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Corporate culture, cultural diversification, and independent directors: Evidence from earnings conference calls[☆]

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ABSTRACT

Capitalizing on a distinctive measure of corporate culture obtained from sophisticated machine learning, we investigate the concept of cultural diversification. A firm is culturally diversified if it is characterized by a variety of diverse cultural attributes. Motivated by agency theory, we hypothesize that risk-averse managers favor cultural diversification, but, owing to agency problems, tend to over-invest in cultural diversification. More effective governance in the form of stronger board independence mitigates the agency conflict, lowering the level of cultural diversification and bringing it closer to the optimal level where shareholder value is maximized. Our results strongly support this hypothesis.

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1. Introduction

Corporate culture is defined as the employees' common values or preferences inside a corporation (Cremer, 1993; van den Steen, 2010; Li et al., 2021a); . Corporate culture is crucial because workers will eventually be confronted with difficult decisions that cannot be properly regulated ex ante (O'Reilly, 1989; Griffin et al., 2021). Unlike formal management mechanisms such as rules and procedures, organizational culture is shaped by peer pressure and social construction of reality (Griffin et al., 2021). Owing to the significant difficulties associated with defining and quantifying corporate culture, researching corporate culture is incredibly difficult, resulting in a dearth of empirical research (Graham et al., 2017).

Capitalizing on a distinctive measure of corporate culture obtained from advanced machine learning algorithms, we contribute to the literature by examining an important aspect of corporate culture that has been so far disregarded. In particular, we investigate cultural diversification. A company is culturally diversified if its corporate culture is characterized by a variety of cultural attributes. By contrast, a company lacks culture diversification if its corporate culture is dominated by only a few dominant cultural qualities. Based on agency theory, we apply the arguments from the literature on corporate diversification on corporate culture.

It is well-documented in the literature that managers tend to be more risk-averse than shareholders as shareholders can diversify their portfolios whereas managers are exposed to more idiosyncratic risk because of their employment and human-specific capital (Amihud and Lev, 1981; Smith and Stulz, 1985; Williams, 1987; Low, 2009). One way in which managers can reduce firm risk is to promote corporate diversification. To the extent that the cash flows from different sectors are not completely correlated, there is a decline in firm risk. Due to agency problems, however, managers are prone to over-diversification, where the firm is diversified beyond the optimal level.

Prior research supports this argument. First, corporate diversification is associated with lower firm value (Shin and Stulz, 1998; Rajan et al., 2000; Lamont, 1997). Furthermore, the diversification discount is deeper when corporate governance is weaker, implying that the lower value is probably caused by agency problems (Hubbard and Palia, 1999; Anderson et al., 2000; May, 1995; Jiraporn et al., 2006, 2008). Applying an analogous logic to corporate culture, we hypothesize that managers are likely in favor of corporate cultural diversification. It is less risky

to invest in several cultural attributes as at least some attributes will likely be successful. To the extent that the outcomes from different cultural attributes are less than perfectly correlated, cultural diversification mitigates firm risk. It is therefore less risky to be culturally diversified.

We focus on the role of board governance, in particular, board independence. The board of directors is often recognized as the most important governance instrument for resolving agency conflicts. Outside independent directors are more likely to be impartial due to their independence from the company. Consequently, the degree of board independence is widely used as a proxy for board quality. More effective board governance brings about corporate actions and choices that are more beneficial to shareholders. Consistent with this view, past research demonstrates the value of independent directors (Rosenstein and Wyatt, 1990; Cotter et al., 1997; Core et al., 1996; Nguyen and Nielsen, 2010; Jenwittayaroje and Jiraporn, 2017).[1]

Based on a large sample of over 16,000 observations across almost 20 years, our results demonstrate that more independent directors bring about a significantly lower level of cultural diversification. The findings are consistent with the notion that risk-averse managers promote cultural diversification to reduce firm risk beyond the point where shareholder value is maximized. Stronger corporate governance in the form of stronger board independence mitigates agency conflicts and brings the degree of cultural diversification closer to the optimal level. Our findings are in agreement with the prediction of agency theory. In term of magnitude, a rise in board independence by one standard deviation results in a reduction in cultural diversification by 3.74% when cultural diversification is measured by the Herfindahl–Hirschman Index.

We include firm fixed effects in our regression analysis. Therefore, our results are less susceptible to the omitted-variable bias. In any case, to corroborate the results, we execute a variety of robustness checks, including propensity score matching, entropy balancing, instrumental-variable analysis, and (Oster, 2019) testing for coefficient stability. All the robustness tests strongly validate our findings. Therefore, our findings are unlikely tainted by endogeneity and are more likely to demonstrate causality, rather than a mere association. We also find that companies that invest more in building up corporate culture tend to invest in more diverse attributes of corporate culture. Our study is among the first to take advantage of the novel measure of corporate culture obtained from sophisticated machine learning and is the first to explore the concept of cultural diversification using agency theory.

The results of our study make important contributions to several key areas of the literature. First, our study contributes significantly to the body of knowledge on corporate culture. Previous studies examine corporate culture from a theoretical perspective (Cremer, 1993; van den Steen, 2010; Li et al., 2021b; Weber et al., 1996; Graham et al., 2017). Nevertheless, there has been a dearth of empirical work on corporate culture. We fill this gap in the literature by investigating an important, yet hitherto overlooked, aspect of corporate culture, i.e., corporate cultural diversification.

Second, the results of our study contribute to the literature in agency theory. Prior research shows that managers tend to over-diversify the firm due to their inherent risk aversion (Shin and Stulz, 1998; Rajan et al., 2000; Lamont, 1997; Hubbard and Palia, 1999; Anderson et al., 2000; May, 1995; Jiraporn et al., 2006, 2008).[2] Extending this argument to corporate culture, we show that managers support corporate policies that result in too much cultural diversification and are forced to cut back in the presence of more effective governance.

Finally, our study contributes to a fast-growing area of the literature in which textual analysis is used (Allee and DeAngelis, 2015; Antweiler and Frank, 2004; Bodnaruk et al., 2015; Chen et al., 2014; Davis et al., 2014; Davis and Tama-Sweet, 2012; Ertugrul et al., 2017; Loughran and McDonald, 2020; Baker et al., 2016a; Chatjuthamard et al., 2021d; Ongsakul et al., 2020b; Ongsakul and Jiraporn, 2019; Chatjuthamard et al., 2020). Loughran and McDonald (2016) provide an in-depth examination of the use of textual analysis in accounting and finance. Our findings demonstrate that textual analysis generates a unique and relevant measure of corporate culture that can be used empirically.

2. Literature review and hypothesis development

2.1. Machine learning and textual analysis

Textual analysis is a relatively new, yet fast growing, discipline of the economics and finance literature. Machine learning can extract a significant amount of information from a large number of documents, such as business annual reports, conference call transcripts, or newspapers, due to advancements in computing power and complex algorithms. For instance, Hassan et al. (2019) use computational linguistics to develop a unique text-based proxy for the political risk faced by individual US firms: the percentage of their quarterly earnings conference calls dedicated to political risk. Using this unique text-based measure of political risk, Ongsakul et al. (2021a) show that corporations spend much more in corporate social responsibility (CSR) when political risk is greater.

Baker et al. (2016b) construct an index of economic policy uncertainty (EPU) using textual analysis to analyze uncertainty-related terms in newspapers. Their text-based EPU index has garnered considerable attention. EPU has been shown to have significant effects on mergers and acquisitions (Bonaime et al., 2018; Nguyen and Phan, 2017), executive risk-taking incentives (Chatjuthamard et al., 2020), governance arrangements (Ongsakul et al., 2021b), board gender diversity, and LGBT-supportive corporate policies (Padungsaksawasdi et al., 2021a).

Moreover, Loughran and McDonald (2020), applying machine learning and textual analysis to Form 10-K's, construct a text-based measure of corporate complexity. This novel measure is validated by other more traditional metrics of firm complexity and is demonstrated to be useful. Exploiting this distinctive measure of firm complexity, Ongsakul et al. (2020a) report that companies more subject to takeover threats exhibit a significantly lower level of firm complexity. They argue that takeover vulnerability exacerbates managerial myopia, resulting in investments that focus more on the short term at the expense of long-term, more complex, projects.

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[1] For example, Rosenstein and Wyatt (1990) report that when independent directors are recruited, the stock market reacts positively. Cotter et al. (1997) discover that independent directors boost target shareholder profits from tender offers when they examine mergers and acquisitions. Core, find a positive correlation between the percentage of independent directors and the market-to-book ratio. Nguyen and Nielsen (2010) reveal a large reduction in stock prices in reaction to the abrupt deaths of independent directors, implying that independent directors are crucial. Jenwittayaroje and Jiraporn (2017) investigate the influence of independent directors on business performance during the 2008 financial crisis and conclude that independent directors have a considerable positive effect on firm performance during the crisis.

[2] Additional studies on corporate diversification are Schoar (2002), Denis et al. (1997), Lins and Servaes (1999), Martin and Sayrak (2003), Mansi and Reeb (2002), Lins and Servaes (2002), Duchin (2010), Sakhartov (2017), Mackey et al. (2017), and Hoang et al. (2021)

2.2. Corporate culture

Corporate culture is a term that refers to an organization's common set of beliefs and values (Cremer, 1993; van den Steen, 2010; Li, Liu, Mai, and Zhang, 2020). In contrast to formal control systems based around rules and procedures, corporate culture is governed by peer pressure and the social construction of reality (Berger and Luckmann, 1967; Li, Liu, Mai, and Zhang, 2021). Corporate culture is an intangible asset that is designed to adapt to unforeseeable events as they occur (Li, Liu, Mai, and Zhang, 2021). With a few noteworthy exceptions, the finance literature has mostly ignored the potential importance of corporate culture. This is especially striking three decades after the revolution of the "incomplete contract" (Grossman and Hart, 1986; Guiso et al., 2015). If contracts are inadequate, culture and values will surely help compensate for the inefficiencies created by the contractual environment's inadequacy (Guiso et al., 2015).

In any event, there have been a few major studies on corporate culture. Guiso et al. (2015), for example, use a unique data set generated by the Great Place to Work Institute (GPTWI), which conducts extensive surveys of workers at over 1000 companies in the United States. They demonstrate that high levels of perceived integrity are associated with favorable outcomes such as higher output, stronger profitability, improved labor relations, and more appeal to potential job seekers.

More recently, Li et al. (2021a) measure the five corporate culture values of innovation, integrity, quality, respect, and teamwork for 62,664 firm-year observations from 2001 to 2018 using one of the most advanced machine learning techniques – the word embedding model – and 209,480 earnings call transcripts. Their results demonstrate that an innovative culture entails more than typical corporate innovation measurements such as R&D investments and patents. They also show that corporate culture is related to business outcomes such as operational efficiency, risk-taking, earnings management, executive pay design, firm value, and deal-making, and that the relationship between culture and performance is greater during difficult economic times.[3]

Ongsakul et al. (2021), employing Li et al.'s (2021a) data, find that corporate integrity is significantly strengthened when the firm is subject to more takeover threats. The findings are consistent with the argument that takeover threats, acting as an external governance mechanism, force managers to adopt corporate policies that are beneficial to shareholders in the long run, such as promoting a strong culture of integrity. Furthermore, they validate the results using the opportunistic timing of option grants, which has been extensively studied in prior research. Finally, Gorton et al. (2021) argue that a theory of the firm and of corporate decision-making that is grounded in corporate culture is more relevant to the practical realities of firms' inner workings than prevailing theories based on agency costs. Corporate culture has a strong potential to provide a theoretical framework for all corporate finance research.

Furthermore, prior research has employed other means to capture corporate culture. For instance, Belias and Koustelios (2015) and Caliskan and Zhu (2019) rely on questionnaires and surveys to gauge organizational culture. For instance, Belias and Koustelios (2015) use data obtained through questionnaires to identify leadership styles, job satisfaction, and organizational culture in Greece. Caliskan and Zhu (2019) also use interviews and document that hierarchy and market culture are the dominant culture attributes in Turkish universities. In addition to large corporations, prior research also studies corporate culture in small

and medium enterprises as well (Lorincová et al., 2022). These alternative methods to extract corporate culture serve as complement to the latest approach using machine learning and textual analysis.

2.3. Managerial risk aversion

One critical aspect of agency theory is the risk-sharing issues that develop when working parties have divergent views and when one party (for example, principals or owners) delegate responsibility to the other party (e.g., managerial agents). In particular, senior executives may face an agency conflict with shareholders over risk preferences. Shareholders, who are entitled to a firm's residual value, may diversify their risk exposure via their ownership portfolio and are therefore thought to be risk neutral. By contrast, managerial agents are unable to diversify their employment risk and hence are more risk averse. If corporate executives are required to bear considerable residual risks, they would seek much greater monetary incentives or make less risky judgments, resulting in sub-optimal corporate strategies (Hoskisson et al., 2009, 2017).

Managers often have the authority to alter corporate risk through the selection of investment initiatives. Managers may reduce business risk by picking projects with reduced cash flow volatility or investing in assets that stabilize the firm's revenue stream, such as diversification activities. Many studies presume that, when risk-averse managers are given the opportunity, they will take on suboptimal corporate risk. They do so to safeguard their company-specific human capital (Amihud and Lev, 1981; Smith and Stulz, 1985) and perquisite consumption (Williams, 1987), both of which are threatened by firm risk (Low, 2009).

2.4. Diversification and agency conflicts

Managerial risk aversion induces risk-averse managers to promote corporate diversification in order to reduce their firm-specific risk. Agency conflicts make it more likely that managers have the firm diversified beyond the optimal point that maximizes shareholders' wealth. Consistent with this argument, plenty of prior research shows that corporate diversification is associated with lower firm value (Shin and Stulz, 1998; Rajan et al., 2000; Lamont, 1997). Reinforcing the notion that corporate diversification is motivated by agency conflicts, several studies find that diversification can be explained by poor corporate governance. For instance, Hubbard and Palia (1999) find that greater pay-performance sensitivity (as measured by shares and options in management compensation packages) and a smaller board of directors mitigate the diversification discount. Additionally, Anderson et al. (2000) discover that CEOs of diversified firms possess lower stock ownership, greater salary, and less pay-performance sensitivity. Finally, May (1995) finds that CEOs who have a greater proportion of their own wealth invested in the company are more likely to adopt diversification strategies (Martin and Sayrak, 2003).

Similarly, Jiraporn et al. (2006), using Gompers et al.'s (2003) Governance Index to measure shareholder rights, report that weaker shareholder rights (hence more agency problems) bring about more diversification. Specifically, they document a 1.1–1.4% decline in firm value for each additional governance provision imposed on shareholders. Along the same lines, Jiraporn et al. (2008) document that firms with more busy directors are more diversified. Busy directors tend to be overstretched, not doing a proper job as effective monitors. Hence, busy directors constitute a weakened governance mechanism that allows opportunistic managers to diversify the firm unnecessarily.

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[3] Additional recent studies related to corporate culture include Zhao, Teng, and Wu (2018), Laio (2018), Islam, Tseng, and Karia (2019), and Fiordelisi, Renneboog, Ricci, and Lopes 2019, Marshall and Adamic (2010), Klein (2011), Iglesias, Iglesias, Sauquet, and Montana (2011), Mueller (2012), and Han (2012).

Supporting the argument based on agency theory, several prior studies using short and long-term event studies document the value destruction associated with corporate diversification. Agrawal et al. (1992) demonstrate that acquiring firms have a statistically significant loss of 10% in the five years after the merger. (Rau and Vermelan, 1998) discover that companies engaged in mergers underperform when compared to matched portfolios of similar size and book-to-market ratio. Megginson et al. (2001), examining the long-term abnormal returns associated with mergers that increase corporate diversification, report that mergers that reduce focus result in a 25% relative loss in stockholder wealth by the third year following the merger, and that each 10% reduction in focus results in a 9% loss in stockholder wealth (Martin and Sayrak, 2003).

2.5. Hypothesis development

Due to managerial risk aversion, managers tend to adopt corporate policies and strategies that are less risky. Because it is notoriously difficult to predict the future, it is probably more risky to promote only a few cultural attributes as none of those few attributes may be beneficial to the firm in the long run. By contrast, by fostering a larger number of cultural dimensions, it is more likely that at least some of the attributes will generate positive outcomes and enhance shareholder value. Therefore, it is less risky to be culturally diversified than culturally focused. Accordingly, risk-averse managers are expected to view cultural diversification favorably and invest to promote several cultural characteristics at the same time, rather than just a few. However, because of agency conflicts, managers are prone to promote cultural diversification beyond the optimal level. Outside independent directors, which constitute a more effective governance mechanism, mitigate the agency conflicts, and reduce the degree of cultural diversification, bringing it closer to the optimal level that maximizes shareholder value. According to this view, more independent directors lead to weaker cultural diversification. The evidence in the literature on corporate diversification supports this view. However, our study is the first to examine diversification using corporate culture.[4]

3. Sample formation and data description

3.1. Sample formation

Li et al. (2021a) provide the data on corporate culture. The data on director attributes are provided by The Institutional Shareholder Services (ISS). COMPUSTAT provides firm-specific characteristics. Where applicable, outliers are excluded. The total sample consists of 16,658 firm-year observations from 2001 to 2018.

3.2. Measuring corporate culture using machine learning

According to Li et al. (2021b), word embedding, a natural language model based on artificial neural networks, is capable of learning context-specific meanings for words and phrases. They offer a novel semi-supervised machine learning approach for developing a culture lexicon and quantifying corporate culture values using this model. They apply this method to 209,480 earnings call transcripts from 2001 to 2018 in order to generate

ratings for the top five corporate culture characteristics defined by Guiso et al. (2015): innovation, integrity, quality, respect, and teamwork. Additionally, they conduct many empirical analyses to validate their unique metric and demonstrate their approach's superiority over a variety of other approaches (Li Mai, Shen, and Yan, 2021). Li et al. (2021a) quantify the prevalence of each corporate culture attribute in each firm-year by dividing the total number of words in the document by the weighted count of words associated with each culture attribute. Li et al. (2021b) provide further information on how textual analysis and machine learning are utilized to assess corporate culture.

3.3. Measuring cultural diversification

Exploiting the cultural score for each of the five cultural attributes included in Guiso et al. (2015), we construct three measures of cultural diversification. First, we calculate the Herfindahl–Hirschman Index (HHI) based on the five cultural traits. HHI has been widely used in the literature to capture the degree of concentration. In the context of our study, we apply HHI to represent the degree of cultural diversification. HHI is higher when the firm's cultural attributes are concentrated in only a few categories. By contrast HHI is lower when the various cultural attributes are more dispersed. Therefore, a lower value of cultural HHI indicates more cultural diversification.

Second, we estimate the dominant cultural attribute index. Specifically, we identify the score of the most dominant cultural trait for each firm. Then, we calculate what percentage of the total score the score of the dominant trait represents. A larger value of this index suggests that the most dominant trait represents a larger proportion of the total score, implying less cultural diversification. A lower value of this index, on the other hand, indicates more cultural diversification.

Finally, we combine the cultural HHI and the dominant cultural attribute index into a single measure using principal component analysis. Essentially, we extract the first component from the principal component analysis and refer to it as the cultural diversification index (CDI). One crucial advantage of this approach is that it focuses exclusively on what the two measures have in common. To the extent that the errors on the two measures are less than perfectly correlated, the new index should be more accurate.

3.4. Additional variables and empirical modeling

We also include several variables that may influence cultural diversification. In terms of firm-specific attributes, we include firm size (Ln of total assets), profitability (EBIT/total assets), leverage (total debt/total assets), investments (capital expenditures/total assets), intangible assets (R&D/total assets and advertising expense/total assets), cash holdings (cash holdings/total assets), asset tangibility (fixed assets/total assets), and discretionary spending (SG&A expense/total assets). We also include board size (total number of directors).

In addition, we include the total culture score, which is the sum of the scores of the five cultural traits because the overall level of corporate culture may influence the degree of cultural diversification. To account for possible variations over time, we include year fixed effects. Crucially, to mitigate the omitted-variable bias, we include firm fixed effects, which control for time-invariant characteristics. The definitions of all the variables are displayed in the Appendix. Table 1 shows the summary statistics for the cultural diversification metrics, board attributes, and firm-specific characteristics.

Essentially, we estimate the following regression analysis

Cultural Diversification $_{it} = a + b$(*% Independent Directors*)$_{it} +$ c(*Controls*)$_{it}$ where i indexes firms and t indexes years.

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[4] It should be noted that our argument for cultural diversification is similar to the argument on corporate diversification, where the company invests in different industry or different geographic locations to achieve diversification. Corporate diversification usually involves significant investments. So, this is distinct from the lottery mentality, which involves a minimal cost relative to the possible reward.

Table 1
Summary statistics
Exploiting the cultural score for each of the five cultural attributes, we construct three measures of cultural diversification. First, we calculate the Herfindahl–Hirschman Index (HHI) based on the five cultural traits. Second, we calculate what percentage of the total score the score of the dominant trait represents. Finally, we combine the cultural HHI and the dominant cultural attribute index into a single measure using principal component analysis. Essentially, we extract the first component from the principal component analysis and refer to it as the cultural diversification index (CDI).

	Mean	S.D.	25th	Median	75th
Corporate culture & cultural diversification					
Culture HHI	28.253	5.873	24.158	26.916	30.799
% Largest culture attribute	0.395	0.091	0.328	0.380	0.446
Cultural Diversification Index (CDI)	0.000	1.392	−0.997	−0.271	0.683
Total culture score	5.480	2.443	3.714	5.003	6.764
Board attributes					
% Independent Directors	77.142	12.923	70.000	80.000	87.500
Board Size	2.292	0.214	2.197	2.303	2.398
Firm-specific characteristics					
Total Assets	10157.700	32725.730	789.667	2201.862	7063.758
Total debt/Total assets	0.234	0.180	0.079	0.227	0.348
EBIT/Total assets	0.097	0.081	0.054	0.091	0.138
Capital expenditures/Total assets	0.049	0.047	0.019	0.035	0.062
Advertising expense/Total assets	0.013	0.029	0.000	0.000	0.009
R&D expense/Total assets	0.027	0.046	0.000	0.000	0.037
Cash holdings/Total assets	0.149	0.157	0.031	0.092	0.216
Fixed assets/Total assets	0.535	0.391	0.215	0.429	0.803
SG&A expense/Total assets	0.214	0.184	0.077	0.175	0.306

4. Results

4.1. Main regression analysis

The firm-fixed-effects regression results are shown in Table 2, where the dependent variables are the three alternative measures of cultural diversification. The standard errors are clustered by firm and industry (2 digit SIC). The first three models in Table 2 include only the percentage of independent directors. The coefficients of board independence are all positive and significant. In Models 4, 5, and 6, we include all the control variables. Again, the coefficients of board independence remain significantly positive. Therefore, the results suggest that independent directors view cultural diversification unfavorably, corroborating the argument that risk-averse managers, motivated by agency problems, promote too many cultural traits, resulting in cultural over-diversification. More effective governance in the form of stronger board independence mitigates the agency conflict and lower the degree of cultural diversification, bringing it closer to the optimal level. Our hypothesis is supported by the evidence, which is based on agency theory.

In terms of economic significance, we estimate the magnitude of the effect of board independence on cultural diversification as follows. The coefficient of board independence in Model 6 Table 2 is 0.004. One standard deviation of the percentage of independent directors is 12.923. Therefore, a rise in board independence by one standard deviation raises the cultural diversification index by 0.004 times 12.923, which is 0.052. Because one standard deviation of the cultural diversification index is 1.392, a rise by 0.052 represents a 3.74% increase in cultural diversification after accounting for the effects of other board and firm-specific characteristics.

Notably, the coefficients of the total corporate culture score, which is a control variable, are negative and significant, suggesting that companies that invest more in corporate culture tend to exhibit more cultural diversification. This is sensible as firms with more resources probably spend more building a stronger corporate culture and are able to invest in several cultural attributes at the same time. By contrast, firms with fewer resources may target only a few cultural qualities only.

4.2. Propensity score matching (PSM)

Due to the inclusion of firm fixed effects in the regression analysis, our findings are not susceptible to the omitted-variable bias. In any event, to confirm the robustness of our findings, we perform propensity score matching (PSM) (Rosenbaum and Rubin, 1983; Lennox et al., 2011; Ongsakul et al., 2021; Chatjuthamard et al., 2021b; Ongsakul et al., 2021a; Chatjuthamard et al., 2021a). The sample is divided into quartiles according to the board's proportion of independent directors. The treatment group consists of observations from the distribution's upper quartile (greatest board independence). Then, for each observation in the treatment group, we choose the most similar observation from the remainder of the sample based on twelve firm and board characteristics (i.e., the twelve control variables included in the regression analysis). As a result, our treatment and control firms are almost identical in every visible attribute except for board independence.

We undertake diagnostic testing to confirm the reliability of our matching. The results are summarized in Table 3 Panel A. Model 1 is a logistic regression with a binary dependent variable equal to one if the company is in the treatment group (with the highest board independence), and zero if it is not. Model 1 encompasses the whole sample (pre-match). The findings indicate that the treatment firms are significantly different from the rest of the sample in a number of ways. Specifically, the treatment firms have larger board size, are larger in size, are more leveraged, make less capital investments, spend less on advertising, hold less cash, have more fixed assets and more discretionary spending. It is important to account for these material differences as they may distort our results.

For the propensity-score matched sample, Model 2 is a logistic regression (post-match). There are no statistically significant coefficients in Model 2. As a result, our treatment and control firms exhibit statistically comparable observable characteristics. To the degree that board independence is unimportant, our treatment and control firms' levels of cultural diversification should be similar. The regression results for the propensity-score matched sample are shown in Table 3 Panel B. In all models, the coefficients of board independence are significantly positive, indicating that increased board independence lowers cultural diversification substantially. Because the PSM results are consistent, we believe that endogeneity is unlikely to be a factor in our conclusion.

Table 2
The effect of board independence on cultural diversification
This table shows the results of a firm-fixed-effects regression analysis. Exploiting the cultural score for each of the five cultural attributes, we construct three measures of cultural diversification. First, we calculate the Herfindahl–Hirschman Index (HHI) based on the five cultural traits. Second, we calculate what percentage of the total score the score of the dominant trait represents. Finally, we combine the cultural HHI and the dominant cultural attribute index into a single measure using principal component analysis. Essentially, we extract the first component from the principal component analysis and refer to it as the cultural diversification index (CDI). For ease of interpretation, we multiply the culture HHI and the percentage of the largest culture attribute by 100.

	(1) Cultural HHI	(2) % Largest cultural attribute	(3) Cultural diversification index	(4) Cultural HHI	(5) % Largest cultural attribute	(6) Cultural diversification index
% Independent directors	**0.015*****	**0.024*****	**0.004*****	**0.015*****	**0.024*****	**0.004*****
	(2.913)	**(3.172)**	**(3.140)**	**(2.722)**	**(3.023)**	**(2.951)**
Ln (Board Size)				0.283	0.019	0.036
				(0.675)	(0.025)	(0.336)
Total culture score				−0.165***	−0.134**	−0.030***
				(−3.203)	(−2.194)	(−2.800)
Ln (Total assets)				−0.335	−0.331	−0.066
				(−1.553)	(−0.897)	(−1.223)
Total leverage				−0.295	−0.380	−0.065
				(−0.503)	(−0.355)	(−0.431)
Profitability				2.110**	3.059**	0.491**
				(2.199)	(2.131)	(2.213)
Capital investments				1.060	−0.432	0.094
				(0.603)	(−0.150)	(0.219)
Advertising intensity				8.551*	11.263	1.903
				(1.697)	(1.371)	(1.562)
R&D Intensity				3.019	4.024	0.676
				(0.714)	(0.596)	(0.665)
Cash holdings				2.040***	3.500***	0.517***
				(6.075)	(6.187)	(6.398)
Asset tangibility				1.379**	2.097**	0.329**
				(2.334)	(2.058)	(2.213)
Discretionary spending				−2.828*	−3.939*	−0.646*
				(−1.797)	(−1.690)	(−1.758)
Constant	27.111***	37.613***	−0.284***	29.175***	39.694***	0.126
	(69.283)	(63.331)	(−3.143)	(12.900)	(10.077)	(0.221)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,519	16,519	16,519	16,519	16,519	16,519
Adjusted R-squared	0.437	0.453	0.454	0.441	0.455	0.457

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

4.3. Entropy balancing

Earlier research has mostly depended on the assumption of observable selection. We overcome this assumption by using Hainmueller's (2012) entropy balancing approach, a variation on standard matching algorithms. By explicitly including covariate balance into the weight function applied to the sample units, entropy balancing in particular achieves a high degree of covariate balance (Hainmueller, 2012): (Balima, 2020; Ongsakul et al., 2021; Chatjuthamard et al., 2021a). Entropy balancing is explained in further details by Hainmueller (2012). This novel matching strategy has lately acquired traction in the literature (McMullin and Schonberger, 2020; Neuenkirch and Tillmann, 2016; Freier et al., 2015; Bol et al., 2020; Neuenkirch and Neumeier, 2016; Glendening et al., 2019; Ongsakul et al., 2021).

Our strategy for balancing entropy is described below. As our treatment group, we choose firms in the top quartile of board independence. The control group is made up of the remaining observations. Then, using entropy balancing, we match the mean, variance, and skewness of the observations in the two groups. Table 4 displays the regression results for the entropy-balanced sample. The coefficients of board independence continue to be positive and significant, reinforcing the hypothesis that board independence diminishes cultural diversification.

4.4. Instrumental-variable analysis (IV)

We also validate the findings using an instrumental-variable analysis, which has been widely adopted in the literature. We employ an instrumental variable based on geographic locations. In particular, we exploit the insight in Knyazeva et al. (2013), who find that the local supply of directors is an important factor in determining board composition. Companies tend to recruit directors locally and thus share the same pool of potential directors. Firms located nearby share the same pool of potential female directors and thus should exhibit a similar degree of board independence. We use the average degree of board independence of all firms within the same city as our instrument.

Furthermore, the location of a company's headquarters was often decided long ago, early in the organization's history, and it seldom changes throughout time (Pirinsky and Wang, 2006). Consequently, the headquarters location is probably exogenous to the firm's contemporaneous characteristics. This strategy, which is based on geographic location, has recently acquired prominence in the literature (Jiraporn et al., 2014; Chintrakarn et al., 2017, 2015).

The regression results are shown in Table 5. Model 1 is a first-stage regression in which the dependent variable is board independence. As predicted, the coefficient of the average degree of board independence of all firms in the same city is significantly positive. Model 2 is a second-stage regression with the dependent variable being cultural HHI. The coefficient of board independence instrumented from the first stage is significantly positive,

Table 3

Propensity score matching

Exploiting the cultural score for each of the five cultural attributes, we construct three measures of cultural diversification. First, we calculate the Herfindahl–Hirschman Index (HHI) based on the five cultural traits. Second, we calculate what percentage of the total score the score of the dominant trait represents. Finally, we combine the cultural HHI and the dominant cultural attribute index into a single measure using principal component analysis. Essentially, we extract the first component from the principal component analysis and refer to it as the cultural diversification index (CDI). For ease of interpretation, we multiply the culture HHI and the percentage of the largest culture attribute by 100.

Panel A: Diagnostic testing

	(1) Pre-match	(2) Post-match
	Treatment (High board independence)	Treatment (High board independence)
Ln (Board size)	3.291***	−0.347
	(11.872)	(−1.091)
Total culture score	0.026	−0.008
	(1.329)	(−0.367)
Ln (Total Assets)	0.172***	0.027
	(3.997)	(0.597)
Total leverage	0.909***	−0.166
	(3.311)	(−0.538)
Profitability	−0.113	−0.487
	(−0.202)	(−0.792)
Capital investments	−5.796***	1.305
	(−4.495)	(0.901)
Advertising intensity	−6.763***	0.260
	(−3.036)	(0.093)
R&D Intensity	−1.635	−2.044
	(−1.166)	(−1.307)
Cash holdings	−0.797**	0.074
	(−1.987)	(0.162)
Asset tangibility	0.843***	0.186
	(4.977)	(0.992)
Discretionary spending	0.912**	0.436
	(2.275)	(0.963)
Constant	−10.910***	1.052
	(−10.840)	(1.019)
Pseudo R-squared	0.186	0.086
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Observations	16,619	7,698

Panel B: The effect of board independence on cultural diversification

	(1) Cultural HHI	(2) % Largest cultural attribute	(3) Cultural diversification index
% Independent directors	**0.015****	**0.028****	**0.004****
	(2.193)	**(2.510)**	**(2.436)**
Ln (Board size)	−0.499	−0.752	−0.118
	(−0.826)	(−0.688)	(−0.763)
Total culture score	−0.206***	−0.206**	−0.041**
	(−3.031)	(−2.147)	(−2.640)
Ln (Total assets)	−0.611***	−0.840**	−0.139**
	(−2.705)	(−2.061)	(−2.486)
Total leverage	−0.447	−1.361	−0.159
	(−0.538)	(−0.916)	(−0.753)
Profitability	2.550	2.824	0.526
	(1.555)	(0.935)	(1.237)
Capital investments	2.589	0.900	0.382
	(0.918)	(0.213)	(0.581)
Advertising intensity	8.980	3.099	1.322
	(1.196)	(0.231)	(0.689)
R&D Intensity	2.613	4.392	0.655
	(0.343)	(0.403)	(0.387)
Cash holdings	2.648***	4.149***	0.641***
	(3.070)	(2.930)	(3.087)
Asset tangibility	−0.404	−0.272	−0.070
	(−0.574)	(−0.212)	(−0.381)
Discretionary spending	−2.861	−3.868	−0.645
	(−1.294)	(−1.001)	(−1.151)
Constant	34.536***	47.640***	1.388*
	(12.978)	(8.669)	(1.913)
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	7,433	7,433	7,433
R-squared	0.554	0.566	0.569

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

Table 4
Entropy balancing

Exploiting the cultural score for each of the five cultural attributes, we construct three measures of cultural diversification. First, we calculate the Herfindahl–Hirschman Index (HHI) based on the five cultural traits. Second, we calculate what percentage of the total score the score of the dominant trait represents. Finally, we combine the cultural HHI and the dominant cultural attribute index into a single measure using principal component analysis. Essentially, we extract the first component from the principal component analysis and refer to it as the cultural diversification index (CDI). For ease of interpretation, we multiply the culture HHI and the percentage of the largest culture attribute by 100.

	(1) Cultural HHI	(2) % Largest cultural attribute	(3) Cultural Diversification Index
% Independent directors	**0.017****	**0.028*****	**0.004****
	(2.477)	**(2.692)**	**(2.650)**
Ln (Board size)	−0.530	−0.906	−0.134
	(−0.774)	(−0.704)	(−0.745)
Total culture score	−0.212***	−0.242***	−0.044***
	(−3.946)	(−3.102)	(−3.581)
Ln (Total assets)	−0.597***	−0.833**	−0.136**
	(−2.971)	(−2.093)	(−2.555)
Total leverage	−0.698	−1.573	−0.206
	(−0.812)	(−1.193)	(−1.010)
Profitability	2.787*	2.524	0.531
	(1.759)	(0.934)	(1.348)
Capital investments	1.783	−0.526	0.174
	(0.782)	(−0.152)	(0.324)
Advertising intensity	10.779	8.599	1.965
	(1.238)	(0.560)	(0.885)
R&D Intensity	6.916	14.219	1.936
	(1.216)	(1.590)	(1.459)
Cash holdings	2.412***	4.181***	0.615***
	(3.092)	(3.273)	(3.292)
Asset tangibility	0.180	0.430	0.055
	(0.243)	(0.326)	(0.290)
Discretionary spending	−2.580	−3.956	−0.617
	(−1.432)	(−1.185)	(−1.313)
Constant	33.951***	47.621***	1.316
	(10.613)	(7.916)	(1.567)
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	16,519	16,519	16,519
R-squared	0.548	0.552	0.558

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

confirming that more independent directors weaken cultural diversification. Model 3 and Model 4 have the other two alternative measures of cultural diversification as dependent variables. The results remain similar. Because an IV analysis is substantially less susceptible to endogeneity, our conclusion is probably not tainted by endogeneity.

4.5. Oster's (2019) approach for testing coefficient stability

Additionally, to ensure that our findings are not skewed by the omitted-variable bias, we exploit (Oster, 2019) insight and calculate the magnitude of the effect of the unobservables required to overcome the effect of the observables, potentially making our conclusions less valid (Chintrakarn et al., 2020). By applying Oster's (2019) technique on our regressions in Table 2, we determine that the influence of the unobservables would have to be more than 2.34–4.06 times that of the observables to invalidate our results. If the ratio is greater than one, the findings are typically considered robust in the literature. As a consequence, our results do not seem to be subject to the omitted-variable bias.

4.6. Sarbanes-Oxley act

Several prior studies that investigate the effect of board independence adopt a quasi-natural experiment based on the Sarbanes-Oxley Act (SOX) of 2002, which forced certain firms to raise their board independence. The law acted as an exogenous shock and is much more likely to show a causal effect. Several recent studies in the literature exploit this exogenous shock as a quasi-natural experiment and explore the effects of board independence on various corporate outcomes, strategies, and policies,

such as director characteristics, director costs, CEO compensation, CEO turnover, managerial ownership, corporate risk-taking, innovation productivity, external audit quality, CEO power, corporate social responsibility (CSR), executive risk-taking incentives, CSR inequality, CEO general managerial skills, and redeployable assets (Engel et al., 2007; Leuz et al., 2008; Piotroski and Srinivasan, 2008; Chhaochharia and Grinstein, 2009; Guthrie et al., 2012; Kamar et al., 2009; Linck et al., 2009; Guo and Masulis, 2015; Jiraporn and Nimmanunta, 2018; Jiraporn and Lee, 2018; Jiraporn et al., 2018, 2016; Chintrakarn et al., 2020; Ongsakul et al., 2020a; Ongsakul and Jiraporn, 2019; Ongsakul et al., 2019; Padungsaksawasdi et al., 2021b).

It is challenging, however, to implement this identification strategy in the context of our study. The primary reason is the sample period. The data on corporate culture from (Li et al., 2021a) are available from 2001 to 2018. So, because SOX was enacted in 2002, there are only a few observations for the period before the passage of SOX. The numbers of observations in the earlier years in the sample period are lower than those towards the end of the sample period. It is therefore difficult to execute this empirical strategy in our study. We run an analysis using this strategy but obtain insignificant result. This is not surprising, however, given the nature of the data and the sample period discussed above.

5. Conclusions

A company's corporate culture may be defined as the common views or preferences held by its personnel inside the organization (Cremer, 1993; van den Steen, 2010; Li et al., 2021b) . In spite

Table 5
Instrumental-variable analysis
This table shows an instrumental-variable analysis where the average percentage of board independence is used as our instrumental variable. Exploiting the cultural score for each of the five cultural attributes, we construct three measures of cultural diversification. First, we calculate the Herfindahl–Hirschman Index (HHI) based on the five cultural traits. Second, we calculate what percentage of the total score the score of the dominant trait represents. Finally, we combine the cultural HHI and the dominant cultural attribute index into a single measure using principal component analysis. Essentially, we extract the first component from the principal component analysis and refer to it as the cultural diversification index (CDI). For ease of interpretation, we multiply the culture HHI and the percentage of the largest culture attribute by 100.

	(1) First stage	(2) Second stage	(3) Second stage	(4) Second stage
	% Independent directors	Cultural HHI	% Largest cultural attribute	Cultural diversification Index
% Independent directors (City average)	**0.898*****			
	(57.939)			
% Independent directors (Instrumented)		**0.018****	**0.030*****	**0.005*****
		(2.448)	**(2.689)**	**(2.631)**
Ln (Board size)	0.970	0.279	0.011	0.034
	(1.096)	(0.798)	(0.020)	(0.422)
Total culture score	0.058	−0.165***	−0.134***	−0.030***
	(1.110)	(−6.412)	(−3.400)	(−5.037)
Ln (Total assets)	0.867**	−0.339**	−0.339*	−0.067**
	(2.235)	(−2.537)	(−1.655)	(−2.150)
Total leverage	−1.184	−0.294	−0.378	−0.065
	(−1.248)	(−0.759)	(−0.637)	(−0.715)
Profitability	−1.690	2.117***	3.073***	0.493***
	(−1.079)	(2.937)	(2.781)	(2.930)
Capital investments	−0.419	1.068	−0.417	0.096
	(−0.129)	(0.697)	(−0.178)	(0.269)
Advertising intensity	−20.172*	8.611**	11.381*	1.920**
	(−1.793)	(2.088)	(1.800)	(1.993)
R&D Intensity	−6.338	3.043	4.070	0.682
	(−0.911)	(1.000)	(0.873)	(0.960)
Cash holdings	4.305***	2.024***	3.468***	0.513***
	(4.215)	(3.831)	(4.282)	(4.155)
Asset tangibility	2.810***	1.368***	2.075***	0.326***
	(2.736)	(3.721)	(3.682)	(3.793)
Discretionary spending	5.477***	−2.853***	−3.988***	−0.653***
	(2.834)	(−3.579)	(−3.264)	(−3.507)
Constant	−5.356			
	(−1.361)			
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	16,653	16,519	16,519	16,519
Adjusted R-squared	0.820	0.443	0.448	0.454

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

of its importance, there has been very little empirical research on corporate culture as a result of the difficulty in measuring and quantifying corporate culture. Our research addresses this void in the literature. Exploiting a novel measure of corporate culture obtained from advanced machine learning and textual analysis, we explore a crucial, yet neglected, aspect of corporate culture, i.e., corporate cultural diversification. A firm is culturally diversified if it is characterized by a variety of corporate culture attributes.

Based on agency theory, our hypothesis posits that managers, who are typically more risk-averse than shareholders, prefer cultural diversification as the diversification effect helps dampen the firm's idiosyncratic risk. However, because of agency conflicts, risk-averse managers tend to over-invest in cultural diversification. Agency problems are mitigated when corporate governance is more effective. Thus, a higher level of board independence, which constitutes a stronger effective governance mechanism, helps alleviate the agency conflict, lowering the degree of cultural diversification and bringing it closer to the optimal level where shareholder value is maximized. Based on a large sample of U.S. firms, our empirical results strongly corroborate this hypothesis, demonstrating that a higher percentage of independent directors on the board result in a significantly lower level of cultural diversification. The results are robust as we employ three alternative measures of cultural diversification and subject the results to a wide variety of robustness checks, including propensity

score matching, entropy balancing, instrumental-variable analysis, and (Oster, 2019) method for testing coefficient stability. All the robustness checks strongly validate the findings.

Our study is the first to explore the concept of cultural diversification using an innovative measure of corporate culture recently developed in the literature. Our research is also the first to link cultural diversification to agency theory and corporate governance, potentially opening up a new area of research where the link between corporate culture and corporate governance is explored together. Our findings extend several key areas of the literature, including corporate culture, agency theory, corporate diversification, managerial risk aversion, and machine learning and textual analysis. We demonstrate that cultural diversification is an important facet of corporate culture and deserves to be investigated further in future research.

CRediT authorship contribution statement

Pongsapak Chindasombatcharoen: Writing – review & editing, Funding acquisition, Validation. **Pattanaporn Chatjuthamard:** Conceptualization, Funding acquisition, Validation, Writing – review & editing. **Pornsit Jiraporn:** Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing.

Appendix

See Table A.1.

Table A.1
Variable definitions.

Variable	Definition
Corporate culture	
Culture HHI	The Herfindahl–Hirschman Index based on the five cultural attributes
% Largest culture attribute	The percentage of the total culture score account for by the largest cultural attribute
Cultural Diversification Index (CDI)	The first component from a principal component analysis combining the other two measures of cultural diversification
Total culture score	The total score of all the five cultural attributes
Board Attributes	
% Independent directors	Proportion of independent directors on the board
Board size	Total number of directors on the board
Firm-specific characteristics	
Firm Size	Total Assets
Total leverage	Total Debt/Total Assets
Profitability	EBIT/Total Assets
Capital investments	Capital Expenditures/Total Assets
Advertising intensity	Advertising Expense/Total Assets
R&D Intensity	R&D Expense/Total Assets
Cash holdings	Cash Holdings/Total Assets
Asset tangibility	Fixed Assets/Total Assets
Discretionary spending	SG&A Expense/Total Assets

References

Agrawal, A., Jaffe, J.F., Mandelker, G.N., 1992. The post-merger performance of acquiring firms: A re-examination of an anomaly. J. Finance 47 (4), 1605–1621. http://dx.doi.org/10.1111/j.1540-6261.1992.tb04674.

Allee, K.D., DeAngelis, M.D., 2015. The structure of voluntary disclosure narratives: Evidence from tone dispersion. J. Account. Res. 53 (2), 241–274. http://dx.doi.org/10.1111/1475-679x.12072.

Amihud, Y., Lev, B., 1981. Risk reduction as a managerial motive for conglomerate mergers. Bell J. Econ. 12 (2), 605. http://dx.doi.org/10.2307/3003575.

Anderson, R.C., Bates, T.W., Bizjak, J.M., Lemmon, M.L., 2000. Corporate governance and firm diversification. Financial Manag. 29 (1), 5. http://dx.doi.org/10.2307/3666358.

Antweiler, W., Frank, M.Z., 2004. Is all that talk just noise? The information content of internet stock message boards. J. Finance 59 (3), 1259–1294. http://dx.doi.org/10.1111/j.1540-6261.2004.00662.x.

Baker, S.R., Bloom, N., Davis, S.J., 2016a. Measuring economic policy uncertainty*. Q. J. Econ. 131 (4), 1593–1636. http://dx.doi.org/10.1093/qje/qjw024.

Baker, S.R., Bloom, N., Davis, S.J., 2016b. Measuring economic policy uncertainty*. Q. J. Econ. 131 (4), 1593–1636. http://dx.doi.org/10.1093/qje/qjw024.

Balima, H.W., 2020. Coups d'état and the cost of debt. J. Comp. Econ. 48 (3), 509–528. http://dx.doi.org/10.1016/j.jce.2020.04.001.

Belias, D., Koustelios, A., 2015. Leadership style job satisfaction, and organizational culture in the greek banking organization. J. Manag. Res. 15 (2), 101–110.

Berger, P.L., Luckmann, T., 1967. Aspects sociologiques du pluralisme. Arch. Sci. Soc. Religions 23 (1), 117–127. http://dx.doi.org/10.3406/assr.1967.2621.

Bodnaruk, A., Loughran, T., McDonald, B., 2015. Using 10-K text to gauge financial constraints. J. Financ. Quant. Anal. 50 (4), 623–646. http://dx.doi.org/10.1017/s0022109015000411.

Bol, D., Giani, M., Blais, A., Loewen, P.J., 2020. The effect of COVID-19 lockdowns on political support: Some good news for democracy? Euro. J. Polit. Res. 60 (2), 497–505. http://dx.doi.org/10.1111/1475-6765.12401.

Bonaime, A., Gulen, H., Ion, M., 2018. Does policy uncertainty affect mergers and acquisitions? J. Financ. Econ. 129 (3), 531–558. http://dx.doi.org/10.1016/j.jfineco.2018.05.007.

Caliskan, A., Zhu, C., 2019. Organizational culture type in turkish universities using OCAI: Perceptions of students. J. Edu. Culture Soc. 10 (2), 270–292. http://dx.doi.org/10.15503/JECS20192.270.292.

Chatjuthamard, P., Jiraporn, P., Lee, S.M., 2021a. Does board gender diversity weaken or strengthen executive risk-taking incentives? PLoS One 16 (10), e0258163. http://dx.doi.org/10.1371/journal.pone.0258163.

Chatjuthamard, P., Jiraporn, P., Treepongkaruna, S., 2021b. How do independent directors view generalist vs specialist CEOs? evidence from an exogenous regulatory shock. International Review of Financial Analysis 78, 101957. http://dx.doi.org/10.1016/j.irfa.2021.101957.

Chatjuthamard, P., Treepongkaruna, S., Jiraporn, P., Jiraporn, N., 2021d. Does firm-level political risk influence corporate social responsibility (CSR)? Evidence from earnings conference calls. Financ. Rev. 56 (4), 721–741. http://dx.doi.org/10.1111/fire.12263.

Chatjuthamard, P., Wongboonsin, P., Kongsompong, K., Jiraporn, P., 2020. Does economic policy uncertainty influence executive risk-taking incentives? Finance Res. Lett. 37, 101385. http://dx.doi.org/10.1016/j.frl.2019.101385.

Chen, H., De, P., Hu, Y.J., Hwang, B.H., 2014. Wisdom of crowds: The value of stock opinions transmitted through social media. Rev. Financ. Stud. 27 (5), 1367–1403. http://dx.doi.org/10.1093/rfs/hhu001.

Chhaochharia, V., Grinstein, Y., 2009. CEO compensation and board structure. J. Finance 64 (1), 231–261. http://dx.doi.org/10.1111/j.1540-6261.2008.01433.x.

Chintrakarn, P., Jiraporn, P., Jiraporn, N., Davidson, T., 2017. Estimating the effect of corporate social responsibility on firm value using geographic identification. Asia-Pacific J. Financial Stud. 46 (2), 276–304. http://dx.doi.org/10.1111/ajfs.12170.

Chintrakarn, P., Jiraporn, P., Tong, S., Chatjuthamard, P., 2015. Estimating the effect of entrenched boards on firm value using geographic identification. Finance Res. Lett. 12, 109–116. http://dx.doi.org/10.1016/j.frl.2014.11.002.

Chintrakarn, P., Jiraporn, P., Tong, S., Jiraporn, N., Proctor, R., 2020. How do independent directors view corporate social responsibility (CSR)? Evidence from a quasi-natural experiment. Financ. Rev. 55 (4), 697–716. http://dx.doi.org/10.1111/fire.12244.

Core, J., Holthausen, R.W., Larcker, D.F., 1996. The financial performance of reverse leveraged buyouts. J. Financ. Econ. 42 (3), 293–332. http://dx.doi.org/10.1016/0304-405x(96)00884-7.

Cotter, J.F., Shivdasani, A., Zenner, M., 1997. Do independent directors enhance target shareholder wealth during tender offers? J. Financ. Econ. 43 (2), 195–218. http://dx.doi.org/10.1016/s0304-405x(96)00886-0.

Cremer, J., 1993. Corporate culture and shared knowledge*. Ind. Corp. Change 2 (3), 351–386. http://dx.doi.org/10.1093/icc/2.3.351.

Davis, A.K., Ge, W., Matsumoto, D., Zhang, J.L., 2014. The effect of manager-specific optimism on the tone of earnings conference calls. Rev. Account. Stud. 20 (2), 639–673. http://dx.doi.org/10.1007/s11142-014-9309-4.

Davis, A.K., Tama-Sweet, I., 2012. Managers' use of language across alternative disclosure outlets: Earnings press releases versus MD & a*. Contemp. Account. Res. 29 (3), 804–837. http://dx.doi.org/10.1111/j.1911-3846.2011.01125.x.

Denis, D.J., Denis, D.K., Sarin, A., 1997. Agency problems equity ownership, and corporate diversification. J. Finance 52 (1), 135–160. http://dx.doi.org/10.1111/j.1540-6261.1997.tb03811.x.

Duchin, R., 2010. Cash holdings and corporate diversification. J. Finance 65 (3), 955–992. http://dx.doi.org/10.1111/j.1540-6261.2010.01558.x.

Engel, E., Hayes, R.M., Wang, X., 2007. The Sarbanes–Oxley Act and firms' going-private decisions. J. Account. Econ. 44 (1–2), 116–145. http://dx.doi.org/10.1016/j.jacceco.2006.07.002.

Ertugrul, M., Lei, J., Qiu, J., Wan, C., 2017. Annual report readability tone ambiguity, and the cost of borrowing. J. Financial Quant. Anal. 52 (2), 811–836. http://dx.doi.org/10.1017/s0022109017000187.

Freier, R., Schumann, M., Siedler, T., 2015. The earnings returns to graduating with honors — Evidence from law graduates. Lab. Econ. 34, 39–50. http://dx.doi.org/10.1016/j.labeco.2015.03.001.

Glendening, M., Mauldin, E.G., Shaw, K.W., 2019. Determinants and consequences of quantitative critical accounting estimate disclosures. Account. Rev. 94 (5), 189–218. http://dx.doi.org/10.2308/accr-52368.

Gorton, G.B., Grennan, J., Zentefis, A., 2021. Corporate culture. SSRN Electr. J. http://dx.doi.org/10.2139/ssrn.3928972, Published.

Graham, J.R., Harvey, C.R., Rajgopal, S., 2017. Corporate culture: Evidence from the field. SSRN Electr. J. http://dx.doi.org/10.2139/ssrn.2805602, Published.

Griffin, D., Li, K., Xu, T., 2021. Board gender diversity and corporate innovation: International evidence. J. Financ. Quant. Anal. 56 (1), 123–154. http://dx.doi.org/10.1017/s002210901900098x.

Grossman, S.J., Hart, O.D., 1986. The costs and benefits of ownership: A theory of vertical and lateral integration. J. Polit. Econ. 94 (4), 691–719. http://dx.doi.org/10.1086/261404.

Guiso, L., Sapienza, P., Zingales, L., 2015. The value of corporate culture. J. Financ. Econ. 117 (1), 60–76. http://dx.doi.org/10.1016/j.jfineco.2014.05.010.

Guo, L., Masulis, R.W., 2015. Board structure and monitoring: New evidence from CEO turnovers. Rev. Financ. Stud. 28 (10), 2770–2811. http://dx.doi.org/10.1093/rfs/hhv038.

Guthrie, K., Sokolowsky, J., Wan, K.M., 2012. CEO compensation and board structure revisited. J. Finance 67 (3), 1149–1168. http://dx.doi.org/10.1111/j.1540-6261.2012.01744.

Hainmueller, J., 2012. Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies. Polit. Anal. 20 (1), 25–46. http://dx.doi.org/10.1093/pan/mpr025.

Hassan, T.A., Hollander, S., Lent, L.van., Tahoun, A., 2019. Firm-level political risk: Measurement and effects*. Q. J. Econ. 134 (4), 2135–2202. http://dx.doi.org/10.1093/qje/qjz021.

Hoang, K., Nguyen, C., Zhang, H., 2021. How does economic policy uncertainty affect corporate diversification? Int. Rev. Econ. Finance 72, 254–269. http://dx.doi.org/10.1016/j.iref.2020.11.008.

Hoskisson, R.E., Castleton, M.W., Withers, M.C., 2009. Complementarity in monitoring and bonding: More intense monitoring leads to higher executive compensation. Acad. Manag. Perspect. 23 (2), 57–74. http://dx.doi.org/10.5465/amp.2009.39985541.

Hoskisson, R.E., Chirico, F., Zyung, J.D., Gambeta, E., 2017. Managerial risk taking. J. Manag. 43 (1), 137–169. http://dx.doi.org/10.1177/0149206316671583.

Hubbard, R.G., Palia, D., 1999. A reexamination of the conglomerate merger wave in the 1960s: An internal capital markets view. J. Finance 54 (3), 1131–1152. http://dx.doi.org/10.1111/0022-1082.00139.

Jenwittayaroje, N., Jiraporn, P., 2017. Do independent directors improve firm value? Evidence from the great recession. Int. Rev. Finance 19 (1), 207–222. http://dx.doi.org/10.1111/irfi.12163.

Jiraporn, P., Jiraporn, N., Boeprasert, A., Chang, K., 2014. Does corporate social responsibility (CSR) improve credit ratings? Evidence from geographic identification. Financial Manag. 43 (3), 505–531. http://dx.doi.org/10.1111/fima.12044.

Jiraporn, P., Jumreornvong, S., Jiraporn, N., Singh, S., 2016. How do independent directors view powerful CEOs? Evidence from a quasi-natural experiment. Finance Res. Lett. 16, 268–274. http://dx.doi.org/10.1016/j.frl.2015.12.008.

Jiraporn, P., Kim, Y.S., Davidson, W.N., 2008. Multiple directorships and corporate diversification. J. Empir. Financ. 15 (3), 418–435. http://dx.doi.org/10.1016/j.jempfin.2007.07.002.

Jiraporn, P., Kim, Y.S., Davidson, W.N., Singh, M., 2006. Corporate governance shareholder rights and firm diversification: An empirical analysis. J. Bank. Finance 30 (3), 947–963. http://dx.doi.org/10.1016/j.jbankfin.2005.08.005.

Jiraporn, P., Lee, S.M., 2018. How do independent directors influence corporate risk-taking? Evidence from a quasi-natural experiment. Int. Rev. Finance 18 (3), 507–519. http://dx.doi.org/10.1111/irfi.12144.

Jiraporn, P., Lee, S.M., Park, K.J., Song, H., 2018. How do independent directors influence innovation productivity? A quasi-natural experiment. Appl. Econ. Lett. 25 (7), 435–441. http://dx.doi.org/10.1080/13504851.2017.1329927.

Jiraporn, P., Nimmanunta, K., 2018. Estimating the effect of board independence on managerial ownership using a quasi-natural experiment. Appl. Econ. Lett. 25 (17), 1237–1243. http://dx.doi.org/10.1080/13504851.2017.1412072.

Kamar, E., Karaca-Mandic, P., Talley, E., 2009. Going-private decisions and the sarbanes-oxley act of 2002: A cross-country analysis. J. Law Econ. Org. 25 (1), 107–133. http://dx.doi.org/10.1093/jleo/ewn019.

Knyazeva, A., Knyazeva, D., Masulis, R.W., 2013. The supply of corporate directors and board independence. Rev. Financ. Stud. 26 (6), 1561–1605. http://dx.doi.org/10.1093/rfs/hht020.

Lamont, O., 1997. Cash flow and investment: Evidence from internal capital markets. J. Finance 52 (1), 83–109. http://dx.doi.org/10.1111/j.1540-6261.1997.tb03809.x.

Lennox, C.S., Francis, J.R., Wang, Z., 2011. Selection models in accounting research. Account. Rev. 87 (2), 589–616. http://dx.doi.org/10.2308/accr-10195.

Leuz, C., Triantis, A., Wang, T.Yue., 2008. Why do firms go dark? Causes and economic consequences of voluntary SEC deregistrations. J. Account. Econ. 45 (2–3), 181–208. http://dx.doi.org/10.1016/j.jacceco.2008.01.001.

Li, K., Liu, X., Mai, F., Zhang, T., 2021a. The role of corporate culture in bad times: Evidence from the COVID-19 pandemic. J. Financ. Quant. Anal. 1–68. http://dx.doi.org/10.1017/s0022109021000326.

Li, K., Mai, F., Shen, R., Yan, X., 2021b. Measuring corporate culture using machine learning. Rev. Financ. Stud. 34 (7), 3265–3315. http://dx.doi.org/10.1093/rfs/hhaa079.

Linck, J., Netter, J., Yang, T., 2009. The determinants of board structure ☆. J. Financ. Econ. 87 (2), 308–328. http://dx.doi.org/10.1016/j.jfineco.2007.03.004.

Lins, K., Servaes, H., 1999. International evidence on the value of corporate diversification. J. Finance 54 (6), 2215–2239. http://dx.doi.org/10.1111/0022-1082.00186.

Lins, K.V., Servaes, H., 2002. Is corporate diversification beneficial in emerging markets? Financial Manag. 31 (2), 5. http://dx.doi.org/10.2307/3666220.

Lorincová, S., Miklošík, A., Hitka, M., 2022. The role of corporate culture in economic development of small and medium-sized enterprises. Technol. Econ. Dev. Econ. 28 (1), 220–238. http://dx.doi.org/10.3846/TEDE.2021.15983.

Loughran, T., McDonald, B., 2016. Textual analysis in accounting and finance: A survey. J. Account. Res. 54 (4), 1187–1230. http://dx.doi.org/10.1111/1475-679x.12123.

Loughran, T., McDonald, B., 2020. Measuring firm complexity. SSRN Electr. J. http://dx.doi.org/10.2139/ssrn.3645372, Published.

Low, A., 2009. Managerial risk-taking behavior and equity-based compensation☆. J. Financ. Econ. 92 (3), 470–490. http://dx.doi.org/10.1016/j.jfineco.2008.05.004.

Mackey, T.B., Barney, J.B., Dotson, J.P., 2017. Corporate diversification and the value of individual firms: A Bayesian approach. Strateg. Manag. J. 38 (2), 322–341. http://dx.doi.org/10.1002/smj.2480.

Mansi, S.A., Reeb, D.M., 2002. Corporate diversification: What gets discounted? J. Finance 57 (5), 2167–2183. http://dx.doi.org/10.1111/0022-1082.00492.

Martin, J.D., Sayrak, A., 2003. Corporate diversification and shareholder value: a survey of recent literature. J. Corp. Finance 9 (1), 37–57. http://dx.doi.org/10.1016/s0929-1199(01)00053-0.

May, D.O., 1995. Do managerial motives influence firm risk reduction strategies? J. Finance 50 (4), 1291–1308. http://dx.doi.org/10.1111/j.1540-6261.1995.tb04059.x.

McMullin, J.L., Schonberger, B., 2020. Entropy-balanced accruals. Rev. Account. Stud. 25 (1), 84–119. http://dx.doi.org/10.1007/s11142-019-09525-9.

Megginson, W.L., Morgan, A., Nail, L.A., 2001. Changes in corporate focus, ownership structure, and long-run merger returns. SSRN Electr. J. http://dx.doi.org/10.2139/ssrn.250993, Published.

Neuenkirch, M., Neumeier, F., 2016. The impact of US sanctions on poverty. J. Dev. Econ. 121, 110–119. http://dx.doi.org/10.1016/j.jdeveco.2016.03.005.

Neuenkirch, M., Tillmann, P., 2016. DOES a GOOD CENTRAL BANKER MAKE a difference? Econ. Inq. 54 (3), 1541–1560. http://dx.doi.org/10.1111/ecin.12326.

Nguyen, B.D., Nielsen, K.M., 2010. The value of independent directors: Evidence from sudden deaths. J. Financ. Econ. 98 (3), 550–567. http://dx.doi.org/10.1016/j.jfineco.2010.07.004.

Nguyen, N.H., Phan, H.V., 2017. Policy uncertainty and mergers and acquisitions. J. Financ. Quant. Anal. 52 (2), 613–644. http://dx.doi.org/10.1017/s0022109017000175.

Ongsakul, V., Chatjuthamard, P., Jiraporn, P., Chaivisuttangkun, S., 2021. Corporate integrity and hostile takeover threats: Evidence from machine learning and CEO luck. J. Behav. Exper. Finance 32, 100579. http://dx.doi.org/10.1016/j.jbef.2021.100579.

Ongsakul, V., Jiraporn, P., 2019. How do independent directors view powerful executive risk-taking incentives? A quasi-natural experiment. Finance Res. Lett. 31, http://dx.doi.org/10.1016/j.frl.2018.12.016.

Ongsakul, V., Jiraporn, N., Jiraporn, P., 2020a. Exploring how independent directors view CSR inequality using a quasi-natural experiment. Corp. Gov. Int. J. Bus. Soc. 20 (6), 1159–1172. http://dx.doi.org/10.1108/cg-03-2020-0086.

Ongsakul, V., Jiraporn, P., Tong, S., Treepongkaruna, S., 2020b. The effect of corporate social responsibility (CSR) on shareholder value: evidence from the 9/11 terrorist attack. Account. Res. J. 34 (1), 91–105. http://dx.doi.org/10.1108/arj-10-2019-0204.

Ongsakul, V., Jiraporn, P., Treepongkaruna, S., 2019. Does managerial ownership influence corporate social responsibility (CSR)? The role of economic policy uncertainty. Account. Finance 61 (1), 763–779. http://dx.doi.org/10.1111/acfi.12592.

Ongsakul, V., Treepongkaruna, S., Jiraporn, P., Uyar, A., 2021a. Do firms adjust corporate governance in response to economic policy uncertainty? Evidence from board size. Finance Res. Lett. 39, 101613. http://dx.doi.org/10.1016/j.frl.2020.101613.

Ongsakul, V., Treepongkaruna, S., Jiraporn, P., Uyar, A., 2021b. Do firms adjust corporate governance in response to economic policy uncertainty? Evidence from board size. Finance Res. Lett. 39, 101613. http://dx.doi.org/10.1016/j.frl.2020.101613.

O'Reilly, C., 1989. Corporations culture, and commitment: motivation and social control in organizations. California Manag. Rev. 31 (4), 9–25. http://dx.doi.org/10.2307/41166580.

Oster, E., 2019. Unobservable selection and coefficient stability: Theory and evidence. J. Bus. Econom. Statist. 37 (2), 187–204. http://dx.doi.org/10.1080/07350015.2016.1227711.

Padungsaksawasdi, C., Treepongkaruna, S., Jiraporn, P., 2021a. LGBT-Supportive Corporate Policies, Risk Aversion and Mitigation, and Economic Policy Uncertainty. Working paper, Pennsylvania State University-Great Valley School of Graduate Professional Studies.

Padungsaksawasdi, C., Treepongkaruna, S., Jiraporn, P., Uyar, A., 2021b. Does board independence influence asset redeployability? Evidence from a quasi-natural experiment. Corp. Gov. Int. J. Bus. Soc. http://dx.doi.org/10.1108/cg-06-2021-0218, ahead-of(ahead-of-print).

Piotroski, J.D., Srinivasan, S., 2008. Regulation and bonding: The sarbanes-oxley act and the flow of international listings. J. Account. Res. 46 (2), 383–425. http://dx.doi.org/10.1111/j.1475-679x.2008.00279.x.

Pirinsky, C., Wang, Q., 2006. Does corporate headquarters location matter for stock returns? J. Finance 61 (4), 1991–2015. http://dx.doi.org/10.1111/j.1540-6261.2006.00895.x.

Rajan, R., Servaes, H., Zingales, L., 2000. The cost of diversity: The diversification discount and inefficient investment. J. Finance 55 (1), 35–80. http://dx.doi.org/10.1111/0022-1082.00200.

Rau, R., Vermelan, T., 1998. Glamour value and the post-acquisition performance of acquiring firms. J. Financial Econ. 49 (2), 223–253. http://dx.doi.org/10.1016/s0304-405x(98)00023-3.

Rosenbaum, P.R., Rubin, D.B., 1983. The central role of the propensity score in observational studies for causal effects. Biometrika 70 (1), 41–55. http://dx.doi.org/10.1093/biomet/70.1.41.

Rosenstein, S., Wyatt, J.G., 1990. Outside directors board independence, and shareholder wealth. J. Financial Econ. 26 (2), 175–191. http://dx.doi.org/10.1016/0304-405x(90)90002-h.

Sakhartov, A.V., 2017. Economies of scope resource relatedness, and the dynamics of corporate diversification. Strateg. Manag. J. 38 (11), 2168–2188. http://dx.doi.org/10.1002/smj.2654.

Schoar, A., 2002. Effects of corporate diversification on productivity. J. Finance 57 (6), 2379–2403. http://dx.doi.org/10.1111/1540-6261.00500.

Shin, H.H., Stulz, R.M., 1998. Are internal capital markets efficient? Q. J. Econ. 113 (2), 531–552. http://dx.doi.org/10.1162/003355398555676.

Smith, C.W., Stulz, R.M., 1985. The determinants of firms' hedging policies. The Journal of Financial and Quantitative Analysis 20 (4), 391. http://dx.doi.org/10.2307/2330757.

van den Steen, E., 2010. On the origin of shared beliefs (and corporate culture). Rand J. Econ. 41 (4), 617–648. http://dx.doi.org/10.1111/j.1756-2171.2010.00114.x.

Weber, Y., Shenkar, O., Raveh, A., 1996. National and corporate cultural fit in mergers/acquisitions: An exploratory study. Manage. Sci. 42 (8), 1215–1227. http://dx.doi.org/10.1287/mnsc.42.8.1215.

Williams, J., 1987. Futures markets: A consequence of risk aversion or transactions costs? J. Polit. Econ. 95 (5), 1000–1023. http://dx.doi.org/10.1086/261499.