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Board cultural diversity and firm performance under competitive pressures

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Abstract

We examine the impact of board cultural diversity, based on directors' ancestry, on firm performance conditional on product market competition. We argue that culturally diverse boards foster critical thinking and offer creative solutions that help firms thrive in competitive environments. We document that culturally diverse boards are associated with superior performance for firms operating in highly competitive industries. To address potential endogeneity issues, we use a quasi-natural experiment of the U.S. import tariff cuts. The positive impact of board cultural diversity on firm performance in competitive markets manifests itself in firms that innovate more, require creative inputs, and face heightened predation risk due to their high interdependence with industry rivals, in line with culturally diverse boards effectively performing their advisory role. Lastly, we find no evidence that board cultural diversity is associated with enhanced monitoring as its benefits fade in the presence of powerful CEOs.

KEYWORDS
board diversity, board of directors, competition, cultural diversity, firm performance, product market

JEL CLASSIFICATION
G34, G30, F02

1 | INTRODUCTION

Board diversity has been a focus of academic research, mirroring a substantial interest from companies, investors, policymakers, and the media. Theoretically, a diverse board can provide broader perspectives and a wider range of ideas and deliver creative solutions to improve corporate outcomes (e.g., An et al., 2021; Jehn, 1995). Diverse boards should have the capabilities to effectively perform their key roles of advising and monitoring managers and, ultimately, improve firm performance. Yet, the existing evidence on the impact of board diversity on firm performance is mixed,[1] reflecting that, in addition to benefits, board diversity can carry costs. In this study, we examine how effective culturally diverse boards are in performing their key functions under the pressure of product market competition.

We focus on an underexamined dimension of board diversity—cultural diversity based on directors' ancestry. Upper echelons theory states that managers' and directors' traits and values affect their interpretation of strategic problems and decision-making (Hambrick, 2007). Applying this theoretical framework, we argue that directors' cultural values affect the strategic decisions of the board and firm outcomes. The focus on cultural diversity is motivated by the growing literature on the importance of directors' and executives' cultural values for corporate policies and firm outcomes (e.g., Giannetti & Zhao, 2019; Liu, 2016; Nguyen et al., 2018; Pan et al., 2017, 2020). Culture significantly influences individuals' values, beliefs, and preferences (Byrne & Bradley, 2007). Directors with diverse cultural backgrounds bring a variety of values and perspectives that facilitate information elaboration (Pieterse et al., 2013) and put forward innovative strategies and solutions (An et al., 2021). Therefore, a culturally diverse board can become a competitive advantage. On the downside, a culturally diverse board may find it more challenging to reach a consensus during the decision-making process because board diversity can also bring communication difficulties and increase the probability of conflicts within the board (Adams et al., 2015; Anderson et al., 2011; Triana et al., 2014). Empirically, only a handful of studies provide evidence on the role of board cultural diversity based on directors' ancestry. Consistent with the theoretical predictions, the evidence suggests that board ancestral cultural diversity fosters innovation (Giannetti & Zhao, 2019) and enhances socially responsible and sustainable performance and disclosure (Barg et al., 2022; Dodd et al., 2022). However, it can also protract the decision-making process and lead to less predictable performance (Giannetti & Zhao, 2019). In this study, we contribute to the budding literature on the effects of board ancestral cultural diversity and examine the impact of board cultural diversity on firm performance and the channels of how such an impact manifests itself.[2]

To evaluate the effectiveness of culturally diverse boards, we examine their impact on firm performance in product markets. We consider product market competition as a mediator of the relationship between board cultural diversity and firm performance.[3] Product market competition fosters the survival of more efficient firms and encourages hard work (Bozec, 2005). One way to outperform competitors is to frequently and consistently introduce innovative strategies (Andrevski et al., 2014). We argue that a culturally diverse board can offer creative solutions to enable the firm to thrive in a competitive environment.[4] In other words, culturally diverse boards can perform their advisory role more effectively. Companies facing intense product market competition can benefit from a culturally diverse board because it can offer creative and complementary insights, broaden managers' vision, seek innovation to outperform rivals, experiment with new ideas, and innovate more effectively to "escape from competition" (Aghion et al.,

[1] Many studies examine the impact of gender diversity of corporate boards (Post & Byron, 2015). García-Meca et al. (2015) and Kim and Starks (2016) report a positive impact of board gender diversity on firm performance, Rose (2007) and Farrell and Hersch (2005) report no impact, while Adams and Ferreira (2009), Triana et al. (2014), and Ahern and Dittmar (2012) report a negative impact.

[2] An important feature of board cultural diversity based on director's ancestry is that this aspect of board diversity is mostly random, not managed by firms in the pursuit to "look diverse" (Dodd et al., 2022). The random nature of cultural diversity reduces the concern that the relationship between board cultural diversity and firm performance is endogenous.

[3] Bozec (2005) shows that corporate boards are more effective when firms operate in competitive environments, that is, the effect of board characteristics (board size, independence, duality) on firm performance is more pronounced in competitive environments.

[4] Indeed, there is evidence that greater board diversity is associated with more corporate innovation (An et al., 2021; Giannetti & Zhao, 2019, Griffin et al., 2021). Firms that have boards with greater ancestral diversity tend to employ strategies different from their competitors and change their strategies more frequently (Bernile et al., 2018; Giannetti & Zhao, 2019). In turn, increased corporate innovation can enhance firm performance (Miller & del Carmen Triana, 2009).

2018). However, in less competitive environments, when there is less need for creative strategies, the net benefits of board diversity diminish and can be outweighed by the costs resulting from erratic decision-making (Frijns et al., 2016; Giannetti & Zhao, 2019). We hypothesize that firms with culturally diverse boards outperform in competitive product markets.

To test our hypothesis, we evaluate the net impact of board cultural diversity on firm performance in competitive environments. We measure board cultural diversity as the average of cultural distances between each pair of directors on the board calculated using Hofstede's culture scores for countries assigned based on directors' ancestry.[5] We determine a director's ancestry using their last name and mapping the likely country of origin of that last name following recent literature (e.g., Brochet et al., 2019; Dodd et al., 2022; Merkeley et al., 2020; Pan et al., 2020). Our measure of firm performance is sales growth, a measure of performance in the firm's product market that captures the firm's ability to capitalize on its competitive advantages. We measure product market competition at the industry level using the Herfindahl–Hirschman Index (HHI), a well-grounded measure in industrial organization literature (Eckard, 1989; Golan et al., 1996; Tirole, 1988).

We use a sample of Standard & Poor's (S&P) 1500 firms and document that, consistent with our prediction, board cultural diversity positively impacts a firm's sales growth in competitive industries. Controlling for other board and firm characteristics and firm and year fixed effects, a one standard deviation increase in board cultural diversity is associated with a 2.8% improvement in sales growth in high-competition industries. However, the effect of board cultural diversity is trivial or negative for firms in low-competition industries.

We show that our finding is robust to using alternative measures of firm performance, product market competition, and board cultural diversity. Our findings confirm the effectiveness of culturally diverse boards in performing their key functions that affect firm performance.

Our results might suffer from several endogeneity issues. First, board cultural diversity might be correlated with other unobserved factors that may affect firm performance in competitive industries. To mitigate a potential omitted variable concern, we show that our results persist after controlling for the impact of gender, age, or tenure diversity of boards in competitive environments. Second, there might be a reverse causality concern due to the potential selection of culturally diverse boards by high-performing firms in competitive industries. We focus on ancestral cultural diversity based on directors' last names, which is less likely to be affected by a firm's hiring decisions than other aspects of board diversity, such as gender (Dodd et al., 2022). Nevertheless, to alleviate reverse causality concerns, we employ an instrumental variable approach with local ancestral composition in firms' headquarter cities as an instrument for board cultural diversity, following Giannetti and Zhao (2019). Our findings hold with the instrumental variable approach. Lastly, we exploit a quasi-natural experiment of import tariff cuts in the U.S. (Frésard, 2010; Frésard & Valta, 2016) to address the concerns of reverse causality between firm performance and competition. We show that firms with culturally diverse boards perform better following exogenous competition shocks from significant import tariff reductions, confirming the effectiveness of culturally diverse boards in competitive markets.

Next, we investigate potential channels through which board cultural diversity may affect firm performance in competitive industries. A culturally diverse board can lead the top management team to think outside the box and generate ideas different from industry rivals. Jehn (1995) shows that some disagreement about performing non-routine and complex tasks can be beneficial since task conflicts can facilitate critical evaluations of alternative solutions and increase thoughtful consideration of criticism. A culturally diverse board can broaden managers' vision, seek innovative solutions, and advocate alternative strategies to outperform rivals in a competitive environment. In line with these arguments, Giannetti and Zhao (2019) find that culturally diverse boards can enhance a firm's innovation capacity. In support of the innovation channel, we find that the performance-enhancing effect of board cultural diversity is concentrated in the sample of firms with greater R&D or patenting activities and high demand for skilled labor (Ghaly et al., 2017). These results imply that culturally diverse boards are beneficial for firms that deal with more complex tasks, require innovative solutions, and have greater advising needs. The findings support

[5] Hofstede's (2001) culture framework is the most widely used framework to measure national culture (Beugelsdijk et al., 2017).

the argument that culturally diverse boards have superior advisory capabilities that contribute to improved firm performance in competitive conditions.

Finally, we evaluate whether culturally diverse boards are effective in monitoring managers conditional on CEO power, which can hinder the board's ability to monitor the CEO's behavior.[6] If board cultural diversity can enhance the board's ability to monitor managers, including powerful CEOs, we would observe that firms with culturally diverse boards outperform in competitive environments even when the firm's CEO is powerful. However, our results show that culturally diverse boards are effective only when their CEOs are less powerful. Therefore, we find no evidence that culturally diverse boards effectively monitor powerful CEOs.[7]

This study contributes to the debate on the costs and benefits of diverse boards (Anderson et al., 2011; Bernile et al., 2018; Frijns et al., 2016) and specifically culturally diverse boards based on directors' ancestry (Barg et al., 2022; Dodd et al., 2022; Giannetti & Zhao, 2019). Anderson et al. (2011) report a positive relationship between a board diversity index and firm performance but not for all firms, highlighting that board diversity brings financial benefits and costs to firms. Bernile et al. (2018) report that greater board diversity lowers firm risk by adopting more robust and persistent policies and leads to better performance. Frijns et al. (2016) document a negative relationship between firm performance and board cultural diversity based on directors' nationality for a sample of large British companies, arguing that in their sample, the costs of cultural nationality diversity outweigh its benefits.[8] In contrast to cultural diversity based on nationality, ancestral cultural diversity captures a broader spectrum of directors' cultural backgrounds based on their ancestry, beyond what can be captured by director nationality. Also, cultural diversity based on nationality might carry extra costs from communication frictions due to more apparent differences among directors (e.g., different accents). Regarding the evidence on the ancestral cultural diversity of boards, Giannetti and Zhao (2019) show that culturally diverse boards lead to higher quantity and quality of innovation outcomes but also unpredictable and inefficient decision-making and high-performance volatility. We contribute to this literature by examining how the net impact of board cultural diversity based on directors' ancestry varies with economic conditions, such as product market competition. Our findings support the theoretical expectations that board ancestral cultural diversity improves the board's capacity to offer innovative solutions that are imperative for firms facing intense competition to outperform their product market rivals.

Additionally, this study contributes to the literature on the effectiveness of diverse boards of directors in performing their key functions as advisors and monitors. Existing studies show that board diversity in terms of independence and gender representation can improve boards' monitoring effectiveness and, in turn, affect corporate outcomes (Adams & Ferreira, 2009; Adams et al., 2015; Lara et al., 2017; Frye et al., 2022). In contrast, Guest (2019) finds no links between board ethnic diversity and monitoring outcomes. The literature on the role of diverse boards as advisors is less developed. Kim and Starks (2016) and An et al. (2021) show that diverse boards, measured with a share of women directors and a diversity index, respectively, have superior advising capacity. We contribute to this literature by showing the value of culturally diverse boards as resourceful advisors for firms in competitive industries and evaluating the advising effectiveness of culturally diverse boards.

Finally, this study adds to an influential body of finance and economics research linking the industrial organization to corporate governance issues. Previous studies posit that competition is vital in aligning interests between managers and shareholders and serves as an external corporate governance mechanism (Chhaochharia et al., 2017; Giroud & Mueller, 2010, 2011). Related studies, such as Li et al. (2019) and Han et al. (2016), demonstrate the importance of

[6] Hermalin and Weisbach (1998) show that CEOs prefer reduced monitoring, and monitoring intensity depends on bargaining between the board and the CEO. Also, Graham et al. (2017) show that powerful CEOs are less likely to be replaced following poor corporate performance.

[7] Additionally, we examine the effectiveness of board monitoring conditional on the quality of governance (reported in Online Appendix D available in the supporting materials section online) We find no evidence that culturally diverse boards are effective for firms with weak governance, supporting the argument that the advantage of culturally diverse boards stems from their superior advising rather than monitoring capacity.

[8] Several studies also evaluate whether the presence of foreign directors (based on nationality) on boards contributes to firm performance. Oxelheim and Randoy (2003) report a positive impact of foreign directors on firm performance, while Masulis et al. (2012) report a negative impact.

product market conditions for the benefits and costs of CEO power. Our study extends this literature by examining the effect of culturally diverse corporate boards on firm performance in different competitive environments.

2 | SAMPLE AND VARIABLES CONSTRUCTIONS

2.1 | Data sample

Our sample includes S&P 1500 firms between 2004 and 2015. We exclude financial (SIC codes between 6000 and 6999) and utility (SIC codes between 4949 and 4999) firms. We collect the information on board directors from GMI (MSI) database and supplement it with data from the Osiris database of Bureau van Dijk, annual reports, and internet sources such as Bloomberg. We extract financial and accounting information from Compustat Industrial files and stock return data from the Center for Research in Security Prices (CRSP). We obtain analysts' earnings forecasts from the Institutional Brokers Estimate System (I/B/E/S) of Thomson Reuters. We discard firm-year observations with sales growth higher than 100% to alleviate the impact of business discontinuities (Almeida et al., 2004).

2.2 | Measuring firm performance

Our main measure of firm performance is *Sales growth* which reflects firm performance in the product market and captures a firm's ability to capitalize on its competitive advantages to increase sales. We compute *Sales growth* as the percentage change in sales from year $t-1$ to year t.

In the robustness analysis, we use alternative measures of firm performance: return on assets (ROA), Tobin's q, cash flow growth, abnormal stock return, and market share growth. *ROA* is the return on assets measured as operating income before depreciation divided by total assets. *Tobin's q* is the natural logarithm of the ratio of the market value of assets to the book value of total assets; it shows how much investors are willing to pay per dollar of asset book value. *Cash flow growth* is the percentage change from year $t-1$ to year in cash flow measured as operating activities less cash flow from extraordinary items. *Abnormal return* is stock returns adjusted for Fama–French three risk factors (Fama & French, 1992). *Market share growth* is the percentage change from year $t-1$ to t in market share, defined as the ratio of a firm's sales to the total sales of all firms in the 4-digit SIC industry. While ROA and market share growth are accounting-based measures of firm performance, Tobin's q and abnormal return reflect a forward-looking market valuation, and cash flow growth alleviates concerns about potential sales and earnings manipulation.

2.3 | Measuring product market competition

To measure product market competition, we use the Herfindahl–Hirschman Index (HHI), computed for each industry and year as the sum of the squared market shares of all firms in a 4-digit SIC industry using Compustat sales data.[9] We examine the competition level a firm faced in a previous year (in year $t-1$) and its relationship with its subsequent performance (in year t).

Low *HHI* values indicate a high level of product market competition. Our *Competition* variable is a dummy variable equal to one (zero) if the *HHI* is in the sample distribution's lowest (highest) quartile.

Furthermore, we use two alternative measures of product market competition. First, we use an alternative industry classification, Text-based Network Industry Classifications (TNIC) of Hoberg and Phillips (2016), to calculate *HHI TNIC*.

[9] The advantage of using the 4-digit SIC industry classification is that it includes a more detailed market definition and leads to an increased (within) variation of HHI. Numerious studies employ HHI based on the 4-digit SIC industry classification, for example, MacKay and Phillips (2005) and Autor et al. (2020).

This industry classification is time-varying and is derived using a text-based analysis of firm product descriptions filed with the Securities and Exchange Commissions. Second, we use product fluidity, a measure of product market threats, from the Hoberg–Phillips data library following Hoberg et al. (2014).[10] Product fluidity measures the changes in a firm's product space due to competitors' moves in the firm's product market. Firms with high levels of product fluidity face more significant competitive threats.

2.4 | Measuring board cultural diversity

We construct our measure of board cultural diversity for each firm-year based on directors' ancestry using Hofstede's (2001) culture framework. We follow recent literature and identify directors' ancestry based on their last name (e.g., Brochet et al., 2019; Dodd et al., 2022; Merkeley et al., 2020; Pan et al., 2020). This approach assumes that last names are passed through generations, like genes and culture, and contain information about a person's cultural values.[11,12] We map all last names in our sample to the most likely country of origin using three reference lists: (1) a list based on historical census records of foreign-born U.S. residents from the Integrated Public Use Microdata Series (IPUMS),[13] (2) a list of common Asian American last names of Lauderdale and Kestenbaum (2000), and (3) the Oxford Dictionary of American Family Names. Using these three reference lists, we match 94% of last names in our sample and identify 41 countries of ancestry.

We use the identified country of ancestry to assign each director scores from Hofstede's (2001) culture framework in four dimensions: individualism, masculinity, power distance, and uncertainty avoidance.[14] First, we compute the cultural distances between each pair of directors as in Kogut and Singh (1988):

$$CDist_{lm} = \sqrt{\sum_{k=1}^{4}\left\{\left(I_{kl} - \frac{I_{km}}{V_k}\right)^2\right\}} \quad \forall\, l \neq m,$$

where $CDist_{lm}$ is the cultural distance between director l and director m; I_{kl} is the score on dimension k for director l, I_{km} is the score on dimension k for director m; and V_k is the in-sample variance of the dimension score.

We calculate the firm-level measure of board cultural diversity as the average of cultural distances from Equation (1), following Frijns et al. (2016) and Dodd et al. (2022):

$$C\,D_{nt} = \frac{\sum_{i,j} CDist_{ij,nt}}{\frac{m_{nt}(m_{nt}-1)}{2}} \quad \forall \quad i < j,$$

where CD_{nt} is the cultural diversity of the board of firm n in year t, and m_{nt} is the number of directors of firm n in year t.

[10] We thank Gordon Phillips and Gerard Hoberg for sharing their product market competition data at https://hobergphillips.tuck.dartmouth.edu/

[11] According to Guiso et al. (2006), culture is deeply rooted and remains unchanged through generations.

[12] This approach ignores the fact that married women can have their husbands' last name, introducing noise in our cultural diversity measure. Women directors constitute only 15% of directors in our sample, with only a portion of them taking their husbands' last name. As a robustness test, we estimate our measure of cultural diversity only for male directors and find that our results hold.

[13] Minnesota Population Centre and Ancestry.com. IPUMS restricted Complete Count Data: Version 1.0 [Machine-readable database]. Minneapolis: University of Minnesota (2013). We use census records from 1850, 1880, 1900, 1910, 1920, 1930, and 1940.

[14] In the robustness analysis, we also include the Hofstede's additional dimensions (long-term orientation and indulgence) and use an alternative culture framework.

2.5 | Control variables

We evaluate the impact of board cultural diversity on firm performance after controlling for other commonly used measures of board diversity—gender and age diversity, director tenure, and director independence (Anderson et al., 2011). Board composition affects firms' strategic decisions (Griffin et al., 2021; Triana et al., 2014) and firm performance (Adams & Ferreira, 2007; Anderson et al., 2011; Chapple & Humphrey, 2014; Guest, 2009). *Gender diversity* is the percentage of female directors on the board. *Age diversity* is the range of directors' age, and *Tenure range* is the range of directors' tenure. *Independent directors* are the proportion of independent directors on the board. We also include *CEO* duality since CEO power influences firm performance (Adams et al., 2005). *CEO duality* is a dummy variable equal to one when the CEO also serves as the board's chairperson and zero otherwise. Lastly, we control for *Board size* since agency issues such as directors' free-riding problems are more severe in larger boards, and it is easier for a CEO to control an oversized board (Cheng, 2008).[15]

We also control for firm-level characteristics that determine firm performance, including *Firm size*, *Leverage*, *Cash holdings*, and *Tangibility* (Fang et al., 2009; Larcker et al., 2013). We include stock return volatility to control for the possibility that a firm's market performance variability affects our results (Giannetti & Zhao, 2019). Finally, we include analyst coverage and institutional ownership since prior research show a significant relationship between these variables and firm performance (Cornett et al., 2007).

2.6 | Summary statistics

Table 1 reports summary statistics, including the number of observations (N), mean, standard deviation (S.D.), median, minimum (Min), and maximum (Max) for all variables. After removing observations with missing firm performance and control variables, we have 9709 firm-year observations for the full sample. The sample size is reduced for alternative measures of firm performance, market competition, and cultural diversity. There are no abnormalities in the distribution of the variables.

3 | EMPIRICAL STRATEGY AND BASELINE RESULTS

3.1 | Main regression results

To examine the benefits of board cultural diversity in various competitive environments, we estimate the following model:

$$\begin{aligned} \textit{Firm performance}_{it} &= \alpha + \delta \textit{Cultural Diversity}_{it} \times \textit{Competition}_{jt-1} + \beta \textit{Cultural Diversity}_{it} \\ &+ \theta\ \textit{Competition}_{jt-1} + \varphi X_{it} + \eta_i + \eta_t + \varepsilon_{it,} \end{aligned} \quad (1)$$

where subscripts *i*, *j*, *t* represent firm, industry, and year, respectively. $\textit{Firm performance}_{it}$ is the firm performance variable, which is *Sales growth* in the baseline model. $\textit{Cultural Diversity}_{it}$ is the measure of board cultural diversity. $\textit{Competition}_{jt-1}$ is a dummy variable equal to one (zero) if the *HHI* is in the lowest (highest) quartile of the sample distribution in year *t*−*1*. This empirical design allows corporate boards to act in year *t* according to the competition conditions their firm faces in year *t*−*1*. Of main interest is the coefficient δ on the interaction term of $\textit{Cultural Diversity}_{it} \times$

[15] We do not control for director's educational background or professional experiences since this information from directors' profiles is largely missing in GMI database.

TABLE 1 Summary statistics.

	N	Mean	SD	Median	Min	Max
Main variables						
Sales growth	9709	0.070	0.178	0.071	−0.852	0.897
HHI	9709	0.383	0.207	0.338	0.066	0.997
Cultural diversity	9709	1.850	0.541	1.858	0.000	3.541
Board characteristics						
Gender diversity	9709	0.117	0.102	0.111	0.000	0.667
Age diversity	9709	22.699	7.167	22.000	2.000	55.000
Tenure range	9709	19.000	10.329	17.000	0.000	74.000
Independent directors	9709	0.736	0.147	0.750	0.000	1.000
CEO duality	9709	0.529	0.499	1.000	0.000	1.000
Board size	9709	9.024	2.158	9.000	4.000	24.000
Firm characteristics						
Firm size	9709	7.525	1.508	7.433	0.443	13.089
Leverage	9709	0.198	0.163	0.191	0.000	0.8529
Cash	9709	0.161	0.163	0.103	0.000	0.950
Tangibility	9709	0.796	0.196	0.849	0.090	1.000
Return volatility	9709	0.103	0.049	0.093	0.024	0.621
Analysts (no log)	9709	11.224	7.559	9.417	1.000	54.833
Institutional ownership	9709	0.771	0.155	0.785	0.353	1.000
Alternative measures of firm performance, competition, and board cultural diversity						
ROA	9709	0.160	0.111	0.146	−1.338	1.825
Tobin's q	9686	0.621	0.541	0.558	−0.992	2.560
Abnormal return	9709	−0.024	0.331	−0.051	−0.890	8.780
Market share growth	9709	0.024	0.165	0.003	−0.800	2.500
HHI TNIC	9653	0.270	0.251	0.173	0.017	1.000
Product fluidity	9565	6.115	3.143	5.518	0.510	24.493
Cultural diversity five dim.	5644	2.150	0.533	2.160	0.000	4.078
Cultural diversity six dim.	5644	2.342	0.577	2.352	0.000	4.528
Cultural diversity GLOBE	8184	3.283	0.645	3.286	0.000	5.761

Note: The table presents the number of observations (N), mean, standard deviation (S.D.), median, minimum (Min), and maximum (Max) for the main variables, including firm performance measure *Sales growth*, market competition measure *HHI*, and measure of board *Cultural diversity*, board-level, and firm-level control variables, and alternative measures of firm performance, competition, and board cultural diversity. Sections 2 and 3 provide definitions of all variables.

$Competition_{jt-1}$ which captures the incremental effect of board cultural diversity in a high-competition relative to a low-competition environment. X_{it} represents board-level control variables, including gender diversity, age diversity, director tenure, independent directors, CEO duality, board size, and firm-level control variables, including firm size, leverage, cash, tangibility, return volatility, analysts, and institutional ownership. The model also includes firm fixed effects, η_i , to control for unobserved time-invariant firm-specific heterogeneity and year dummies, η_t, to control for concurrent economic trends or other potential year differences in firm performance. Robust standard errors for coefficient estimates are heteroskedasticity-consistent and adjusted for industry-level clustering (Petersen, 2009).

We estimate the above model for the sample of high-competition (top 25%) and low-competition (bottom 25%) firms (following Cetorelli & Strahan, 2006) that has 4439 firm-year observations with available data for firm performance and control variables. Table 2 presents the estimation results. Without any control variables, the coefficient of *Cultural diversity* × *Competition* is positive and statistically significant at the 5% level (Column 1).[16] This coefficient estimate remains positive and significant when we include firm-level controls (Column 2), board-level controls (Column 3), and firm- and board-level controls (Column 4). The evidence in Table 2 shows that cultural diversity has a positive and significant impact on a firm's sales growth in high-competition industries.[17,18]

In terms of economic magnitude, based on the full model specification (Column 4), a one standard deviation increase in *Cultural diversity* contributes to a 3.6% (0.066 × 0.541) improvement in sales growth for firms operating in high-competition industries. This improvement is economically significant as it represents a 51.4% increase over the unconditional mean of sales growth, which is 7.0%.

In all regressions reported in Table 2, the coefficient estimates on *Cultural Diversity* are negative and significant at the 10% or 5% levels, implying that the value added by board cultural diversity is negative for firms in low-competition industries. The coefficient estimates on *Cultural Diversity* are smaller in magnitude than those on *Cultural diversity* × *Competition*, suggesting that the overall impact of board cultural diversity for firms in high-competition industries is positive.

Regarding control variables, board gender diversity, asset tangibility, and analyst following are negative determinants of sales growth, while firm size and institutional ownership are positive determinants. All specifications include firm fixed effects, meaning that the results cannot be explained by omitted time-invariant firm characteristics, for example, firm reputation or culture.

3.2 | Robustness tests

3.2.1 | Alternate measures of firm performance

In this section, we employ alternative measures of firm performance to ensure our findings do not rely on a certain measure of firm performance. Panel A of Table 3 reports the estimation results of the baseline model Equation (1) with *ROA*, *Cash flow growth*, *Tobin's q*, *Abnormal stock return*, and *Market share growth* as alternative measures of firm performance (defined in Section 2.2). The coefficients on *Cultural diversity* × *Competition* remain positive and are significant, at least at the 10% level. The results indicate that the positive impact of board cultural diversity on firm performance in high-competition industries is robust to using alternative measures of firm performance.

3.2.2 | Alternate measures of product market competition

In this section, we evaluate the robustness of the main finding by using alternative measures of product market competition. First, we show that our results are not restricted to a particular sorting methodology of the *HHI*. We re-estimate our baseline regression using (i) the reciprocal of the *HHI* (raw score) (*HHI score*) and (ii) a competition variable defined as a dummy variable equal to one (zero) if the *HHI* is in the lowest (highest) tercile (rather than quartile as in the main

[16] In unreported analysis, we estimate the effects of cultural diversity without interacting with the competition variable and find no evidence that *Cultural diversity* has a significant impact on firm performance in general conditions.

[17] Given a potential double-edged nature of board diversity (Triana et al., 2014), we test whether cultural diversity exerts a nonlinear effect on firm performance in high-competition industries. We find no statistically significant evidence of a non-liner relationship. Online Appendix A (available in the supporting materials section online) explains the methodology and reports the estimation results.

[18] In Online Appendix B (available in the supporting materials section online), we report the estimation results of the impact of board cultural diversity measured using individual cultural dimensions (uncertainty avoidance, individualism, power distance, and masculinity). We find that diversity in all cultural dimensions has a positive association with firm performance in competitive industries.

TABLE 2 Competition and the benefits of board cultural diversity.

	(1)	(2)	(3)	(4)
Cultural diversity × Competition	0.064***	0.073***	0.061***	0.066***
	(0.022)	(0.020)	(0.022)	(0.020)
Competition	−0.053	−0.108*	−0.053	−0.106*
	(0.050)	(0.060)	(0.050)	(0.064)
Cultural diversity	−0.038*	−0.039**	−0.036*	−0.032*
	(0.020)	(0.018)	(0.020)	(0.018)
Gender diversity			−0.119**	−0.194***
			(0.058)	(0.071)
Age diversity			0.000	0.001
			(0.001)	(0.001)
Tenure range			−0.000	−0.001**
			(0.001)	(0.001)
Independent directors			−0.036	−0.047
			(0.038)	(0.038)
CEO duality			0.011	0.001
			(0.009)	(0.010)
Board size			0.001	−0.004*
			(0.003)	(0.003)
Firm size		0.183***		0.190***
		(0.034)		(0.034)
Leverage		0.045		0.056
		(0.067)		(0.067)
Cash		0.031		0.029
		(0.091)		(0.091)
Tangibility		−0.153**		−0.144**
		(0.068)		(0.066)
Return volatility		−0.014		−0.037
		(0.119)		(0.119)
Analysts		−0.062***		−0.061***
		(0.022)		(0.023)
Institutional ownership		0.081*		0.084*
		(0.046)		(0.046)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Obs.	4459	4276	4459	4276
Adj. R^2	0.306	0.375	0.306	0.378

Note: The table presents coefficient estimates of regressions that evaluate the effect board cultural diversity on firm performance in competitive industries. The dependent variable is *Sales growth*, calculated as the percentage change in firm sales from year *t*−*1* to year *t*. *Cultural diversity* is the average of cultural distances between each pair of directors. *Competition* is a dummy variable equal to one (zero) if the *HHI* index based on the 4-digit SIC industry level is in the lowest (highest) quartile of the sample distribution in year *t*−*1*. All regressions include firm and year fixed effects. Robust standard errors clustered at the industry level are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

TABLE 3 Alternative measures of firm performance, cultural diversity, and market competition.

Panel A. Alternative measures of firm performance					
	ROA	Cash flow growth	Tobin's q	Abnormal return	Market share growth
	(1)	(2)	(3)	(4)	(5)
Cultural diversity ×	0.026**	0.391*	0.161***	0.080*	0.042**
Competition	(0.013)	(0.23)	(0.056)	(0.042)	(0.019)
Competition	−0.079***	−1.398**	−0.260**	0.017	−0.074
	(0.025)	(0.55)	(0.129)	(0.091)	(0.060)
Cultural diversity	0.000	−0.212	−0.055	−0.094***	−0.011
	(0.008)	(0.21)	(0.048)	(0.030)	(0.016)
Controls	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Obs.	4059	4275	4054	4059	4276
Adj. R^2	0.705	0.008	0.723	0.051	0.274
Panel B. Alternative measures of competition					
	HHI score	HHI terciles	HHI TNIC	Product fluidity	
	(1)	(2)	(3)	(4)	
Cultural diversity × Competition	0.085***	0.031*	0.040*	0.025	
	(0.030)	(0.016)	(0.020)	(0.019)	
Competition	−0.153**	−0.067*	−0.079*	−0.070*	
	(0.068)	(0.038)	(0.043)	(0.039)	
Cultural diversity	0.045***	0.004	−0.014	0.022*	
	(0.013)	(0.012)	(0.014)	(0.011)	
Controls	Yes	Yes	Yes	Yes	
Firm fixed effects	Yes	Yes	Yes	Yes	
Year fixed effects	Yes	Yes	Yes	Yes	
Obs.	9709	5425	4772	4744	
Adj. R^2	0.312	0.305	0.331	0.311	
Panel C. Alternative measures of board cultural diversity					
		Hofstede Five dimensions	Hofstede Six dimensions	GLOBE	
		(1)	(2)	(3)	
Cultural diversity × Competition		0.045**	0.040**	0.044**	
		(0.021)	(0.019)	(0.018)	
Cultural diversity		−0.009	−0.005	−0.142*	
		(0.019)	(0.017)	(0.083)	

(Continues)

TABLE 3 (Continued)

Panel C. Alternative measures of board cultural diversity			
	Hofstede Five dimensions	Hofstede Six dimensions	GLOBE
	(1)	(2)	(3)
Competition	−0.049	−0.043	−0.036**
	(0.076)	(0.074)	(0.017)
Controls	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Obs.	2495	2495	3627
Adj. R^2	0.397	0.397	0.364

Note: The table presents coefficient estimates of regressions with alternative measures of firm performance, competition, and board cultural diversity. In Panel A, the dependent variables are alternative measures of firm performance: *ROA*, *Cash flow growth*, *Tobin's q*, *Abnormal return*, and *Market share growth*. Panel B presents the estimation results with alternative measures of product market competition. *HHI score* is the reciprocal of the HHI (raw score). *HHI terciles* is a dummy variable equal to one (zero) if the *HHI* is in the lowest (highest) tercile of the sample distribution. *HHI TNIC* is a dummy variable equal to one (zero) if the TNIC HHI index is in the lowest (highest) quartile of the sample distribution in year *t−1*. *Product fluidity* is a dummy variable equal to one (zero) if a firm's product fluidity is in the highest (lowest) quartile of the sample distribution in year *t−1*. Panel C presents the estimation results with alternative measures of board cultural diversity: board cultural diversity estimated using five and six dimensions of the Hofstede culture framework and using the GLOBE culture scores. All regressions include firm- and board-level control variables as in Table 2 and firm and year fixed effects. Robust standard errors clustered at the industry level are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

analysis) of the sample distribution (*HHI terciles*). Panel B of Table 3 reports the estimation results of Equation (1) using *HHI score* and *HHI terciles* competition variables in Columns 1 and 2, respectively. We find that our main result holds when using these alternative sorting methods.

Second, we use two alternative measures of product market competition: (1) HHI TNIC based on the Text-based Network Industry Classifications (Hoberg & Phillips, 2016) and (2) a firm's product fluidity (Hoberg et al., 2014). In this analysis, we classify the sample firms as high- or low-competition according to their *HHI TNIC* and *Product fluidity*. A firm is classified as "high-competition" if its *HHI TNIC* (*Product fluidity*) is in the lowest (highest) quartile of the sample distribution. The Competition variables are defined in Section 2.3.

Panel B of Table 3 reports the estimation results of the baseline regression using *HHI TNIC* and *Product fluidity* competition variables in Columns 3 and 4, respectively. The coefficient on *Cultural diversity* × *Competition* for *HHI TNIC* is positive and statistically significant. Even though it is insignificant for *Product fluidity*, it is positive, which is consistent with our prediction that having a culturally diverse board is beneficial for firms to grow when firms face high competition threats.[19]

Overall, this analysis shows that our main finding on the positive impact of board cultural diversity is robust to using alternate measures of product market competition.

[19] An additional unreported analysis by the level of competition measured with *Product fluidity* shows that cultural diversity is more valuable for firms in a highly competitive environment (measured with *Product fluidity*) as the coefficient on *Cultural diversity* is positive and significant only for "High competition" subsample.

3.2.3 | Alternate measures of cultural diversity

While Hofstede's (2001) 4-dimension culture framework is widely used and recognized, we want to ensure that a specific definition of culture does not drive our results. Hence, we consider several alternatives to compute *Cultural Diversity*. First, we incorporate Hofstede's additional cultural dimensions: (1) long-term orientation and use five cultural dimensions to compute *Cultural Diversity*, and (2) long-term orientation and indulgence versus restraints dimensions and use six cultural dimensions to compute *Cultural Diversity*. Second, we use the Global Leadership and Organizational Behavior Effectiveness (GLOBE) culture framework (House et al., 2004). This framework comprises nine dimensions: performance orientation, assertiveness orientation, future orientation, humane orientation, institutional collectivism, family collectivism, gender egalitarianism, power distance, and uncertainty avoidance. We employ GLOBE's societal practices scores.[20]

Panel C of Table 3 reports the baseline model estimation results with alternative cultural diversity measures. The coefficient estimates on *Cultural diversity* × *Competition* are positive and significant at the 5% level in all models. Board cultural diversity continues to have a significant and positive impact on firms' sales growth in competitive industries when we use alternate measures of cultural diversity. It implies that the choice of culture framework does not drive the documented effect of board cultural diversity on firm performance in competitive markets.

4 | ADDRESSING ENDOGENEITY CONCERNS

4.1 | Additional controls

In this section, we address the concern that omitted board characteristics variables can explain our results. For instance, if other aspects of board diversity impact firm performance in high-competition industries and different dimensions of board diversity are highly correlated, *Cultural diversity* may capture the contribution of other aspects of board diversity such as gender diversity, director age diversity, director tenure diversity, or board independence. To allow other aspects of board diversity to operate through competition, we additionally include the interaction terms between other measures of board diversity and *Competition*. Table 4 reports the baseline model results with the additional controls. The coefficients on *Cultural diversity* × *Competition* remain positive and significant at the 1% level in all specifications when we include the interaction terms of board gender diversity, director age diversity, directors' tenure range, or board independence with *Competition*. We find that board gender diversity, age diversity, directors' tenure range, or board independence make no significant contribution to improving firm performance when firms face high competition. In contrast to the implication of Bernile et al. (2018) that common variation in all aspects of board diversity matters for firm outcomes, we find that the cultural aspect of board diversity is the main factor underlying a firm's growth in a competitive environment.

4.2 | Instrumented variable analysis

Our inferences can be biased if firms that are high performers in competitive industries are also more capable of selecting a more culturally diverse board. We focus on the ancestral cultural diversity of board directors; therefore, endogenous selection might be less of a concern. For example, Dodd et al. (2022) show that ancestral cultural diversity is less likely to be affected by the firm's hiring decisions than other aspects of board diversity (e.g., gender diversity). Nevertheless, we employ an instrumental variable approach to alleviate the potential selection bias concern and mitigate doubts regarding the identification.

[20] GLOBE's societal practices ("as is") scores reflect behavior or practices that respondents perceive to be widespread.

TABLE 4 Controlling for the impact of other aspects of board diversity.

	(1)	(2)	(3)	(4)
Cultural diversity × Competition	0.067***	0.067***	0.067***	0.065***
	(0.020)	(0.020)	(0.020)	(0.020)
Gender diversity × Competition	−0.013			
	(0.164)			
Age diversity × Competition		0.001		
		(0.002)		
Tenure range × Competition			−0.000	
			(0.001)	
Independent Directors × Competition				0.046
				(0.064)
Competition	−0.105*	−0.117	−0.097	−0.135
	(0.063)	(0.078)	(0.070)	(0.093)
Cultural diversity	−0.032*	−0.032*	−0.032*	−0.031*
	(0.019)	(0.018)	(0.018)	(0.018)
Gender diversity	−0.186*	−0.193***	−0.194***	−0.194***
	(0.102)	(0.071)	(0.072)	(0.071)
Age diversity	0.001	0.000	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Director tenure	−0.001**	−0.001**	−0.001	−0.001**
	(0.001)	(0.001)	(0.001)	(0.001)
Independent directors	−0.047	−0.047	−0.047	−0.077**
	(0.038)	(0.038)	(0.038)	(0.038)
Control variables	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Obs.	4230	4230	4230	4230
Adj. R^2	0.369	0.369	0.368	0.369

Note: The table presents coefficient estimates of regressions that evaluate the effect of competition on the value of board cultural diversity controlling for the interaction between competition and gender diversity (Column 1), age diversity (Column 2), directors' tenure range (Column 3) and percentage of independent directors (Column 4). The dependent variable is *Sales growth*, calculated as the percentage change in firm sales from year *t−1* to year *t*. *Cultural diversity* is the average of cultural distances between each pair of directors. *Competition* is a dummy variable equal to one (zero) if the *HHI* index based on the 4-digit SIC industry level is in the lowest (highest) quartile of the sample distribution in year *t−1*. All regressions include firm- and board-level control variables as in Table 2 and firm and year fixed effects. Robust standard errors clustered at the industry level are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

The ancestral composition of boards depends on the ancestral composition of the location of the firm's headquarters chosen in firms' early life cycles (Alam et al., 2014; Giannetti & Zhao, 2019; Knyazeva et al., 2013). Unlike directors' skills or experience that are chosen according to the firm's investment opportunities and challenges, the level of board diversity depends on the supply of potential directors (Giannetti & Zhao, 2019). We follow Giannetti and Zhao (2019) and exploit the ancestry composition of the location of a firm's headquarters. We estimate *Local Cultural diversity* as the average board cultural diversity in the city where firm *i* is headquartered as our instrument

TABLE 5 The benefits of board cultural diversity: Instrumental variables approach.

	First stage *Cultural diversity* (1)	Second stage *Sales growth* (2)
$\widehat{Cultural\ diversity} \times$ Competition		0.201**
		(0.092)
Competition	−0.533*	−0.373*
	(0.302)	(0.207)
$\widehat{Cultural\ diversity}$		−0.169*
		(0.095)
Local Cultural diversity	0.252***	
	(0.032)	
Controls	Yes	Yes
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Obs.	3269	3269
Adj. R^2	0.266	0.207

Note: The table presents coefficient estimates from an instrumental variable approach that uses a two-stage least squares estimation procedure: first-stage regression (Column 1) and two-stage least squares regression (Column 2). *Local Cultural diversity*, calculated as the average board cultural diversity of the city where firm *i* is headquartered (excluding firm *i*), is used as the instrumental variable. In the first-stage regression, we regress *Cultural diversity* on the firm- and board-level control variables as in Table 2 and the instrumental variable and obtain the predicted value for *Cultural diversity*. In the second-stage regression, we regress *Sales growth* on the predicted value from the first-stage regression ($\widehat{Cultural\ diversity}$) and the firm- and board-level control variables as in Table 2. The first and second stage regressions include 4-digit SIC industry and year fixed effects. Robust standard errors clustered at the industry level are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

for board cultural diversity. We exclude the board diversity of firm *i* when computing the average. Table 5 reports the instrumental variable approach results using a two-stage least squares regression procedure estimated as follows:

$$\text{Firststage}: Cultural\ Diversity_{it} = a + b\ Local\ Cultural\ Diversity_i + c\ Competition_{jt-1} + d\ X_{it} + \eta_j + \eta_t + \varepsilon_{it}, \quad (2)$$

$$\text{Secondstage}: Firm\ performance_{it} = \alpha + \delta\ \widehat{Cultural\ Diversity}_{it} \times Competition_{jt-1} + \beta \widehat{Cultural\ Diversity}_{it} + \theta\ Competition_{jt-1} + \varphi X_{it} + \eta_j + \eta_t + v_{it}, \quad (3)$$

where *Local Cultural diversity* is our instrument and the fitted values from the regression of Equation (2) $\widehat{Cultural\ Diversity}_{it}$ are used in the regression of Equation (3). Because our city-level instrument lacks within-firm variation, we include 4-digit SIC industry and year fixed effects in all regressions. Column 1 of Table 5 reports the first-stage regression results and shows that the coefficient on *Local Cultural diversity* is positive and statistically significant at the 1% level.[21] Hence our instrument is relevant, demonstrating that the cultural composition of the board reflects

[21] The adjusted R-squared (unreported) for an unrestricted regression model (with controls and the instrument) is 0.266, which is 30% higher than the adjusted R-squared for a restricted one (with controls only), which is 0.203.

that of the firm's location. Column 2 reports the second-stage regression results with the interaction term of the instrumented board diversity *Cultural diversity* and *Competition*. The coefficient on *Cultural diversity* × *Competition* is positive and statistically significant at the 5% level.[22] This analysis provides evidence that board cultural diversity benefits firms operating in competitive industries after dealing with endogeneity concerns using an instrumental variable approach.

4.3 | The quasi-natural experiment

To alleviate concerns about a potential measurement error of product market competition, we exploit the response of firm performance to unexpected changes in industry import tariff rates (i.e., exogenous changes in competition) in a quasi-natural experiment, following Frésard (2010) and Frésard and Valta (2016). The import tariff reductions lower the trade barriers and increase a firm's exposure to foreign competition. Significant import tariff rate reductions provide a source of variation that is exogenous to a firm's operations and is partly unanticipated (Valta, 2012).

Following Dasgupta et al. (2018), we utilize firm-year observations 3 years before and after each import tariff cut event (excluding the year of the tariff cut).[23] We end up with 531 firm-year observations. We estimate Equation (1) with the import tariff cut variable *Post_tariff_cut* instead of *Competition* variable to measure the increases in product market competition. *Post_tariff_cut* is a binary variable equal to one for the first 3 years after the firm's industry has encountered a significant import tariff cut and zero otherwise.

Column 1 of Table 6 reports the estimation results of the main specification. The coefficient on *Post_tariff_cut* is negative (although insignificant), showing that firms suffer a decline in performance following an increase in foreign competition brought by import tariff cuts. The coefficient on *Cultural diversity* × *Post_tariff_cut* is positive and statistically significant at the 5% level, indicating that board cultural diversity improves firm performance following product market competition shocks.

As an additional analysis, we construct a propensity-score matched sample following Dasgupta et al. (2018). In the year before the import tariff cut, the treated firms, the ones that undergo import tariff cuts, are matched to control firms that do not undergo import tariff cuts in a different industry, based on sales growth, Tobin's q, total assets, cash flow, cash holdings, and leverage. The matched sample that includes treated and control firms has 814 firm-year observations. We re-run the regression of import tariff cuts (as in Column 1 of Table 6) using the matched sample and report the results in Column 2 of Table 6. The coefficient on *Cultural diversity* × *Post_tariff_cut* is positive and statistically significant at the 1% level, confirming that firms with culturally diverse boards perform better in highly competitive markets.

Overall, the analysis of firm performance around import tariff cuts confirms the benefits of having culturally diverse boards for firms facing increased product market competition.

5 | SUBSAMPLE ANALYSIS

In this section, we perform cross-sectional tests to explore potential factors that might affect the relationship between board cultural diversity and firm performance in competitive industries. We consider whether firms require more innovation, deal with more complex tasks, or headed by a powerful CEO.[24]

[22] Notably, the estimated coefficients from the instrumental variable regression are larger than those from the OLS regressions. This is likely because we use industry fixed effects rather than firm fixed effects (note that we can't use firm fixed effects in the first stage given that the instrument *Local Cultural diversity* is a state-level variable), or because the instrumental variables approach reduces the errors-in-variables bias.

[23] Online Appendix C (available in the supporting materials section online) describes how we identify the import tariff cut events.

[24] We also test the effectiveness of board monitoring (as compared to board advising role) conditional on the quality of governance in Online Appendix D (available in the supporting materials section online).

TABLE 6 The quasi-natural experiment: Reductions of import tariff rates.

	Main specification	Matched sample
	(1)	(2)
Cultural diversity × Post_tariff_cut	0.033**	0.053***
	(0.016)	(0.020)
Cultural diversity	0.034	−0.020
	(0.022)	(0.031)
Post_tariff_cut	−0.069	−0.096*
	(0.050)	(0.049)
Controls	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Obs.	531	814
Adj. R^2	0.367	0.305

Note: The table presents coefficient estimates of regressions that evaluate the effect of import tariff cuts on the value of board cultural diversity. The dependent variable is *Sales growth*, calculated as the percentage change of sales from year *t*−*1* to year *t*. *Cultural diversity* is the average of cultural distances between each pair of directors. *Post_tariff_cut* is a dummy variable equal to one for the first 3 years after the firm's industry has encountered a significant import tariff cut, and zero otherwise; a significant import tariff cut is defined as an import tariff rate reduction larger than three times the median tariff rate reduction in the industry. Column 2 reports the estimation results for a propensity-score-matched sample; in the year before the import tariff cut, the treated firms that undergo the tariff cut are matched based on sales growth, Tobin's q, total assets, cash flow to total assets, cash to total assets, and leverage to the untreated firms in a different industry. The sample is restricted to the 3 years before and the three after the import tariff cuts, excluding the event year of import tariff cut. All regressions include firm- and board-level control variables as in Table 2 and firm and year fixed effects. Robust standard errors clustered at the industry level are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

5.1 | Importance of innovation

We argue that culturally diverse boards promote firm performance in competitive industries by facilitating critical evaluations of alternative solutions and offering creative and contrasting insights. If this is the case, the benefits of board diversity under high competition should be more prevalent when firms require innovative inputs or face more complex problems.

To capture the levels of innovative inputs and complexity, we use three variables: (1) R&D expenses, (2) patents, and (3) labor skill levels. We classify the sample firms as "High R&D" when their R&D expenses (scaled by the number of employees) in the past 3 years are above the sample median. Next, we trace firms' demand for innovation using their patenting activities from the patent dataset of Kogan et al. (2017) that records firms' patents filed at the U.S. Patent and Trademark Office. We assign firms to the "Patents" subsample if they report non-zero and non-missing values for patents and the "No Patents" subsample otherwise. Lastly, to measure a firm's level of complexity, we employ the labor skill index of Ghaly et al. (2017) which quantifies a firm's demand for labor skills.[25] Firms that demand high labor skill sets are more likely to face more complex tasks. We assign firms with above (below) median labor skill index to the "High labor skills" ("Low labor skills") subsample.

Table 7 reports the estimation results for the subsamples split by R&D, Patents, and Labor skill index. All regressions include all control variables as in Table 2 and year and firm fixed effects. Regarding R&D, the coefficient on *Cultural diversity* × *Competition* is significant only for "High R&D" firms (Column 1). It indicates that the impact of board cultural

[25] This industry-specific Labor skill index is based on the Occupational Employment Statistics data from the Bureau of Labor Statistics and the O*NET skill level classification of occupations (Ghaly et al., 2017). We thank Dr. Mohamed Ghaly for sharing his labor skill index data.

TABLE 7 Cross-sectional analysis: Importance of innovation.

	High R&D	Low R&D	Patents	No Patents	High labor skills	Low labor skills
	(1)	(2)	(3)	(4)	(5)	(6)
Cultural diversity ×	0.095***	0.032	0.097***	0.018	0.092***	0.006
Competition	(0.001)	(0.253)	(0.029)	(0.030)	(0.029)	(0.032)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	2161	2115	1573	2703	2246	1531
Adj. R^2	0.402	0.335	0.452	0.322	0.360	0.367
Diff. in coefficients between subsamples	0.063		0.080		0.086	
(*p*-value)	(0.058)		(0.027)		(0.025)	

Note: The table presents coefficient estimates of regressions that evaluate the effect of competition on the value of board cultural diversity for the sample firms partitioned based on the importance of innovation. We classify firms as "High (Low) R&D" when their R&D expenses (scaled by the number of employees) in the past 3 years are above (below) the sample median. We assign firms into the "Patents" subsample if they report non-zero and non-missing values for patents and the "No Patents" subsample otherwise (Kogan et al., 2017). We assign firms with above-median and below-median labor skills (Ghaly et al., 2017) into "High labor skills" and "Low labor skills" subsamples. We also report a Chow test of subsample differences in the coefficient estimates of *Cultural diversity* × *Competition* (based on the coefficient estimates for the triple interaction term of *Cultural diversity* × *Competition* × *Importance Innovation*, where *Importance Innovation* indicates firm with high R&D, patents, or high labor skills). One-sided *p*-value are shown for the null hypothesis that coefficient estimates of *Cultural diversity* × *Competition* for firms with high R&D, patents or high labor skills are larger than those with low R&D, no patents or low labor skills, respectively. The dependent variable is Sales growth, calculated as the percentage change in firm sales from year t−1 to year t. Cultural diversity is the average of cultural distances between each pair of directors. Competition is a dummy variable equal to one (zero) if the HHI index based on the 4-digit SIC industry level is in the lowest (highest) quartile of the sample distribution in year t−1. All regressions include firm- and board-level control variables as in Table 2 and firm and year fixed effects. Robust standard errors clustered at the industry level are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

diversity under high market competition is meaningful for firms that engage in R&D activities and, therefore, may require creative input from their board of directors. Next, the impact of board cultural diversity is more pronounced for firms with patents as manifested by the significant positive coefficient estimate on *Cultural diversity* × *Competition* only for the "Patents" subsample (Column 3). Lastly, the positive effect of board cultural diversity in competitive industries manifests only for firms that demand high labor skills ("High labor skills" subsample) and, accordingly, cope with more complex tasks. Additionally, we test whether the differences in the impact of cultural diversity on competition-performance between the subsamples by the importance of innovation are statistically significant. We add to the regression a triple interaction term *Cultural diversity* × *Competition* × *Innovation* together with *Competition* × *Innovation*, *Cultural diversity* × *Innovation*, where *Innovation* is a variable indicating "High R&D", "Patents" or "High labor skills" subsample, and report in Table 7 its coefficient estimates (Diff. in coefficients between subsamples) as well as its one-sided *p*-value. The *p*-value implies that firms classified as "High R&D", "Patents" or "High labor skills" have larger coefficient estimates on *Cultural diversity* × *Competition* at the 10% level, further supporting a more prominent role of cultural diversity for firms emphasizing innovation.

TABLE 8 Cross-sectional analysis: CEO power.

	CEO duality		CEO pay slice	
	No	Yes	Low	High
	Low power	High power	Low power	High power
	(1)	(2)	(3)	(4)
Cultural diversity × Competition	0.071*	0.042	0.106***	0.028
	(0.041)	(0.027)	(0.037)	(0.025)
Controls	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Obs.	2037	2239	2182	2008
Adj. R^2	0.382	0.395	0.388	0.345
Diff. in coefficients between subsamples	0.029		0.079	
(*p*-value)	(0.280)		(0.039)	

Note: The table presents coefficient estimates of regressions that evaluate the effect of competition on the value of board cultural diversity conditional on CEO power, measured by CEO duality and CEO pay slice. For the *CEO Duality* classification, we assign firms into the "Yes" subsample when the CEO is the board's chairperson, and "No" subsample otherwise. For the *CEO pay slice* classification, we assign firms into "High" ("Low") subsamples when the CEO pay slice fraction, which is the fraction of the CEO's total compensation in the combined total compensation of the top-five executive team, is above (below) the sample median. We also report a Chow test of subsample differences (based on the coefficient estimates for the triple interaction term of *Cultural diversity* × *Competition* × *Power*, where *Power* indicates firms with low CEO power (no CEO duality or low CEO pay slice). One-sided *p*-value are shown for the null hypothesis that coefficient estimates of *Cultural diversity* × *Competition* for firms with low CEO power are larger than those with high CEO power. The dependent variable is *Sales growth*, calculated as the percentage change in firm sales from year *t*−1 to year *t*. *Cultural diversity* is the average of cultural distances between each pair of directors. *Competition* is a dummy variable equal to one (zero) if the *HHI* index based on the 4-digit SIC industry level is in the lowest (highest) quartile of the sample distribution in year *t*−1. All regressions include firm- and board-level control variables as in Table 2 and firm and year fixed effects. Robust standard errors clustered at the industry level are reported in the parenthesis. *, **, and *** indicate significance at the 10%, 5% and 1% levels, respectively.

5.2 | CEO power

Finally, we examine whether the effect of board cultural diversity depends on CEO power. The effectiveness of board monitoring may diminish in the presence of a powerful CEO based on the evidence that managers can use their power to hinder monitoring and prevent boards from properly functioning. Adams et al. (2005) show that firms with powerful CEOs have more variable firm performance. Han et al. (2016) find that the quality of decision-making of powerful CEOs is compromised since they are less likely to receive independent advice. To explore the role of CEO power, we use two measures: (1) CEO duality, which indicates when CEO is also the chairperson of the board, and (2) CEO pay slice, which is the fraction of CEO total compensation in the combined total compensation of the top-five executive team (Bebchuk et al., 2011). CEO compensation information is from the ExecuComp database. CEO triality and high CEO pay slice indicate high CEO power.

Panel A of Table 8 reports the estimation results for CEO power. The coefficients on *Cultural diversity* × *Competition* are positive and significant only when firms are run by a CEO who does not serve as the chairperson of the board (Column 1) and when the CEO pay slice is low (Column 3). We also conduct a Chow test of subsample differences (based on the coefficient estimates for the triple interaction term of *Cultural diversity* × *Competition* × *Power*), where *Power* indicates firms with low CEO power (no CEO duality or low CEO pay slice) and report *p*-values of the one-sided test under the null hypothesis that the coefficient on *Cultural diversity* × *Competition* for firms with no CEO duality (low

CEO pay slice) is larger than that for firms with CEO duality (high CEO pay slice). The *p*-values show that the benefits of a culturally diverse board are significantly stronger for firms with lower CEO pay slice.

Overall, the findings indicate that firms headed by a powerful CEO enjoy fewer benefits from a culturally diverse board, arguably, because board monitoring is less effective when a CEO is powerful or powerful CEOs are less likely to follow strategic advice from their board of directors. As such, we cannot conclude that board cultural diversity facilitates effective monitoring of managers. Based on our findings, we suggest that the benefits of culturally diverse boards are mainly due to their superior advising rather than monitoring capacity, consistent with the theorizing of An et al. (2021).

6 | CONCLUSION

Today, companies around the globe are ramping up diversity in the boardroom. At the same time, increased globalization and rapid technological developments put substantial competitive pressures on companies.[26] In this study, we examine whether board diversity is a potential factor that can help firms overcome the challenges of intensified product market competition. We focus on one aspect of diversity—ancestral cultural diversity, an important source of individual differences among directors that can improve decision-making in the boardroom and generate positive corporate outcomes. We argue that culturally diverse boards can facilitate creative solutions and critical thinking that help firms thrive in a competitive environment.

In line with theoretical predictions, board cultural diversity positively impacts product market performance for firms operating in competitive industries. Our results survive various robustness checks, such as controlling for the impact of other dimensions of board diversity—gender, age, director tenure diversity, and board independence and using alternate measures of firm performance, product market competition, and board cultural diversity. We attempt to alleviate the endogeneity concerns by instrumenting our diversity with the local ancestral cultural diversity in the firm's headquarters location. We also exploit the quasi-natural experiment of import tariff cuts in the U.S. as a shock to product market competition. We show that board cultural diversity contributes to a better firm performance following the competition shock, confirming our main result on the positive impact of board cultural diversity.

We supplement our main empirical results with cross-sectional tests to evaluate potential channels of how board cultural diversity improves firm performance in competitive industries. We show that the positive effect of cultural diversity is more prominent for innovative firms and firms that request more creative inputs. Lastly, we find that board cultural diversity is more effective when CEOs are less powerful.

Collectively, our findings support the view that cultural diversity should be advocated, at least in the context of corporate boards. Despite potential shortcomings associated with a diverse board, we show that the benefits of board cultural diversity in a competitive environment likely outweigh its costs.

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[26] According to the Report of American Immigration Council, 44% of the year 2022's Fortune 500 company list were founded by immigrants or their children. The crucial role played by immigrants in the US economy further underscores the importance of understanding the impacts of cultural diversity in business settings. The report is available at https://data.newamericaneconomy.org/en/fortune500-2021/

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