statistic
CASH ETR (3 years)	0.230	0.231	−0.001	−0.49
Other tax planning variables				
SHELTERScore	1.692	1.035	0.657***	25.94
SHELTER	0.307	0.207	0.100***	18.77
DTAX	0.056	0.053	0.002*	1.87
TAX HAVEN	0.523	0.457	0.066***	8.88
Instrumental variables				
MEDIAN COLLABORATE	1.746	1.713	0.033***	6.76
CLOSENESS	0.154	0.131	0.023***	20.28
Firm-level controls				
SIZE	6.612	5.808	0.804***	31.11
MTB	3.249	2.805	0.444***	9.87
LEVERAGE	0.220	0.221	−0.001	−0.41
CASH	0.198	0.189	0.009***	2.74
NOL	0.399	0.386	0.013**	2.32
ΔNOL	−0.001	−0.003	0.003***	3.38
ROA	0.193	0.190	0.002	1.43
EQUITY	0.001	0.001	0.000***	4.34
TANG	0.320	0.346	−0.026***	−7.36
INTANG	0.212	0.182	0.030***	10.17
TOBINQ	2.073	1.947	0.126***	7.62
CAPEX	0.070	0.076	−0.006***	−6.18
R&D	0.123	0.028	0.095	1.05
FOREIGN	0.019	0.015	0.004***	8.32
Corporate governance controls				
BSIZE	8.408	8.271	0.137***	3.59
BINDEP	0.721	0.730	−0.009***	−3.35
DUALITY	0.474	0.512	−0.038***	−4.49
PCTFEMALE	0.106	0.097	0.009***	5.12
BIG4	0.799	0.758	0.041***	5.91
ABILITY	0.008	0.012	−0.004*	−1.81

This table reports univariate test results for all variables in the study using *CONTROL* and *COLLABORATE* to divide the sample into two groups. *CONTROL* is control-oriented corporate culture estimate of a company obtained using textual analysis. *COLLABORATE* is collaboration-oriented corporate culture estimate of a company obtained using textual analysis. See Sect. 3 for more details. High (low) groups are firm-year observations in the top (bottom) tercile of the industry-adjusted cultural dimension. All variables are defined in "Appendix 1"

effective tax rate under GAAP (*GAAP ETR*) are reported in the first three columns of Table 3. In our test of *H1a*, the coefficient on *CONTROL* is positive and statistically significant (β = 0.017***, *t*-statistic = 5.91). This result is consistent with larger tax burdens and supports *H1a*. In our test of *H1b*, the coefficient on *COLLABORATE* is negative and

statistically significant (β = −0.012***, *t*-statistic = −8.36). This outcome is consistent with smaller tax burdens and supports *H1b*. In terms of the control variables, we find that larger and more profitable firms report larger tax burdens. In contrast, firms with higher leverage, foreign income, cash holdings, loss carry forward, and equity income report smaller tax burdens. These results are consistent with prior findings (Cheng et al. 2012; Dyreng et al. 2010; Hasan et al. 2017).

The last three columns in Table 3 provide the results for our second measure of tax planning, the cash effective tax rate (*CASH ETR*). The coefficient for *CONTROL* is once again positive and statistically significant at the 1% level, which adds further support for *H1a* (β = 0.012***, *t*-statistic = 3.54). The coefficient for *COLLABORATE* is again negative and statistically significant, which is consistent with the prediction in *H1b* (β = −0.006***, *t*-statistic = −4.61). These findings support our predictions in *H1a* and *H1b* and show that firms with control (collaboration) oriented cultures are associated with larger (smaller) tax burdens.

5.2 Alternative proxies for corporate tax planning

Our preliminary tests use 1-year proxies for a firm's effective tax rates as our dependent variable. However, Dyreng et al. (2008) argue that long-run tax planning measures are superior to short-run measures since they avoid the inevitable variation in annual estimates driven by timing differences and transitory corporate events. To control for potential measurement errors in our dependent variables, we test whether our baseline results are robust to long-run measures of corporate tax planning. Table 4 contains the results of re-estimating Eq. (1) using either the 3-year GAAP effective tax rate (*GAAP ETR (3 years)*) or the three-year cash effective tax rate (*CASH ETR (3 years)*) as the dependent variable. The coefficients on *CONTROL* (*COLLABORATE*) remain consistently positive (negative) and statistically significant across all our models. These results support our predictions in H1a and H1b and show that firms with control (collaboration) oriented cultures are associated with larger (smaller) tax burdens over longer time horizons.

5.3 Propensity score matching results

To alleviate potential endogeneity concerns, we first turn to propensity-score matching. We follow Bhandari et al. (2022) and start by identifying a treatment and control group. Accordingly, we calculate the tercile for industry-adjusted *CONTROL* and *COLLABORATE* for each year separately, conditional on the available data in that specific year. We proceed by classifying firm-year observations in the top tercile as our treatment group and firm-year observations in the bottom tercile as our control group. To generate our propensity scores, we estimate a probit regression model for each cultural dimension in each year separately. Our matching criteria require a one-to-one match with no replacement and a caliper of 0.01.

This procedure gives us a balanced sample of 10,270 firm-year observations for the control group (low control culture) and 10,270 firm-year observations for the treatment group (high control culture) during our sampling period 1994–2019. We repeat the same procedure for our other cultural dimension *COLLABORATE* and end up with a balanced sample of 11,863 firm-year observations for our control group (low collaboration culture) and 11,863 firm-year observations for our treatment group (high collaboration culture).

Table 3 Corporate culture and tax planning: baseline OLS results

Dependent variable	*GAAP ETR*			*CASH ETR*		
	(1)	(2)	(3)	(4)	(5)	(6)
CONTROL	0.017***		0.018***	0.012***		0.013***
	(5.91)		(6.53)	(3.54)		(3.81)
COLLABORATE		−0.012***	−0.012***		−0.006***	−0.006***
		(−8.36)	(−8.64)		(−4.61)	(−4.81)
SIZE	0.007***	0.007***	0.008***	0.007***	0.008***	0.008***
	(10.68)	(11.31)	(12.11)	(10.35)	(10.51)	(10.97)
MTB	−0.001***	−0.001***	−0.001***	−0.003***	−0.003***	−0.003***
	(−5.54)	(−5.32)	(−5.60)	(−9.06)	(−8.92)	(−9.07)
LEVERAGE	−0.061***	−0.066***	−0.060***	−0.084***	−0.087***	−0.083***
	(−9.48)	(−10.48)	(−9.54)	(−11.52)	(−12.16)	(−11.50)
CASH	−0.056***	−0.057***	−0.056***	−0.074***	−0.074***	−0.074***
	(−14.36)	(−14.59)	(−14.56)	(−16.94)	(−17.08)	(−17.05)
NOL	−0.021***	−0.022***	−0.021***	−0.045***	−0.046***	−0.045***
	(−9.60)	(−10.32)	(−9.88)	(−17.45)	(−17.83)	(−17.58)
ΔNOL	0.067***	0.068***	0.067***	0.160***	0.160***	0.160***
	(5.16)	(5.23)	(5.16)	(12.83)	(12.88)	(12.82)
ROA	0.073***	0.077***	0.072***	0.050***	0.053***	0.050***
	(7.65)	(8.19)	(7.68)	(4.66)	(4.93)	(4.63)
EQUITY	−0.889***	−0.882***	−0.842***	−0.712***	−0.715***	−0.687***
	(−3.97)	(−4.04)	(−3.88)	(−2.78)	(−2.79)	(−2.69)
TANG	−0.018***	−0.019***	−0.018***	−0.076***	−0.076***	−0.076***
	(−3.38)	(−3.49)	(−3.44)	(−12.26)	(−12.31)	(−12.31)
INTANG	−0.004	−0.005	−0.004	−0.008	−0.009*	−0.008
	(−1.00)	(−1.07)	(−0.93)	(−1.63)	(−1.68)	(−1.60)
FOREIGN	−0.183***	−0.197***	−0.188***	−0.007	−0.016	−0.009
	(−5.59)	(−6.12)	(−5.82)	(−0.18)	(−0.40)	(−0.24)
Intercept	0.242***	0.282***	0.260***	0.238***	0.264***	0.248***
	(7.95)	(9.70)	(8.84)	(8.13)	(9.28)	(8.64)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.122	0.126	0.127	0.123	0.124	0.124
Observations	42,640	42,640	42,640	42,640	42,640	42,640

Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. The *t*-statistics are based on robust standard errors clustered at the firm level

This table reports OLS regression results that examine the effects of corporate culture on corporate tax planning. *CONTROL* is control-oriented corporate culture estimate of a company obtained using textual analysis. *COLLABORATE* is collaboration-oriented corporate culture estimate of a company obtained using textual analysis. See Sect. 3 for more details. *GAAP ETR* is the GAAP effective tax rate for the year defined as total income-tax expense scaled by pre-tax income adjusted for special items. *CASH ETR* is the cash effective tax rate for the year defined as total income taxes paid scaled by pre-tax income adjusted for special items. All other variables are defined in "Appendix 1"

Table 4 Corporate culture and tax planning: long-term tax planning measures

Dependent variable	*GAAP ETR (3 years)*			*CASH ETR (3 years)*		
	(1)	(2)	(3)	(4)	(5)	(6)
CONTROL	0.033***		0.035***	0.019***		0.019***
	(7.24)		(7.65)	(4.60)		(4.81)
COLLABORATE		−0.012***	−0.013***		−0.006***	−0.006***
		(−6.48)	(−6.90)		(−3.99)	(−4.26)
SIZE	0.015***	0.015***	0.016***	0.010***	0.009***	0.010***
	(15.71)	(15.71)	(16.64)	(11.12)	(11.05)	(11.62)
MTB	−0.002***	−0.002***	−0.002***	−0.003***	−0.003***	−0.003***
	(−4.99)	(−4.66)	(−4.97)	(−7.60)	(−7.40)	(−7.58)
LEVERAGE	−0.074***	−0.084***	−0.074***	−0.083***	−0.088***	−0.083***
	(−7.29)	(−8.36)	(−7.27)	(−9.58)	(−10.33)	(−9.56)
CASH	−0.090***	−0.091***	−0.091***	−0.083***	−0.084***	−0.084***
	(−13.29)	(−13.44)	(−13.41)	(−14.04)	(−14.14)	(−14.11)
NOL	−0.046***	−0.049***	−0.047***	−0.048***	−0.049***	−0.048***
	(−13.08)	(−13.70)	(−13.25)	(−15.52)	(−15.93)	(−15.59)
ΔNOL	0.108***	0.110***	0.108***	0.135***	0.137***	0.135***
	(4.01)	(4.07)	(4.00)	(7.69)	(7.75)	(7.70)
ROA	0.175***	0.183***	0.174***	0.088***	0.093***	0.087***
	(12.06)	(12.76)	(12.11)	(6.80)	(7.17)	(6.77)
EQUITY	−0.298	−0.328	−0.253	−0.507*	−0.529*	−0.487*
	(−0.88)	(−0.98)	(−0.76)	(−1.72)	(−1.79)	(−1.66)
TANG	−0.012	−0.013	−0.012	−0.081***	−0.081***	−0.081***
	(−1.51)	(−1.57)	(−1.53)	(−11.07)	(−11.12)	(−11.11)
INTANG	−0.001	−0.002	−0.001	−0.006	−0.006	−0.006
	(−0.20)	(−0.32)	(−0.16)	(−0.95)	(−1.04)	(−0.93)
FOREIGN	−0.039	−0.062	−0.043	−0.014	−0.026	−0.015
	(−0.85)	(−1.37)	(−0.94)	(−0.31)	(−0.59)	(−0.35)
Intercept	0.148***	0.209***	0.167***	0.200***	0.233***	0.210***
	(2.61)	(3.95)	(3.14)	(6.00)	(7.29)	(6.46)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.071	0.071	0.073	0.106	0.106	0.106
Observations	40,635	40,635	40,635	39,175	39,175	39,175

Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. The *t*-statistics are based on robust standard errors clustered at the firm level

This table reports OLS regression results that examine the effects of corporate culture on corporate tax planning. *CONTROL* is control-oriented corporate culture estimate of a company obtained using textual analysis. *COLLABORATE* is collaboration-oriented corporate culture estimate of a company obtained using textual analysis. See Sect. 3 for more details. *GAAP ETR* is the GAAP effective tax rate for the year defined as total income-tax expense scaled by pre-tax income adjusted for special items. *CASH ETR* is the cash effective tax rate for the year defined as total income taxes paid scaled by pre-tax income adjusted for special items. *GAAP ETR (3 years)* is the three-year *GAAP ETR* where the numerator and denominator of the *GAAP ETR* are summed over the past 3 years. *CASH ETR (3 years)* is the 3-year *CASH ETR* where the numerator and denominator of the *CASH ETR* are summed over the past 3 years. All other variables are defined in "Appendix 1"

We then return to our baseline regression with our matched sample of firms. We include the same control variables as before and re-estimate our baseline regression with our matched sample of 20,540 (23,726) firm-year observations for *CONTROL* (*COLLABORATE*). The results provided in Table 5 add further support to our baseline findings. The coefficient on *CONTROL* (*COLLABORATE*) remains positive (negative) and statistically significant across all tax planning measures. This result illustrates that while we control for observable differences in firm characteristics, firms with a high control culture (a high collaboration culture) continue to be associated with larger (smaller) tax burdens.

5.4 Instrumental variable regression results

One potential source of endogeneity in our empirical setting arises from omitted variable bias. To strengthen our identification strategy and potentially mitigate the influence of omitted variable bias, we turn to two instrumental variables – the median culture score for all the firms in the same 3-digit SIC (excluding the focal firm) and the firm's closeness centrality. We argue that firms within the same sector within an industry face similar product-market competition, and to succeed, they are likely to adopt similar corporate cultural values. Similarly, the cooperative nature of collaborative firms extends beyond internal operations and transmits to their external networks. Accordingly, we expect greater closeness centrality in firms with collaboration-oriented cultures than in control-oriented cultures. We also argue that these instruments satisfy the exclusion criteria since both industry-level culture and greater centrality are unlikely to influence tax planning except through internal corporate culture.

To calculate closeness centrality, we rely on a network of organizations obtained from BoardEx and the definition in Eq. (2).

$$CLOSENESS_i = \frac{N-1}{\sum_{j \neq i} v(i,j)} \tag{2}$$

where $v(i,j)$ represents the distance between firms i and j, and N is the total number of firms within a network. Greater closeness centrality values represent greater network centrality within a network of firms. We employ closeness centrality instead of degree centrality since closeness accounts for a firm's direct and indirect connections established through director interlocks.

The first-stage regression results in Table 6, Columns (1) and (4), show that the median culture type within an industry positively correlates with the focal firm's culture type. The coefficients on *CLOSENESS* indicate that control-oriented (collaboration-oriented) cultures have lower (greater) closeness centrality. These signs are consistent with our expectations outlined above. The Craig-Donald *F*-statistic is higher than the traditionally accepted thresholds specified in Stock and Yogo (2005), which indicates that the instruments are not weak. The second-stage results in Columns (2) and (3) and Columns (5) and (6) are also consistent with our baseline results. The coefficients on the predicted value of *CONTROL* (*COLLABORATE*) are positive (negative) and statistically significant at the 1% and 10% levels across our tax planning measures. The associated *p* values with Hansen's *j*-statistics in all columns indicate that the instruments do not overidentify the equations. These findings provide further support for *H1a* and *H1b*.

Table 5 Corporate culture and tax planning: propensity-score matched sample

Dependent variable	*GAAP ETR* (1)	*GAAP ETR* (2)	*CASH ETR* (3)	*CASH ETR* (4)
CONTROL	0.011***		0.008***	
	(4.80)		(2.75)	
COLLABORATE		−0.017***		−0.010***
		(−7.30)		(−3.79)
SIZE	0.008***	0.006***	0.008***	0.007***
	(9.68)	(7.33)	(9.04)	(7.44)
MTB	−0.002***	−0.001***	−0.003***	−0.002***
	(−4.57)	(−4.25)	(−7.13)	(−6.44)
LEVERAGE	−0.060***	−0.072***	−0.087***	−0.094***
	(−7.42)	(−8.81)	(−9.96)	(−10.89)
CASH	−0.056***	−0.061***	−0.075***	−0.073***
	(−10.64)	(−12.03)	(−13.19)	(−13.33)
NOL	−0.021***	−0.016***	−0.047***	−0.043***
	(−8.07)	(−6.25)	(−14.24)	(−13.83)
ΔNOL	0.062***	0.035**	0.164***	0.149***
	(3.42)	(2.01)	(9.46)	(8.69)
ROA	0.076***	0.081***	0.049***	0.058***
	(6.13)	(6.53)	(3.55)	(4.23)
EQUITY	−1.068***	−0.845***	−1.080***	−0.678**
	(−4.25)	(−3.02)	(−3.43)	(−2.25)
TANG	−0.010	−0.030***	−0.067***	−0.086***
	(−1.62)	(−4.36)	(−8.70)	(−11.58)
INTANG	−0.007	−0.006	−0.002	−0.008
	(−1.28)	(−1.14)	(−0.27)	(−1.25)
FOREIGN	−0.208***	−0.163***	−0.044	0.063
	(−5.20)	(−4.18)	(−0.89)	(1.38)
Intercept	0.221***	0.258***	0.229***	0.250***
	(6.67)	(7.32)	(6.84)	(7.54)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.116	0.127	0.118	0.132
Observations	20,540	23,726	20,540	23,726

Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. The *t*-statistics are based on robust standard errors clustered at the firm level

This table reports OLS regression results from propensity-score matched samples, where *GAAP ETR* or *CASH ETR* are regressed on high and low scores of *COLLABORATE* and *CONTROL*, respectively. The matched samples are created by pairing firms with high cultural scores (the treatment group) with firms with low cultural scores (control group) based on the similarity of the control variables from the main analysis. Specifically, the treatment group (control group) comprises firm-year observations in the top (bottom) tercile of each industry-adjusted cultural dimension (COLLABORATE and CONTROL). See Sect. 5.3 for more details. *CONTROL* is the control-oriented corporate culture estimate of a company obtained using textual analysis. *COLLABORATE* is the collaboration-oriented corporate culture estimate of a company obtained using textual analysis. See Sect. 3 for more details. *GAAP ETR* is the GAAP effective tax rate for the year defined as total income-tax expense scaled by pre-tax income adjusted for special items. *CASH ETR* is the cash effective tax rate for the year defined as total income taxes paid scaled by pre-tax income adjusted for special items. All other variables are defined in "Appendix 1"

6 Additional analyses

6.1 Alternative fixed effects

Given the novelty of applying text-based variables to proxy for different dimensions of corporate culture, there might be some concern that our textual measures pick up on some unobserved firm characteristics instead of identifying a pure culture-specific effect. It is possible that our analysis, so far, omits some tax planning determinant that is correlated with other included variables. Therefore, we re-estimate our baseline model with alternative fixed effects to mitigate potential endogeneity issues from correlated omitted variables. First, we apply industry-year interacted fixed effects to control for any industry cyclicality. We report these results in Table 7, where we employ *GAAP ETR* and *CASH ETR* as our dependent variables in Columns (1) and (2), respectively. The results show a positive coefficient on *CONTROL* ($\beta = 0.017$***, t-statistic $= 6.07$) and a negative coefficient on *COLLABORATE* ($\beta = -0.011$***, t-statistic $= -8.24$) when we regress our cultural variables and controls from Eq. (1) on *GAAP ETR* in Column (1). We notice a similar pattern when we regress our cultural variables on *CASH ETR* in Column (2), namely, a positive coefficient on *CONTROL* ($\beta = 0.011$***, t-statistic $= 3.16$) and a negative coefficient on *COLLABORATE* ($\beta = -0.006$***, t-statistic $= -4.63$). We interpret the coherent signs in Columns (1) and (2) in favor of our baseline analysis. Next, we employ firm fixed effects to control for time-invariant firm characteristics that may be correlated with tax planning and corporate culture. We report these results in Columns (3) and (4). The coefficient on *CONTROL* is positive ($\beta = 0.014$***, t-statistic $= 4.89$), and the coefficient on *COLLABORATE* is negative ($\beta = -0.001$*, t-statistic $= -1.80$) when we regress our cultural variables and controls from Eq. (1) on *GAAP ETR* in Column (3). Again, we note a similar in-sample pattern in Column (4) when we use *CASH ETR* as the dependent variable. The coefficient on *CONTROL* is still positive ($\beta = 0.010$***, t-statistic $= 2.81$), but the coefficient on *COLLABORATE* is positive and statistically insignificant ($\beta = 0.001$, t-statistic $= 0.62$). These results further support our hypotheses and mitigate the influence of time-invariant firm characteristics.

6.2 Cooperate governance

Another alternative explanation is that our cultural dimensions capture formal corporate governance mechanisms. If such mechanisms also determine the quality of a firm's intra-organizational knowledge flows, which aids in identifying and exploiting certain tax positions, corporate governance could constitute a correlated omitted variable. The relevance of corporate governance mechanisms to tax outcomes is an entrenched notion in the tax literature, and previous studies have shown that tax planning can be explained by, for example, CEO ability (Koester et al. 2017), board gender diversity (Richardson et al. 2016), board composition (Armstrong et al. 2015) and CEO-centrality (Chyz and White 2014). To account for the potential impact of omitted corporate governance mechanisms and executive characteristics on corporate tax planning, we include board size (*BSIZE*), the fraction of independent directors (*BINDEP*), board gender diversity (*PCTFEMALE*), CEO duality (*DUALITY*), and CEO ability (*ABILITY*) as additional control variables. Data for corporate

Table 6 Corporate culture and tax planning: instrumental variable regressions

Dependent variable	IV first-stage *CONTROL*	IV second-stage *GAAP ETR*	IV second-stage *CASH ETR*	IV first-stage *COLLABOR*	IV second-stage *GAAP ETR*	IV second-stage *CASH ETR*
	(1)	(2)	(3)	(4)	(5)	(6)
MEDIAN CONTROL	0.177***					
	(6.84)					
MEDIAN COLLABORATE				0.280***		
				(5.52)		
CLOSENESS	−0.185***			0.619***		
	(−3.23)			(5.31)		
P(CONTROL)		0.120***	0.093*			
		(2.68)	(1.68)			
P(COLLABORATE)					−0.081***	−0.033*
					(−5.20)	(−1.84)
SIZE	−0.042***	0.004	0.006**	0.060***	0.004***	0.004**
	(−14.51)	(1.63)	(2.00)	(9.54)	(2.83)	(2.21)
MTB	0.005***	−0.001***	−0.002***	0.005**	−0.000	−0.001***
	(5.75)	(−2.96)	(−4.70)	(2.19)	(−0.43)	(−3.96)
LEVERAGE	−0.329***	−0.023	−0.042*	0.011	−0.062***	−0.073***
	(−14.49)	(−1.30)	(−1.96)	(0.19)	(−7.60)	(−7.75)
CASH	−0.020	−0.065***	−0.095***	−0.039	−0.069***	−0.098***
	(−1.21)	(−10.19)	(−14.04)	(−1.23)	(−10.71)	(−14.77)
NOL	−0.054***	−0.004	−0.029***	−0.055***	−0.014***	−0.036***
	(−6.97)	(−1.01)	(−6.66)	(−3.12)	(−5.24)	(−10.94)
ΔNOL	0.076***	0.034*	0.141***	0.042	0.046**	0.149***
	(2.68)	(1.89)	(8.00)	(0.71)	(2.56)	(8.74)
ROA	0.357***	0.079***	0.059**	−0.090	0.114***	0.090***
	(9.16)	(3.44)	(2.25)	(−0.96)	(8.90)	(5.88)

Table 6 (continued)

Dependent variable	IV first-stage *CONTROL*	IV second-stage *GAAP ETR*	IV second-stage *CASH ETR*	IV first-stage *COLLABOR*	IV second-stage *GAAP ETR*	IV second-stage *CASH ETR*
	(1)	(2)	(3)	(4)	(5)	(6)
EQUITY	−1.073	−0.573**	−0.196	2.027	−0.520*	−0.231
	(−1.22)	(−1.99)	(−0.60)	(1.03)	(−1.86)	(−0.70)
TANG	−0.058***	−0.029***	−0.095***	0.067	−0.032***	−0.099***
	(−2.88)	(−3.46)	(−10.08)	(1.25)	(−4.30)	(−11.20)
INTANG	−0.044***	−0.017***	−0.028***	0.019	−0.019***	−0.030***
	(−2.60)	(−2.68)	(−3.71)	(0.51)	(−3.06)	(−4.25)
FOREIGN	−0.418***	−0.157***	0.048	−0.288	−0.232***	−0.001
	(−4.06)	(−3.38)	(0.90)	(−1.09)	(−5.78)	(−0.03)
Intercept	1.285***			0.855***		
	(13.05)			(4.48)		
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.370	−0.027	0.023	0.095	−0.146	0.025
Craig-Donald F-statistic	84.154			116.068		
Hansen *j*-statistic		2.577	0.525		0.000	0.752
p value		0.108	0.469		0.984	0.386
Observations	24,033	24,032	24,032	24,033	24,032	24,032

Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. The *t*-statistics are based on robust standard errors clustered at the firm level

This table reports regression outputs where the median culture score for all firms within the same industry and the firm's closeness centrality are used as instruments for *CONTROL* and *COLLABORATE* in a two-stage least squares regression. In the second stage, the dependent variable is *GAAP ETR* or *CASH ETR,* and the variables of interest are the predicted values for *CONTROL* or *COLLABORATE*. See Sect. 5.4 for more details. *CONTROL* is the control-oriented corporate culture estimate of a company obtained using textual analysis. *COLLABORATE* is the collaboration-oriented corporate culture estimate of a company obtained using textual analysis. See Sect. 3 for more details. *GAAP ETR* is the GAAP effective tax rate for the year defined as total income-tax expense scaled by pre-tax income adjusted for special items. *CASH ETR* is the cash effective tax rate for the year defined as total income taxes paid scaled by pre-tax income adjusted for special items. All other variables are defined in "Appendix 1"

Table 7 Corporate culture and tax planning: alternative fixed effects

Dependent variable	*GAAP ETR* (1)	*CASH ETR* (2)	*GAAP ETR* (3)	*CASH ETR* (4)
CONTROL	0.017***	0.011***	0.014***	0.010***
	(6.07)	(3.16)	(4.89)	(2.81)
COLLABORATE	−0.011***	−0.006***	−0.001*	0.001
	(−8.24)	(−4.63)	(−1.80)	(0.62)
SIZE	0.008***	0.008***	0.010***	0.007***
	(11.86)	(10.45)	(6.33)	(3.75)
MTB	−0.001***	−0.003***	−0.001***	−0.002***
	(−5.72)	(−9.10)	(−3.23)	(−6.26)
LEVERAGE	−0.061***	−0.082***	−0.034***	−0.018**
	(−9.44)	(−11.13)	(−4.44)	(−1.99)
CASH	−0.056***	−0.074***	−0.019***	−0.041***
	(−14.04)	(−16.49)	(−3.89)	(−6.98)
NOL	−0.022***	−0.046***	−0.018***	−0.033***
	(−10.21)	(−17.85)	(−7.29)	(−10.54)
ΔNOL	0.070***	0.161***	0.031**	0.118***
	(5.31)	(12.80)	(2.40)	(9.31)
ROA	0.071***	0.051***	0.030***	−0.044***
	(7.33)	(4.60)	(2.96)	(−3.38)
EQUITY	−0.845***	−0.653**	−0.377	−1.181***
	(−3.87)	(−2.55)	(−1.58)	(−4.12)
TANG	−0.019***	−0.077***	0.002	−0.012
	(−3.42)	(−12.12)	(0.32)	(−1.43)
INTANG	−0.004	−0.008	−0.015***	0.006
	(−0.86)	(−1.46)	(−2.76)	(0.97)
FOREIGN	−0.198***	−0.015	−0.102***	−0.359***
	(−6.04)	(−0.38)	(−2.75)	(−7.72)
Intercept	0.279***	0.259***	0.273***	0.271***
	(40.75)	(31.89)	(27.05)	(21.43)
Industry-year fixed effects	Yes	Yes	No	No
Firm fixed effects	No	No	Yes	Yes
Year fixed effects	No	No	Yes	Yes
Adjusted R^2	0.135	0.136	0.062	0.044
Between R^2			0.104	0.089
Overall R^2			0.070	0.058
Observations	42,640	42,640	42,640	42,640

Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. The *t*-statistics are based on robust standard errors clustered at the firm level

This table reports OLS regression results that examine the effects of corporate culture on corporate tax planning. *CONTROL* is control-oriented corporate culture estimate of a company obtained using textual analysis. *COLLABORATE* is collaboration-oriented corporate culture estimate of a company obtained using textual analysis. See Sect. 3 for more details. *GAAP ETR* is the GAAP effective tax rate for the year defined as total income-tax expense scaled by pre-tax income adjusted for special items. *CASH ETR* is the cash effective tax rate for the year defined as total income taxes paid scaled by pre-tax income adjusted for special items. All other variables are defined in "Appendix 1"

governance variables comes from BoardEx and Peter Demerjian's website.[3] We also follow Klassen et al. (2016) and control for the potential impact of external monitoring and include a dummy variable (*BIG4*), which indicates whether a Big-4 audit firm audits a firm or not.

We then return to our baseline regression and re-estimate Eq. (1) with our additional control variables. Columns (1) to (3) of Table 8 report results for regressions where we employ *GAAP ETR* as our dependent variable. The results in Column (3) show that the coefficient on *CONTROL* is positive and statistically significant ($\beta = 0.10^{***}$, *t*-statistic = 2.66) while the coefficient on *COLLABORATE* is negative and statistically significant ($\beta = -0.046^{***}$, *t*-statistic = −9.14). We observe a consistent pattern in Columns (4) to (6) of Table 8, where we employ *CASH ETR* as our dependent variable, namely, that the coefficient on *CONTROL* (*COLLABORATE*) remains positive (negative) and statistically significant across all specifications. The additional control variables display various signs and varying degrees of statistical significance. These results align with prior research and do not change our main inferences (Richardson et al. 2016; Chyz and White 2014). The adjusted R^2 is slightly higher compared to our baseline model, but adding additional governance controls does not seem to add much explanatory power to the analysis.

6.3 Tax sheltering activities: test of *H2a* and *H2b*

So far, we have argued that collaboration- and control-oriented cultures influence tax decisions differently due to cultural differences, which can be recognized in a firm's decision structures and approach to knowledge management. It is, however, relevant to acknowledge that our results could also be explained within an agency framework. More specifically, the bureaucratic nature of control-oriented cultures may foster corporate values and norms, restricting managers from pursuing tax positions equivalent to rent-seeking behavior. It is also possible that the informal organization structure of collaboration-oriented firms shapes a corporate environment that inefficiently restricts managerial resource diversion. But predicting how agency conflicts influence corporate tax behavior contingent on governance properties is ambiguous because of complementarities between tax-sheltering activities and managerial rent extraction. More specifically, Desai and Dharmapala (2006) suggest that weak (strong) governance mechanisms decrease (increase) the marginal benefit of concealing resource diversion through sophisticated tax schemes due to the existence (absence) of less costly alternatives. To further map the underlying drivers behind our baseline results, we turn to four variables that reflect more refined forms of tax planning in the previous literature (Rego and Wilson 2012).

First, we estimate Wilson's (2009) tax shelter score (*SHELTERScore*) to generate yearly tax sheltering probabilities for each firm with sufficient data in our sample. We use this score to create an indicator variable (*SHELTER*), which equals one if a firm's annual tax sheltering probability ranks in the top quartile of the corresponding distribution that year and zero otherwise. Next, we turn to the residuals from Frank et al. (2009) model to capture tax practices that drive permanent differences between the book and taxable income (*DTAX*). This measure is not usually acknowledged as a proxy for tax aggressiveness (Dyreng et al. 2010), but we include it in our analysis since it is often argued to be indicative of a deliberate attempt to avoid taxes. Finally, we obtain tax-haven data from WRDS'

[3] We thank Peter Demerjian for making managerial ability data publicly available at the following website: https://peterdemerjian.weebly.com/managerialability.html

Table 8 Corporate culture and tax planning: additional governance controls

Dependent variable	*GAAP ETR*			*CASH ETR*		
	(1)	(2)	(3)	(4)	(5)	(6)
CONTROL	0.008**		0.010***	0.018***		0.019***
	(2.26)		(2.66)	(3.73)		(3.90)
COLLABORATE		−0.046***	−0.046***		−0.026***	−0.027***
		(−9.09)	(−9.14)		(−5.26)	(−5.34)
SIZE	−0.002*	−0.002*	−0.002	−0.002	−0.002	−0.002
	(−1.90)	(−1.69)	(−1.62)	(−1.32)	(−1.28)	(−1.16)
MTB	−0.001*	−0.000	−0.000	−0.002***	−0.001***	−0.002***
	(−1.82)	(−1.04)	(−1.11)	(−4.63)	(−4.24)	(−4.33)
LEVERAGE	−0.064***	−0.066***	−0.064***	−0.081***	−0.085***	−0.080***
	(−7.52)	(−8.32)	(−7.89)	(−8.11)	(−8.77)	(−8.14)
CASH	−0.067***	−0.065***	−0.064***	−0.094***	−0.094***	−0.093***
	(−10.18)	(−9.98)	(−9.89)	(−13.85)	(−13.91)	(−13.74)
NOL	−0.011***	−0.013***	−0.013***	−0.035***	−0.037***	−0.036***
	(−4.33)	(−5.42)	(−5.23)	(−11.18)	(−11.84)	(−11.57)
ΔNOL	0.046**	0.048***	0.047***	0.149***	0.150***	0.150***
	(2.48)	(2.60)	(2.58)	(8.42)	(8.56)	(8.52)
ROA	0.137***	0.137***	0.135***	0.122***	0.124***	0.120***
	(9.17)	(10.06)	(9.91)	(7.32)	(7.69)	(7.50)
EQUITY	−0.657**	−0.623**	−0.627**	−0.232	−0.206	−0.215
	(−2.31)	(−2.29)	(−2.32)	(−0.68)	(−0.60)	(−0.63)
TANG	−0.032***	−0.032***	−0.031***	−0.102***	−0.103***	−0.102***
	(−4.08)	(−4.29)	(−4.21)	(−11.22)	(−11.31)	(−11.25)
INTANG	−0.021***	−0.022***	−0.021***	−0.037***	−0.038***	−0.037***
	(−3.58)	(−3.71)	(−3.64)	(−5.10)	(−5.23)	(−5.11)
FOREIGN	−0.235***	−0.250***	−0.247***	−0.021	−0.034	−0.028
	(−5.72)	(−6.42)	(−6.34)	(−0.45)	(−0.73)	(−0.61)
BSIZE	0.001	0.001	0.001	0.004***	0.004***	0.004***
	(1.30)	(1.13)	(1.10)	(4.94)	(4.94)	(4.89)
BINDEP	0.010	−0.007	−0.007	−0.032***	−0.041***	−0.042***
	(0.96)	(−0.75)	(−0.76)	(−2.72)	(−3.65)	(−3.69)
DUALITY	0.005*	0.004*	0.004*	0.005*	0.005*	0.005*
	(1.96)	(1.84)	(1.74)	(1.82)	(1.86)	(1.70)
PCTFEMALE	−0.003	0.001	0.000	0.029*	0.032*	0.031*
	(−0.20)	(0.07)	(0.04)	(1.70)	(1.86)	(1.82)
BIG4	0.003	0.005	0.006	0.015***	0.016***	0.017***
	(0.69)	(1.40)	(1.57)	(3.28)	(3.42)	(3.70)
ABILITY	−0.006	−0.008	−0.009	−0.039***	−0.040***	−0.041***
	(−0.56)	(−0.78)	(−0.81)	(−3.20)	(−3.30)	(−3.36)
Intercept	0.267***	0.325***	0.313***	0.198***	0.249***	0.225***
	(7.02)	(9.31)	(8.61)	(3.88)	(5.31)	(4.46)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 8 (continued)

Dependent variable	*GAAP ETR*			*CASH ETR*		
	(1)	(2)	(3)	(4)	(5)	(6)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.123	0.141	0.142	0.131	0.134	0.135
Observations	21,853	21,853	21,853	21,853	21,853	21,853

Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. The *t*-statistics are based on robust standard errors clustered at the firm level

This table reports OLS regression results that examine the effects of corporate culture on corporate tax planning. *CONTROL* is control-oriented corporate culture estimate of a company obtained using textual analysis. *COLLABORATE* is collaboration-oriented corporate culture estimate of a company obtained using textual analysis. See Sect. 3 for more details. *GAAP ETR* is the GAAP effective tax rate for the year defined as total income-tax expense scaled by pre-tax income adjusted for special items. *CASH ETR* is the cash effective tax rate for the year defined as total income taxes paid scaled by pre-tax income adjusted for special items. All other variables are defined in "Appendix 1"

subsidiary data file, which uses annual 10-K filings to identify whether a firm has a subsidiary in a tax-haven country. We include an indicator variable *(TAX HAVEN),* which equals one if a firm has at least one offshore tax haven subsidiary and zero otherwise.[4]

We return to our baseline regression and employ our tax-sheltering proxies as dependent variables in Eq. (1). The sample sizes differ across the models since the data availability for our tax sheltering proxies varies across the sample period. We report the result for this specification in Table 9. Columns (1) and (2) report regression outputs where we regress *SHELTERScore* and *SHELTER*, respectively, on our cultural dimensions along with the battery of controls defined in Eq. (1). The coefficients on *CONTROL* are negative and statistically significant ($\beta = -0.226$***, *t*-statistic $= -8.65$ and $\beta = -0.325$***, *t*-statistic $= -3.70$) and the coefficients on *COLLABORATE* are positive with varying degrees of statistical significance ($\beta = 0.034$***, *t*-statistic $= 4.18$ and $\beta = 0.011$, *t*-statistic $= 0.41$). These results indicate that collaboration-oriented firms might achieve lower effective tax rates through tax shelters. However, the outcome in Columns (1) and (2) are not necessarily inconsistent with shareholder wealth maximization. While these results may indicate that collaboration-oriented firms inefficiently restrict managerial rent-seeking, they could also imply that such firms just efficiently unveil and exploit tax planning opportunities of more sophisticated character. In Column (3), we proceed and regress *TAX HAVEN* on our cultural dimensions together with the previous set of controls. The coefficient on *CONTROL* remains negative and statistically significant ($\beta = -0.442$***, *t*-statistic $= -4.96$), while the coefficient on *COLLABORATE* turns negative and statistically insignificant ($\beta = -0.013$, *t*-statistic $= -0.50$). We interpret these findings in favor of our main narrative since they suggest collaboration-oriented firms do not achieve corporate tax savings through offshore subsidiaries in tax havens.

Finally, in Column (4), we regress *DTAX* on our cultural dimensions and standard control variables in Eq. (1). We observe a positive insignificant coefficient on *CONTROL* ($\beta = 0.003$, *t*-statistic $= 1.59$) and a positive and statistically significant coefficient on *COLLABORATE* ($\beta = 0.003$, *t*-statistic $= 3.40$). This outcome indicates that collaboration-oriented firms exploit tax practices that drive permanent differences between the book and

[4] Appendix A provides more detailed definitions of these measures.

Table 9 Corporate culture and tax sheltering activities

Dependent variable	*SHELTERScore*	*SHELTER*	*TAXHAVEN*	*DTAX*
	(1)	(2)	(3)	(4)
CONTROL	−0.226***	−0.325***	−0.442***	0.003
	(−8.65)	(−3.70)	(−4.96)	(1.59)
COLLABORATE	0.034***	0.011	−0.013	0.003***
	(4.18)	(0.41)	(−0.50)	(3.40)
SIZE	0.680***	1.364***	0.453***	−0.004***
	(110.65)	(46.59)	(20.62)	(−9.74)
MTB	−0.042***	−0.069***	−0.025***	0.001***
	(−13.08)	(−7.96)	(−3.72)	(2.62)
LEVERAGE	−0.198***	−0.150	0.662***	0.020***
	(−2.86)	(−0.72)	(3.77)	(5.13)
CASH	0.346***	0.547***	−0.102	0.031***
	(7.26)	(4.92)	(−0.81)	(7.86)
NOL	0.251***	0.438***	0.332***	0.011***
	(13.16)	(6.67)	(5.55)	(8.16)
ΔNOL	−7.680***	−15.692***	−0.075	0.566***
	(−48.67)	(−29.79)	(−0.32)	(46.65)
ROA	2.788***	4.645***	−1.882***	−0.012
	(23.57)	(15.79)	(−6.59)	(−1.15)
EQUITY	9.000***	18.072***	−2.305	0.279*
	(4.27)	(2.90)	(−0.39)	(1.83)
TANG	0.241***	0.306*	−0.860***	0.009**
	(4.37)	(1.87)	(−4.93)	(2.33)
INTANG	0.360***	0.539***	−0.342***	−0.009***
	(7.60)	(4.26)	(−2.73)	(−2.64)
FOREIGN	11.251***	22.776***	13.975***	0.200***
	(32.07)	(20.93)	(12.47)	(8.94)
Intercept	−3.371***	−10.815***	−2.455***	0.036***
	(−14.96)	(−19.79)	(−4.59)	(4.34)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adjusted/Pseudo R^2	0.787	0.517	0.211	0.519
Observations	39,528	39,440	26,845	26,314

Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. The *t*-statistics are based on robust standard errors clustered at the firm level

This table reports OLS regression results that examine the effects of corporate culture on corporate tax planning. *CONTROL* is control-oriented corporate culture estimate of a company obtained using textual analysis. *COLLABORATE* is collaboration-oriented corporate culture estimate of a company obtained using textual analysis. See Sect. 3 for more details. All other variables are defined in "Appendix 1"

taxable income. We relate this finding to the previous literature and acknowledge that a collaboration-oriented corporate culture may constitute a firm-specific characteristic associated with aggressive corporate reporting. The collective evidence in Table 9 indicates that collaboration-oriented (control-oriented) is associated with more refined (conservative) tax

sheltering activities. We further note that we find no evidence to be interpreted in favor of Desai and Dharmapala's (2006) agency hypothesis.

6.4 Corporate culture, tax planning, and firm value

While developing our hypothesis, we entertain the idea that a firm's cultural orientation is important for corporate tax decisions since it caters to how decision rights are allocated within an organization. We argue that the distribution of decision rights has comprehensive implications for knowledge-intensive corporate procedures because it dictates how intra-organizational knowledge is discovered, exchanged, and utilized. Consequently, we identify two indirect channels that could help explain our baseline findings. A firm's cultural orientation may influence social factors such as intra-organizational trust and vertical communication flows, shaping how tax-specific knowledge is discovered and exchanged. Alternatively, a firm's cultural orientation may serve as an implicit social control system that regulates to which extent management can utilize tax planning activities for rent extraction purposes.

Up to this point, we have only established that collaboration-oriented (control-oriented) firms are associated with lower (higher) tax burdens. We have not yet resolved whether these differences in tax outcomes are driven by intra-organizational efficiency or opportunistic rent-seeking behavior. To clarify this central question, which theoretically divides the tax literature, we examine the relationship between corporate culture, tax planning, and firm value. More specifically, we gauge how shareholders view tax planning activities conditional on a firm's cultural orientation by estimating the subsequent model:

$$\begin{aligned} Firm\ value_{it} = {} & \beta_0 + \beta_1 Culture\ type_{it} + \beta_2 Tax\ planning_{it} + \beta_3 Culture\ type \\ & \times\ Tax\ planning_{it} + \beta_n Controls + Firm\ and\ year\ FE + \varepsilon_{it}. \end{aligned} \tag{3}$$

We regress *Firm value* (proxied by *TOBINQ*) on a firm's cultural orientation, our standard tax planning proxies, their interaction, and our baseline controls. If investors view corporate tax planning in control- or collaboration-oriented firms as a value-enhancing activity, we expect a positive and statistically significant coefficient on the interaction term *Culture type* × *Tax planning*. Table 10 reports the results and covers 42,433 firm-year observations from 1994 to 2019.

In Columns (1)–(6), we observe a positive (negative) coefficient on *CONTROL* (*COLLABORATE*) across all specifications with varying degrees of significance. Accordingly, control-oriented firms are associated with higher firm values than collaboration-oriented firms. More importantly, however, we observe reversed signs on most interaction terms. The coefficient on the interaction term *CONTROL* × *GAAP ETR* is negative and insignificant in Column (1), while the coefficient on the interaction term *COLLABORATE* × *GAAP ETR* is positive and statistically significant ($\beta = 0.133$, *t*-statistic = 2.67) in Column (3). We observe a similar pattern in Columns (2) and (4), where the coefficient on the interaction term *CONTROL* × *CASH ETR* is insignificant, while the coefficient on the interaction term *COLLABORATE* × *CASH ETR* remains positive and statistically significant at the 10% level. In Columns (5) and (6), we add interactions of *GAAP ETR* and *CASH ETR* with both cultural dimensions. The signs on the coefficients and statistical significance remain consistent with those in the first four columns. These results indicate that corporate tax planning in collaboration-oriented firms is positively valued by investors, which would align with both traditional economic theory and our arguments regarding knowledge management and its positive implications

Table 10 Corporate culture, tax planning, and firm value

	Dependent variable: *TOBINQ*					
	(1)	(2)	(3)	(4)	(5)	(6)
CONTROL	0.107**	0.064*			0.107**	0.065*
	(2.23)	(1.91)			(2.24)	(1.95)
CONTROL×*GAAP ETR*	−0.117				−0.116	
	(−0.96)				(−0.95)	
CONTROL×*CASH ETR*		0.040				0.038
		(0.49)				(0.48)
COLLABORATE			−0.044**	−0.018	−0.045**	−0.020*
			(−2.47)	(−1.50)	(−2.55)	(−1.67)
COLLABORATE×*GAAP ETR*			0.133***		0.131***	
			(2.67)		(2.64)	
COLLABORATE×*CASH ETR*				0.062*		0.061*
				(1.77)		(1.75)
GAAP ETR	0.136		−0.296***		−0.115	
	(0.70)		(−2.74)		(−0.54)	
CASH ETR		−0.297**		−0.350***		−0.412***
		(−2.28)		(−4.64)		(−2.89)
SIZE	−0.235***	−0.229***	−0.237***	−0.232***	−0.235***	−0.229***
	(−10.17)	(−9.94)	(−10.28)	(−10.06)	(−10.17)	(−9.93)
LEVERAGE	−0.308***	−0.313***	−0.318***	−0.324***	−0.308***	−0.313***
	(−3.96)	(−4.02)	(−4.07)	(−4.15)	(−3.96)	(−4.02)
ROA	4.837***	4.823***	4.836***	4.823***	4.835***	4.823***
	(32.62)	(32.44)	(32.60)	(32.42)	(32.63)	(32.45)
TANG	−1.039***	−1.047***	−1.035***	−1.043***	−1.039***	−1.048***
	(−14.91)	(−15.04)	(−14.89)	(−15.01)	(−14.94)	(−15.07)
CASH	0.452***	0.443***	0.451***	0.443***	0.452***	0.442***
	(6.86)	(6.72)	(6.85)	(6.71)	(6.86)	(6.72)
CAPEX	1.343***	1.364***	1.349***	1.370***	1.343***	1.365***
	(8.92)	(9.03)	(8.97)	(9.08)	(8.93)	(9.05)
R&D	0.024**	0.024**	0.024**	0.024**	0.024**	0.024**
	(2.18)	(2.22)	(2.14)	(2.18)	(2.17)	(2.21)
Intercept	2.232***	2.334***	2.469***	2.450***	2.319***	2.369***
	(15.41)	(17.45)	(18.83)	(19.42)	(15.50)	(17.45)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.312	0.313	0.312	0.313	0.312	0.313
Between R^2	0.200	0.201	0.198	0.199	0.199	0.200
Overall R^2	0.229	0.232	0.227	0.231	0.228	0.232
Observations	42,433	42,433	42,433	42,433	42,433	42,433

Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively. The *t*-statistics are based on robust standard errors clustered at the firm level

This table reports OLS regression results that examine the effects of corporate tax planning on firm value contingent on corporate culture. *CONTROL* is control-oriented corporate culture estimate of a company obtained using textual analysis. *COLLABORATE* is collaboration-oriented corporate culture estimate of a company obtained using textual analysis. See Sect. 3 for more details. *GAAP ETR* is the GAAP effective tax rate for the year defined as total income-tax expense scaled by pre-tax income adjusted for special items. *CASH ETR* is the cash effective tax rate for the year defined as total income taxes paid scaled by pre-tax income adjusted for special items. All other variables are defined in "Appendix 1"

for intra-organizational knowledge flows. This finding also indicates that collaboration-oriented cultures do not achieve corporate tax savings by destroying firm value. On the contrary, shareholders value less conservative reporting practices in such firms. These observations contribute with further nuance to the existing evidence on collaboration-oriented cultures, which primarily draws attention to its negative implications for traditional control mechanisms.

7 Conclusion

In this study, we examine the effect of corporate culture on corporate tax planning. Using the competing values framework and building on the management theories of decision structures and knowledge management, we argue that internally oriented corporate cultures have variations in intra-organizational knowledge flows that ultimately impact firms' tax planning activities. Specifically, control-oriented cultures that adopt bureaucratic decision structures are associated with higher tax burdens than collaboration-oriented cultures, which embrace more lateral decision structures. Our empirical results from a sample of U.S. firms from 1994 to 2019 are consistent with these hypotheses. We also find that our results are not driven by cross-sectional differences in firm characteristics and are robust to instrumental variable regressions addressing endogeneity. Finally, we show that collaboration-oriented cultures do not achieve corporate tax savings by destroying firm value.

These findings offer an interesting juxtaposition to the previous tax literature, which documents a compelling relationship between control-oriented organizational features and low tax burdens. While these studies emphasize the importance of attributes such as internal information quality (Gallemore and Labro 2015), internal control quality (Bauer 2015), and organizational capital (Hasan et al. 2021), we provide evidence suggesting that structureless reciprocity between the tax department and operating units also can contribute to smaller tax burdens that ultimately benefit shareholders. These findings offer further nuance to the tax literature, which may help us better understand how the inner workings of the firm influence corporate tax planning.

We do, however, note several limitations with our study. First, it is relevant to emphasize that corporate culture and tax planning could be endogenously determined by, for example, managerial characteristics. While we cannot infer causality, we attempt to address this issue with a battery of control variables, alternative fixed effects, and instrumental variable regressions. Another limitation is the reliance on cultural proxies obtained from annual reports, which could be biased and compromised if firms systematically engage in impression management. We acknowledge the possibility that the language used in the annual report could portray top managements' aspirations for corporate culture rather than the underlying social construct itself. A natural extension of this study would be to triangulate this issue and analyze how similar measures of corporate culture from, for example employee reviews, influence tax decisions. Finally, our main analysis is restricted to tax planning in firms with positive earnings, while corporate culture could influence tax planning in loss firms in many other ways. We leave this venue open for future research.

Appendix 1: Variable definitions

Tax planning variables	
GAAP ETR	The GAAP effective tax rate for the year defined as total income-tax expense scaled by pre-tax income adjusted for special items
CASH ETR	The cash effective tax rate for the year defined as total income taxes paid scaled by pre-tax income adjusted for special items
GAAP ETR (3 years)	Three-year *GAAP ETR* where the numerator and denominator of the *GAAP ETR* are summed over the past 3 years
CASH ETR (3 years)	Three-year *CASH ETR* where the numerator and denominator of the *CASH ETR* are summed over the past 3 years
Other tax planning variables	
SHELTERScore	A measure of corporate tax sheltering activities based on the prediction model of Wilson (2009). The model is as follows: $SHELTERScore = -4.86 + 5.20 \times BTD + 4.08 \times DAP - 1.41 \times LEVERAGE + 0.76 \times AT + 3.51 \times ROA + 1.72 \times FOREIGN + 2.43 \times R\&D$ where *BTD* is the book-tax difference and is defined as book income less taxable income, scaled by lagged assets. Book income is pretax income while taxable income is calculated by summing the current federal tax expense and current foreign tax expense, dividing by the statutory tax rate (0.35), and then subtracting the change in net operating loss carryforwards; *DAP* is the discretionary accruals from the performance-adjusted modified cross-sectional Jones model; *LEVERAGE* is the sum of short-term and long-term debt divided by total assets; *AT* is the natural logarithm of total assets; *ROA* is operating income before depreciation divided by lagged total assets; *FOREIGN* equals 1 for firm observations reporting foreign income and zero otherwise; and *R&D* is research and development expense divided by lagged total assets
SHELTER	We follow Rego and Wilson (2012) and define *SHELTER* as an indicator variable that equals 1 for firm-years in the top quintile of the tax shelter prediction scores
DTAX	*DTAX* is the residual from the following regressions estimated by year and two-digit SIC code based on the model from Frank et al. (2009): $PERMD = \alpha + \beta_1 INTANG + \beta_2 UNCON + \beta_3 MI + \beta_4 CSTE + \beta_5 \Delta NOL + \beta_6 LAGPERMP + \varepsilon$ where *PERMD* equals the difference between the total book-tax differences and the temporary book-tax differences: $PERMD = \left\{ \left[PI - \frac{TXFED+TXFO}{STR} \right] - \frac{TXDI}{STR} \right\}$ *PI* is the pretax income; *TXFED* is the current federal tax expense; *TXFO* is the current foreign tax expense; *TXDI* is the deferred tax expense; and *STR* is the statutory tax rate, which equals 0.35 *INTANG* is goodwill and other intangibles; *UNCON* is the income (loss) reported under the equity method; *MI* is the income (loss) attributable to minority interests; *CSTE* is the current state tax expense; *ΔNOL* is the change in net operating loss carryforwards; and *LAGPERMD* is *PERMD* at year t − 1. All the variables, including the intercept, are scaled by lagged assets. We run this model by year and two-digit SIC code using the entire Compustat database when the required information is available
TAX HAVEN	An indicator variable that equals 1 if a firm has at least one tax-haven country subsidiary and zero otherwise. We obtain tax-haven data from WRDS' subsidiary data file
Corporate culture measures	
CONTROL	Control-oriented corporate culture estimates of a company obtained using textual analysis and keywords specified in Fig. 1

COLLABORATE	Collaboration-oriented corporate culture estimates of a company obtained using textual analysis and keywords specified in Fig. 1
Instrumental variables	
MEDIAN CONTROL	The median of *CONTROL* for all firms (excluding the focal firm) in the same three-digit SIC industry
MEDIAN COLLABORATE	The median of *COLLABORATE* for all firms (excluding the focal firm) in the same three-digit SIC industry
CLOSENESS	A measure of network centrality that captures the centrality of a firm within a network of *N* firms. It is obtained based on the following equation $CLOSENESS_i = \frac{N-1}{\sum_{j \neq i} v(i,j)}$ where *N* is the total number of firms in the network and *i* represents firm *i* for which the measure is calculated and $v(i, j)$ represents the vector of all the distances between firm *i* and any other firm reachable in its network. The shorter the distance between the focal firm and other firms in the network (i.e., smaller denominator), the greater is the closeness centrality of the firm
Firm-level controls	
SIZE	Natural logarithm of total assets
MTB	Market-to-book ratio, defined as market value of equity divided by book value of equity
LEVERAGE	Sum of short-term and long-term debt divided by total assets
CASH	Cash and cash equivalents divided by lagged total assets
NOL	Equals 1 if the net operating loss carryforwards is greater than zero, and zero otherwise
ΔNOL	Change in net operating loss carryforwards divided by lagged total assets
ROA	Operating income before depreciation divided by lagged total assets
EQUITY	Income (loss) reported under the equity method divided by lagged total assets
TANG	Net property, plant, and equipment divided by lagged total assets
INTANG	Goodwill and other intangible assets divided by lagged total assets
FOREIGN	Equals 1 for firm observations reporting foreign income, and zero otherwise
TOBINQ	Market value of equity plus book value of total assets minus book value of equity, all divided by book value of assets
CAPEX	Capital expenditures divided by lagged total assets
R&D	Research and development expenses divided by lagged total assets, considered 0 if missing
Corporate governance controls	
BSIZE	Total number of directors on the board
BINDEP	Percentage of independent directors on the board
DUALITY	Equals 1 if the CEO is also the chairman of the board, and zero otherwise
PCTFEMALE	Percentage of female directors on the board
BIG4	Equals 1 if the firm is audited by a Big-4 audit firm, and zero otherwise
ABILITY	Residual of firm efficiency score estimated by Demerjian et al. (2012)

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Declarations

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TIMMY THOR

Essays on the Role of Corporate Culture in Accounting and Finance

Economists have traditionally used property rights theory and agency theory to rationalize and explain corporate outcomes. The influence of this line of thought cannot be overemphasized, and the principal-agent framework has profoundly shaped our perspective on managerial and corporate behavior. While the premise of this framework has helped to explain economic outcomes by specifying how property rights influence corporate behavior within the realm of agency conflicts, it marginalizes much of the social nature of the firm. This underscores that socio-organizational factors deserve more attention in economics and that mental constructs such as corporate culture must be explored to advance our understanding of corporate behavior. This dissertation contributes to this effort and introduces three essays that utilize accounting information to examine the financial and non-financial implications of corporate culture through the lens of various stakeholders.

The first essay focuses on employees and examines the link between corporate culture and workplace safety. The results show that firms with strong corporate cultures record lower regulatory fines, are less likely to be penalized, and sustain fewer safety-related violations. Additional analyses of establishment-level data from the United States Occupational Safety and Health Administration also reveal lower levels of workplace injuries and illnesses in firms with stronger corporate cultures. A potential economic explanation for these patterns is documented by connecting firms with a strong corporate culture to safety-related spending.

The second essay seeks to understand how corporate values and norms affect knowledge-intensive corporate activities and focus on tax planning in firms with control and collaboration-oriented corporate cultures. The results show that firms with collaboration-oriented (control-oriented) corporate cultures record lower (higher) tax burdens over short and long time horizons. Additional tests uncover that firms with collaboration-oriented corporate cultures achieve these tax savings by engaging in tax-sheltering activities and that such savings positively affect firm value. No evidence of equivalent behavior is recorded in firms with control-oriented corporate cultures.

The third essay explores how corporate culture shapes the role of the supplier in the context of interfirm financing and focuses on trade credit provision in firms with control, collaboration, creativity, and competition-oriented cultures. The results show that firms with control and competition-oriented corporate cultures extend more trade credit to customers, while the opposite pattern partly applies to firms with collaboration and creativity-oriented corporate cultures. Additional analyses reveal that firms with control and competition-oriented corporate cultures extend more trade credit during different economic circumstances and that such policies affect firm performance.

A central theme across these essays is the application of natural language processing techniques to explore how social aspects of the firm affect corporate outcomes that have financial and non-financial implications for several primary stakeholders. This work adds to the literature on the intersection of corporate governance, behavioral corporate finance, and organizational behavior by shedding light on how corporate culture influences workplace safety, tax planning, and trade credit policies in publicly listed firms.

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