



The Diversity-Performance Paradox: Evidence from S&P 500 Firms Before the COVID-19 Pandemic

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This study examines the relationship between board diversity and firm performance while evaluating the moderating role of innovation strategy. Using panel data from 487 S&P 500 firms spanning 2015–2019, the study reassessed the diversity–performance relationship by addressing endogeneity concerns that may bias prior findings in corporate governance research. Firm performance was measured using Tobin’s *q* and return on assets, while board diversity was captured through gender and ethnic representation. Innovation strategy was measured using research and development intensity. The empirical analysis employed ordinary least squares, firm fixed-effects models, and dynamic panel estimations to distinguish cross-sectional associations from within-firm effects. The results indicated that board diversity is positively associated with firm performance under pooled regressions. However, these relationships disappeared after controlling for firm fixed-effects and dynamic endogeneity. The findings suggest that the apparent benefits of board diversity are largely driven by persistent firm characteristics rather than changes in board composition itself. Overall, the study contributes to the corporate governance literature by demonstrating the importance of addressing endogeneity when evaluating board diversity outcomes and by providing a pre-pandemic benchmark for future governance research.

Keywords: Board diversity, firm performance, innovation strategy, corporate governance, endogeneity

JEL: G34, M14, O3

Board diversity has become a central issue in contemporary corporate governance research and policy discussions. Regulators, institutional investors, and corporate stakeholders increasingly encourage firms to improve gender and ethnic representation on corporate boards as part of broader governance reforms designed to enhance accountability, legitimacy, and organizational effectiveness (Feng, 2020; Driss *et al.*, 2024; Hao and Rezaee, 2025). Diverse boards are frequently viewed as mechanisms that improve monitoring quality, broaden strategic perspectives, strengthen stakeholder responsiveness, and enhance organizational decision-making (Wang *et al.*, 2020; Ludwig and Sassen, 2022; Petruzzelli and Badia, 2024).

The growing emphasis on diversity reflects broader changes in governance environments. Firms increasingly operate within complex stakeholder networks characterized by rising demands for transparency, accountability, sustainability, and strategic adaptability (Bellucci *et al.*, 2019; Christensen

et al., 2021). Consequently, board composition has attracted substantial attention because diverse boards may provide broader expertise, heterogeneous knowledge resources, and stronger stakeholder representation that contribute to long-term competitiveness and organizational legitimacy (Dragomir *et al.*, 2022; Ruiz *et al.*, 2021).

Several theoretical perspectives, including stakeholder theory, agency theory, and legitimacy theory, suggest that board diversity may influence firm performance. However, empirical evidence remains mixed. While many studies report positive associations between board diversity and firm value, innovation capability, governance quality, and strategic adaptability, other studies find weak or statistically insignificant effects once firm-specific characteristics are controlled for. As a result, the economic consequences of board diversity remain controversial.

One explanation for these inconsistent findings is endogeneity. Firms with stronger governance systems, superior managerial quality, more progressive organizational cultures, and historically stronger performance may be more likely to appoint diverse directors. Consequently, observed diversity-performance relationships may reflect broader organizational advantages rather than the independent effects of board composition itself. This issue is particularly relevant among large publicly listed firms where governance quality, innovation capability, and reputational capital vary systematically across organizations.

This study refers to this tension as the diversity-performance paradox. Firms with more diverse boards frequently appear to outperform less diverse firms in pooled regressions; however, these advantages may weaken or disappear once persistent firm characteristics are controlled for. Distinguishing between cross-sectional differences across firms and within-firm changes in board composition is therefore essential for understanding whether diversity itself contributes to improved performance.

The study further examines whether innovation strategy influences the relationship between board diversity and firm performance. Innovation-oriented firms operate in uncertain and knowledge-intensive environments that require effective information processing and strategic adaptability (Clarkson *et al.*, 2020; Stuart *et al.*, 2022). Diverse boards may be particularly valuable in such settings because they provide broader expertise and heterogeneous perspectives that support innovation-related decision-making. At the same time, firms with stronger innovation capabilities may also possess superior governance structures and greater incentives to appoint diverse directors, further complicating causal interpretation.

Using panel data from 487 S&P 500 firms during 2015–2019, this study examines the relationship between board diversity and firm performance while evaluating the moderating role of innovation strategy. Firm performance is measured using Tobin's q and return on assets, while board diversity is captured through gender and ethnic representation. The empirical analysis employs pooled ordinary least

squares, firm fixed-effects models, between estimators, and dynamic panel estimation techniques to distinguish cross-sectional associations from within-firm governance effects.

This study contributes to the literature in four ways. First, it reassesses the board diversity–performance relationship by explicitly addressing endogeneity concerns that may bias prior governance research. Second, it evaluates whether innovation strategy moderates the relationship between board diversity and firm performance. Third, it distinguishes between cross-sectional governance differences and within-firm governance effects. Finally, by focusing on the 2015–2019 pre-pandemic period, the study establishes a clearly defined baseline of board diversity–performance relationships under relatively stable governance and operating conditions. This baseline can support future studies that use comparable post-pandemic data to assess whether these relationships changed following the governance, organizational, and financial disruptions associated with COVID-19.

The remainder of the paper is organized as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 describes the data, variables, and methodology. Section 4 presents the empirical results. Section 5 reports robustness analyses. Sections 6–9 provide the discussion, conclusion, implications, and future research directions.

LITERATURE REVIEW

Theoretical Underpinnings

This study draws on stakeholder theory, agency theory, and legitimacy theory to explain the relationship between board diversity and firm performance. Stakeholder theory argues that firms create value by responding effectively to the interests and expectations of diverse stakeholder groups (Bellucci *et al.*, 2019; Ruiz *et al.*, 2021). A diverse board may improve stakeholder representation, communication, and strategic responsiveness, thereby supporting organizational performance.

Agency theory suggests that board composition influences monitoring effectiveness and managerial oversight. Diverse directors may contribute independent perspectives, reduce groupthink, and strengthen board monitoring, improving governance quality and decision-making (Erin *et al.*, 2022; Ludwig and Sassen, 2022). Legitimacy theory further proposes that diversity enhances organizational legitimacy by aligning governance structures with evolving social and institutional expectations (Dragomir *et al.*, 2022; Christensen *et al.*, 2021). Consequently, board diversity may contribute to both economic and non-economic organizational outcomes.

Gender Diversity and Firm Performance

Gender diversity has become an important governance issue as firms face increasing pressure to improve

board representation (Driss *et al.*, 2024; Hao and Rezaee, 2025). Female directors may contribute different experiences, leadership styles, and stakeholder perspectives that enhance board effectiveness and strategic decision-making (Wang *et al.*, 2020; Petruzzelli and Badia, 2024). Prior studies report that gender-diverse boards are associated with improved governance quality, innovation, sustainability initiatives, and firm value, although empirical findings remain mixed after controlling for firm-specific characteristics (Aggarwal *et al.*, 2019; Makkonen, 2022; Sierra-Morán *et al.*, 2024).

Drawing on stakeholder, agency, and legitimacy theories, greater gender diversity should improve board effectiveness and organizational performance.

H₁: Board gender diversity is positively associated with firm performance.

Ethnic Diversity and Firm Performance

Ethnic diversity may expand the range of knowledge, experiences, and external networks available to boards. Diverse ethnic representation may improve firms' ability to understand heterogeneous stakeholder groups, respond to market changes, and identify strategic opportunities (Ludwig and Sassen, 2022; Wang *et al.*, 2020). Prior evidence suggests that ethnically diverse boards may contribute to innovation, organizational adaptability, and long-term competitiveness, although the magnitude and significance of these effects vary across studies and institutional contexts (Danso *et al.*, 2024; An *et al.*, 2021; Nageri, 2025).

From a stakeholder and legitimacy perspective, ethnic diversity strengthens board representation and responsiveness, which may enhance firm performance.

H₂: Board ethnic diversity is positively associated with firm performance.

Innovation Strategy as a Moderator

Innovation-oriented firms operate in uncertain and knowledge-intensive environments that require strategic flexibility and effective information processing (Clarkson *et al.*, 2020; Stuart *et al.*, 2022). Research suggests that diverse boards may be particularly valuable in such settings because they provide broader expertise, heterogeneous knowledge resources, and alternative perspectives for solving complex problems (An *et al.*, 2021; Makkonen, 2022). Firms with stronger innovation capabilities also tend to adopt more sophisticated governance structures and invest in long-term strategic development (Huang *et al.*, 2024).

From an information-processing perspective, innovation intensity increases the complexity, uncertainty, and knowledge demands faced by corporate boards. Under such conditions, the heterogeneous expertise, experiences, and perspectives associated with board diversity are more likely

to be relevant to strategic decision-making. Diverse directors may improve the board's ability to evaluate alternative technologies, challenge established managerial assumptions, identify emerging market opportunities, and assess the risks associated with long-term innovation investments (An *et al.*, 2021; Makkonen, 2022; Sierra-Morán *et al.*, 2024). In contrast, when firms pursue less innovation-intensive strategies, strategic decisions may be more routine and the additional informational benefits of board diversity may be less consequential. Innovation strategy therefore operates as a contextual condition that can strengthen the extent to which diverse board resources are translated into superior firm performance.

Accordingly, the benefits of board diversity may become more pronounced when firms pursue innovation-intensive strategies.

H₃: Innovation strategy positively moderates the relationship between board diversity and firm performance, such that the positive relationship is stronger in firms with higher innovation intensity.

Endogeneity and the Diversity-Performance Paradox

Despite strong theoretical arguments, the diversity-performance relationship remains controversial. One explanation is endogeneity. High-performing firms often possess stronger governance systems, superior managerial quality, greater innovation capabilities, and more progressive organizational cultures that simultaneously support both stronger performance and greater diversity (Aggarwal *et al.*, 2019). Consequently, positive diversity-performance relationships observed in pooled regressions may reflect persistent firm characteristics rather than causal governance effects.

This concern can be understood through both agency theory and organizational selection arguments. From an agency perspective, firms with stronger monitoring systems, more professional boards, and better managerial discipline may simultaneously achieve superior performance and adopt more diverse board structures. Diversity may therefore be correlated with the broader quality of the governance system rather than independently causing improved performance. Similarly, organizational selection suggests that firms with stronger reputations, greater financial resources, and more progressive corporate cultures are better positioned to attract and appoint directors from diverse backgrounds. These persistent characteristics may influence both board composition and firm outcomes, creating an omitted-variable bias in pooled estimates (Aggarwal *et al.*, 2019; Carter *et al.*, 2010; Sierra-Morán *et al.*, 2024).

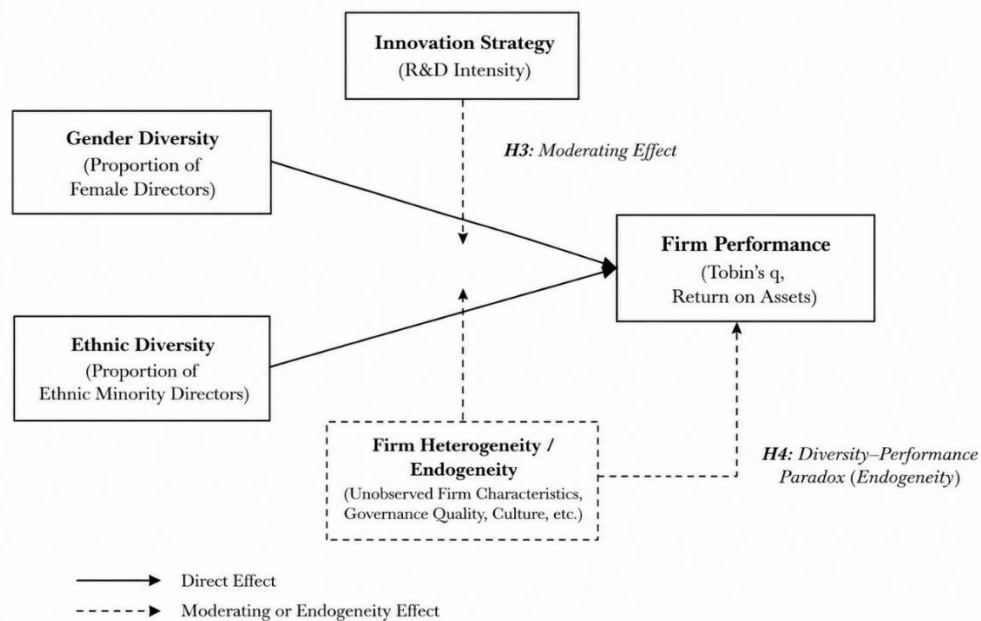
Reverse causality may also arise because firms with stronger prior performance possess greater resources, legitimacy, and stakeholder pressure to expand board representation. In this case, performance affects diversity rather than diversity affecting performance. Firm fixed-effects models

reduce bias arising from time-invariant unobserved characteristics, while dynamic panel models account for performance persistence and potential feedback between prior performance and current board composition. If the positive coefficients observed in pooled regressions are primarily driven by selection, omitted variables, or reverse causality, their magnitude and statistical significance should decline once these factors are controlled for.

Firm fixed-effects and dynamic panel estimations provide a more rigorous framework for addressing unobserved heterogeneity, reverse causality, and performance persistence (Sierra-Morán *et al.*, 2024; Nageri, 2025). If diversity effects weaken after controlling for these factors, the apparent performance advantages associated with diversity may largely reflect cross-sectional organizational differences.

H₄: The positive relationship between board diversity and firm performance weakens after controlling for firm-specific heterogeneity and endogeneity.

Figure 1 presents the theoretical framework. Gender diversity and ethnic diversity are proposed to influence firm performance directly, while innovation strategy moderates these relationships. The framework further recognizes that observed diversity-performance relationships may be affected by endogeneity and persistent firm heterogeneity.



Source: Authors' presentation

Figure 1. Theoretical Framework

METHODOLOGY

Sample and Procedure

This study examined the relationship between board diversity and firm performance using panel data from S&P 500 firms during the period 2015 to 2019. The pre-pandemic period provided a stable setting for examining governance-performance relationships before the structural disruptions associated with COVID-19. Data on board and director characteristics were obtained from Institutional Shareholder Services, formerly RiskMetrics, through the Wharton Research Data Services database. This dataset provides detailed information on director characteristics such as gender, ethnicity, age, board affiliation, and meeting attendance.

Firm level financial data are collected from S&P Capital IQ. To conduct regressions including lagged variables, financial information was collected for the period 2014 to 2019. Firms with missing director characteristics or incomplete financial information were removed from the sample. After data screening, the final dataset consisted of 487 firms and 2183 firm year observations, forming an unbalanced panel. The study focused on the pre-pandemic period from 2015 to 2019 in order to avoid the structural disruptions associated with the COVID-19 pandemic. The pandemic substantially altered corporate governance environments, organizational decision-making processes, and financial performance dynamics across industries. Examining the pre-pandemic period therefore provides a more stable institutional setting for evaluating the relationship between board diversity, innovation strategy, and firm performance.

Variables and Measurement

This study examines the relationship between board diversity and firm performance while controlling for firm level and board level characteristics. Table 1 summarizes all variables used in the empirical analysis.

–Dependent Variables

Firm performance was measured using two indicators: Tobin's q and return on assets (ROA). Tobin's q was employed as a market-based measure of firm performance because it reflects investors' expectations regarding future growth opportunities and strategic value creation. Prior governance studies (see Hossain *et al.*, 2020; Hossain *et al.*, 2023; Ardiana, 2023; Li *et al.*, 2024) frequently use Tobin's q to capture the market valuation effects associated with governance quality and organizational capabilities.

Return on assets was used as an accounting-based performance measure reflecting firms' operational efficiency and profitability (see Feng, 2021; Samani and Sabelfeld, 2023; Xu *et al.* 2025). Employing both market-based and accounting-based indicators improved robustness by capturing different dimensions of organizational performance.

–Independent Variables

Board diversity represents the key explanatory variable in this study. It was measured using both gender diversity and ethnic diversity indicators – the insight comes from the work of Radu and Smaili (2022) and Huang *et al.* (2024).

Gender diversity was measured using a dummy variable that equals one if the board includes at least one female director and zero otherwise. Ethnic diversity was measured using a dummy variable that equals one if the board includes at least one ethnic minority director and zero otherwise. According to Institutional Shareholder Services, ethnic minority directors include individuals identified as Asian, Black or African American, Hispanic or Latin American, Middle Eastern, Indian, or Native American.

The dummy specifications capture the presence of female and ethnic minority directors on corporate boards. However, because many S&P 500 firms already maintain at least minimal levels of board diversity, within-firm variation in the dummy measures may be relatively limited during the sample period (Tingbani *et al.*, 2020). This issue is particularly relevant for firm fixed-effects estimation, which relies on temporal within-firm variation over time.

To address this concern, additional analyses employed percentage-based diversity measures to better capture variation in board composition intensity. These alternative specifications provided a more sensitive measure of diversity representation and improved robustness regarding the measurement of board diversity.

–Moderating Variable

Innovation strategy was measured using research and development intensity, defined as research and development expenditure divided by prior-year total assets. R&D intensity is widely used as a proxy for firms' innovation orientation, technological capability, and long-term strategic investment commitment in corporate governance and innovation research (An *et al.*, 2021; Makkonen, 2022; Nageri, 2025). This measure captured the extent to which firms allocate resources toward innovation-related activities.

–Control Variables

Several control variables, commonly used in corporate governance research, were included in the model (see Dutta and Dutta., 2021; Soliman and Ben-Amar., 2022; Wen *et al.*, 2022; Develay and James., 2024). These variables capture firm characteristics and board characteristics that may influence firm performance.

Firm size was measured as the logarithm of total assets. Firm age was measured as the logarithm of years since the firm's founding. Board size was measured as the logarithm of the total number of directors. Board age represented the logarithm of the average age of board members. Leverage was calculated as total debt divided by total assets. Board independence was measured as the proportion

of independent directors on the board. Director meeting attendance was measured as the proportion of directors attending less than seventy five percent of board meetings. Table 1 lists symbols and definitions of all the variables used in this research. To reduce the influence of extreme values, all continuous variables were winsorized at the first and ninety ninth percentiles.

Variables	Symbols	Definitions
Firm performance (Dependent variables)		
Tobin's q	$TOBINQ_{it}$	The book value of assets plus the market value of common equity minus the book value of common equity divided by the book value of assets (Log transformed)
Return on assets	ROA_{it}	Annual net income divided by total assets
Diversity (Independent variables)		
Female representation	RPF_{it}	A dummy variable, the value is one when there is female director in the board, zero otherwise
Ethnic minority representation	RPE_{it}	A dummy variable, the value is one when there is ethnic minority director in the board, zero otherwise
% of female directors	$PFEM_{it}$	Number of female directors divided by total number of directors
% of ethnic minority directors	$PEHN_{it}$	Number of ethnic minority directors divided by total number of directors
Innovative strategy (moderator)		
Innovation intensity	$INNO_STR_{it-1}$	Research and development expense divided by total assets from the prior year
Control variables		
Firm size	$FSize_{it}$	The logarithm of total assets
Firm age	$FAGE_{it}$	The logarithm of years since foundation
Board size	$BSize_{it}$	The logarithm of the total number of directors
Board age	$BAGE_{it}$	The logarithm of average age of directors in the board
Leverage	LEV_{it}	Total debt divided by total assets
% of independent directors	IND_{it}	Number of independent directors divided by total number of directors
% of directors attending less than 75% of board meetings	$ATTEN75_{it}$	Number of directors attending less than 75% of board meetings divided by total number of directors

Source: Authors' definition

Table 1: Variable Definitions

Model Specification

The empirical analysis employed multiple estimation approaches in order to distinguish cross-sectional associations from within-firm governance effects. Pooled ordinary least squares estimation captured average cross-sectional relationships between board diversity and firm performance. However, pooled estimations may not adequately control for unobserved firm heterogeneity and endogeneity concerns.

Firm fixed-effects estimation addressed this limitation by controlling for time-invariant firm characteristics and focusing on within-firm variation over time. Dynamic panel estimation was further employed to address potential reverse causality and performance persistence.

To examine the relationship between board diversity and firm performance, panel regression models were employed. The baseline regression model is specified as follows:

$$Perform = \beta_0 + \beta_1 Diversity + \beta_2 Innovation + \beta_3 (Diversity \times Innovation) + \beta_4 Controls + \varepsilon$$

Where, Perform represents firm financial performance measured by Tobin's q or return on assets. Diversity represents board diversity including gender diversity and ethnic diversity. Innovation represents innovation strategy measured by innovation intensity. Controls represent the vector of firm and board level control variables, and ε represents the error term.

To further examine the effects of different types of diversity, gender diversity and ethnic diversity are tested separately. The corresponding regression equation is:

$$P_{it} = \alpha_0 + \alpha_1 DIVER_{it} + \alpha_2 INNO_STR_{it-1} + \alpha_3 (DIVER_{it} \times INNO_STR_{it-1}) + \alpha_4 X_{it} + \varepsilon_{it}$$

Where, $DIVER_{it}$ represents board diversity measured by either gender diversity or ethnic diversity.

In addition, a joint diversity specification model was estimated to compare the explanatory power of gender diversity and ethnic diversity, simultaneously. The joint diversity specification allows the study to evaluate the relative explanatory contribution of gender diversity and ethnic diversity while accounting for overlap between the two dimensions of board representation.

$$P_{it} = \gamma_0 + \gamma_1 RPF_{it} + \gamma_2 RPE_{it} + \gamma_3 INNO_STR_{it-1} + \gamma_4 (RPF_{it} \times INNO_STR_{it-1}) + \gamma_5 (RPE_{it} \times INNO_STR_{it-1}) + \gamma_6 X_{it} + \varepsilon_{it}$$

Analysis Technique

The empirical analysis employed panel data regression techniques. Both ordinary least squares (OLS) models and firm fixed-effects models were estimated. The OLS models included industry and year fixed-effects following Carter *et al.* (2010).

The Hausman test was conducted to determine whether the fixed-effects or the random effects estimation is appropriate. The results favor the use of the firm fixed-effects models, indicating that unobserved firm specific characteristics influence the relationship between board diversity and firm performance.

Additional regression analyses were conducted to distinguish within-firm and between-firm effects and to evaluate the moderating role of innovation strategy.

RESULTS

Descriptive Statistics and Correlation Results

Table 2 reports descriptive statistics for the final sample of 2,183 firm–year observations from 487 S&P 500 firms during 2015–2019. Female board representation is widespread, while ethnic minority representation remains limited. Firms with minority directors exhibit higher average Tobin's q and R&D intensity, motivating the multivariate analysis.

Variables	N	Mean	p50	S.D.	Min	Max
Tobin's q	2183	0.70	0.59	0.59	-0.20	2.57
ROA	2183	0.06	0.06	0.06	-0.14	0.26
Female representation	2183	0.99	1.00	0.10	0.00	1.00
Ethnic minority representation	2183	0.26	0.00	0.44	0.00	1.00
Number of female directors	2183	2.48	2.00	1.10	0.00	7.00
Number of ethnic minority directors	2183	0.33	0.00	0.65	0.00	6.00
% of female directors	2183	0.23	0.22	0.09	0.00	0.46
% of ethnic minority directors	2183	0.03	0.00	0.06	0.00	0.25
Innovation intensity	2183	0.02	0.00	0.04	0.00	0.18
Firm size	2183	10.07	9.93	1.29	6.82	13.71
Firm age	2183	4.07	4.09	0.76	1.61	5.38
Board size	2183	2.35	2.40	0.19	1.61	2.77
Board age	2183	4.14	4.14	0.05	4.00	4.27
Leverage	2183	0.30	0.30	0.18	0.00	0.93
% of independent directors	2183	0.65	0.82	0.35	0.00	0.93
% of directors attending less than 75 % of board meetings	2183	0.00	0.00	0.02	0.00	0.10

Source: Authors' definition

Table 2: Summary Statistics

Table 3 (see Appendix–I) displays the correlation matrix of variables, providing the test of multicollinearity and initial evidence for hypotheses. The innovative strategy has a correlation of 0.996 with the interaction between female representation and innovative strategy, suggesting multicollinearity. To further confirm the problem, variance inflation factors (VIF) were calculated. Innovative strategy and the interaction term have variance inflation factors of 13.35 and 14.79, respectively, larger than the cut-off value of 10, indicating multicollinearity. After the innovation strategy is demeaned, this problem is addressed. Through the correlation matrix, female representation has a significantly positive correlation with ROA, but slightly positive and not significant with Tobin's q, which is not consistent with hypothesis 1. The positive and significant correlations between ethnic minority representation and performance, and correlations between interaction terms and performance provide initial support to hypotheses 2 to 4.

Gender Diversity and Firm Performance

Table 4 (see Appendix–II) reports the relationship between gender diversity and firm performance. The

OLS results show that female board representation is positively associated with Tobin's q and ROA, and the interaction with innovation intensity is positive in pooled specifications. However, these relationships become statistically insignificant under firm fixed-effects. This pattern suggests that the positive OLS association is mainly driven by persistent cross-sectional differences across firms rather than within-firm changes in gender representation.

Ethnic Diversity and Firm Performance

Table 5 (see Appendix-III) reports the results for ethnic minority board representation. OLS estimates indicate a positive association between ethnic diversity and firm performance, although the moderating role of innovation intensity is inconsistent across performance measures. Once firm fixed-effects are introduced, the coefficients on ethnic diversity and the interaction terms lose statistical significance. These results suggest that ethnic diversity-performance associations are primarily cross-sectional rather than within-firm effects.

Joint Effects of Gender Diversity and Ethnic Diversity

Table 6 (see Appendix-IV) jointly includes gender and ethnic diversity. The OLS results show positive associations between both diversity measures and firm performance, with gender diversity generally displaying a stronger association in market-based specifications. However, the effects again disappear under firm fixed-effects. The joint results reinforce the argument that observed diversity-performance relationships mainly reflect persistent firm characteristics rather than direct performance effects of board composition changes.

Robustness Checks

-Alternative Measures of Board Diversity

Table 7 (see Appendix-V) reports robustness tests using percentage-based gender and ethnic diversity measures. The results remain consistent with the baseline findings. Percentage-based diversity measures are positively associated with firm performance under OLS specifications, but the effects become insignificant under firm fixed-effects. Table 8 (see Appendix-VI) reports joint specifications and produces similar conclusions. These findings indicate that the main results are not driven by the dummy-variable measurement of board diversity.

-Between-Estimators Results

Table 9 (see Appendix-VII) reports between-estimator results. Ethnic diversity is positively associated with average firm performance across firms, while gender diversity shows weaker effects. These results support the view that diversity-performance relationships are mainly cross-sectional. Firms with

persistently higher diversity also tend to display stronger long-term organizational characteristics, but within-firm diversity changes do not generate robust short-term performance effects.

Diagnostic Tests and Robust Standard Errors

Variance inflation factor diagnostics indicate multicollinearity between innovation intensity and interaction terms under dummy-variable specifications. This issue is addressed by demeaning innovation intensity. No multicollinearity concerns arise when diversity is measured using percentage variables. Tests further indicate the presence of heteroskedasticity in pooled regressions and serial correlation in fixed-effects models. Accordingly, all reported regressions employ heteroskedasticity- and autocorrelation-robust standard errors.

Dynamic Panel Estimation and Endogeneity

Table 10 (see Appendix-VIII) reports dynamic panel estimations. Lagged firm performance strongly predicts current performance, confirming substantial performance persistence. After controlling for lagged performance and potential reverse causality, the effects of board diversity become statistically insignificant. These results further support the conclusion that pooled diversity-performance associations are not robust once dynamic endogeneity is addressed.

DISCUSSION

This study examines whether board diversity contributes to firm performance after accounting for innovation strategy, unobserved heterogeneity, and dynamic endogeneity. The findings reveal a clear distinction between cross-sectional associations and within-firm effects. Under pooled OLS estimations, both gender diversity and ethnic diversity exhibit positive associations with firm performance. However, these relationships largely disappear once firm fixed-effects and dynamic panel approaches were introduced.

The findings are broadly consistent with stakeholder theory, agency theory, and legitimacy theory. Diverse boards may improve stakeholder representation, strengthen governance legitimacy, and provide broader perspectives for strategic decision-making (Bellucci *et al.*, 2019; Ruiz *et al.*, 2021; Dragomir *et al.*, 2022). Such advantages may explain why firms with more diverse boards often exhibit stronger market valuation and profitability. However, the results suggest that these observed benefits are not necessarily generated by short-term changes in board composition. Instead, they appear to be closely associated with persistent organizational characteristics that simultaneously support stronger governance quality, greater diversity, and superior performance.

The results therefore support the diversity – performance paradox proposed in this study. Firms that

maintain more diverse boards tend to possess stronger organizational capabilities, more sophisticated governance systems, and greater strategic resources. Similar concerns regarding governance-related endogeneity have been highlighted in sustainability and disclosure research, where governance structures often reflect broader organizational quality rather than isolated causal mechanisms (Christensen *et al.*, 2021; Erin *et al.*, 2022; Petruzzelli and Badia, 2024).

The moderating role of innovation strategy provides additional insights. Innovation-oriented firms operate in uncertain and knowledge-intensive environments that require effective information processing and strategic adaptability (Clarkson *et al.*, 2020; Stuart *et al.*, 2022). Consistent with upper-echelon arguments, diverse boards may contribute broader expertise and heterogeneous perspectives that facilitate innovation-related decision-making (An *et al.*, 2021; Nageri, 2025). Nevertheless, the moderation effects weaken considerably under fixed-effects specifications, suggesting that innovation capability itself may be another manifestation of underlying organizational quality.

Overall, the findings indicate that board diversity remains an important governance characteristic, but its economic consequences are more complex than implied by simple cross-sectional analysis. Diversity may contribute to legitimacy, representation, and strategic flexibility, yet the direct financial effects appear substantially smaller once endogeneity and firm-specific heterogeneity are addressed.

CONCLUSION

Drawing on stakeholder theory, agency theory, and legitimacy theory, this study examines the relationship between board diversity and firm performance among S&P 500 firms during the pre-pandemic period. The analysis further evaluates whether innovation strategy moderates this relationship and whether observed diversity-performance associations remain robust after controlling for endogeneity. The results indicate that board diversity is positively associated with firm performance under pooled regressions. Firms with female and ethnic minority directors generally exhibit higher market valuation and stronger operating performance. These findings are initially consistent with arguments that diverse boards provide broader expertise, stronger stakeholder representation, and improved governance quality. However, the positive relationships weaken substantially after introducing firm fixed-effects and dynamic panel estimations. Once unobserved heterogeneity, performance persistence, and potential reverse causality are addressed, the estimated effects of board diversity become statistically insignificant across most specifications. The evidence therefore suggests that much of the observed diversity-performance relationship reflects persistent organizational characteristics rather than direct causal effects arising from changes in board composition.

The study consequently highlights the importance of distinguishing between cross-sectional governa-

nce differences and within-firm governance changes. While diversity remains valuable from governance, legitimacy, and representation perspectives, the findings suggest that diversity alone does not automatically generate immediate improvements in financial performance.

IMPLICATIONS

This study provides several theoretical, practical, and methodological implications. From a theoretical perspective, the findings contribute to the ongoing debate regarding the economic consequences of board diversity. Existing governance research often reports positive diversity-performance relationships, yet the present findings demonstrate that these relationships are highly sensitive to the treatment of endogeneity and unobserved heterogeneity. The results therefore extend prior governance studies by emphasizing the distinction between cross-sectional organizational differences and within-firm governance effects (Aggarwal *et al.*, 2019; Makkonen, 2022; Sierra-Morán *et al.*, 2024).

From a practical perspective, the findings suggest that policymakers, regulators, investors, and corporate boards should avoid evaluating diversity initiatives solely through short-term financial outcomes. Diversity may strengthen legitimacy, stakeholder engagement, governance quality, and organizational reputation even when immediate financial benefits are difficult to identify (Wang *et al.*, 2020; Radu and Smaili, 2022; Driss *et al.*, 2024). Consequently, diversity should be viewed as one component of a broader governance strategy rather than an isolated mechanism of value creation.

From a methodological perspective, the study demonstrates the importance of rigorous causal identification in governance research. Similar concerns have emerged in studies examining Environmental, Social and Governance (ESG) performance, disclosure quality, stakeholder engagement, and sustainability reporting, where empirical conclusions often depend heavily on model specification and endogeneity treatment (Ardiana, 2023; Dutta and Dutta, 2021; Soliman and Ben-Amar, 2022; Wen *et al.*, 2022). The comparison between pooled regressions, fixed-effects models, between estimators, and dynamic panel estimations highlights the importance of employing multiple econometric approaches when evaluating governance outcomes.

LIMITATIONS AND FUTURE DIRECTIONS

Several limitations provide opportunities for future research. First, the analysis focuses exclusively on large publicly listed firms in the United States. Because S&P 500 firms generally possess relatively advanced governance structures and established diversity practices, the findings may not fully generalize to smaller firms, privately held firms, or firms operating in emerging markets. Future studies may examine

whether diversity–performance relationships vary across institutional environments and governance regimes.

Second, board diversity was measured using gender and ethnic representation. Future research may explore additional dimensions of diversity, including educational background, professional expertise, international experience, tenure diversity, and cognitive diversity. Such measures may capture governance characteristics that are not fully reflected by demographic indicators alone.

Third, this study focuses primarily on financial performance outcomes. Prior research suggests that governance mechanisms may influence broader organizational outcomes, including disclosure quality, sustainability performance, stakeholder engagement, innovation effectiveness, and information transparency (Hossain *et al.*, 2020; Hossain *et al.*, 2023; Li *et al.*, 2024; Xu *et al.*, 2025). Future studies may therefore investigate whether board diversity contributes more strongly to non–financial outcomes than to traditional accounting– or market–based performance measures.

Finally, future research may employ stronger identification strategies, including regulatory shocks, natural experiments, instrumental variables, or quasi–experimental designs. Such approaches may provide additional evidence regarding the causal mechanisms linking board diversity, innovation strategy, governance quality, and organizational performance.

REFERENCES

- Aggarwal, R., Jindal, V., & Seth, R. (2019). Board diversity and firm performance: The role of business group affiliation. *International Business Review*, 28(6): 101600. <https://doi.org/10.1016/j.ibusrev.2019.101600>
- An, H., Chen, C. R., Wu, Q., & Zhang, T. (2021). Corporate innovation: Do diverse boards help? *Journal of Financial and Quantitative Analysis*, 56(1): 155–182. <https://doi.org/10.1017/S0022109019001005>
- Ardiana, P. A. (2023). Stakeholder engagement in sustainability reporting by Fortune Global 500 companies: A call for embeddedness. *Meditari Accountancy Research*, 31(2): 344–365. <https://doi.org/10.1108/MEDAR-03-2021-1247>
- Bellucci, M., Simoni, L., Acuti, D., & Manetti, G. (2019). Stakeholder engagement and dialogic accounting. *Accounting, Auditing and Accountability Journal*, 32(5): 1467–1499. <https://doi.org/10.1108/AAAJ-09-2017-3158>
- Carter, D. A., D'Souza, F., Simkins, B. J., & Simpson, W. G. (2010). The gender and ethnic diversity of US boards and board committees and firm financial performance. *Corporate Governance: An International Review*, 18(5): 396–414. <https://doi.org/10.1111/j.1467-8683.2010.00809.x>
- Christensen, H., Hail, L., & Leuz, C. (2021). Mandatory CSR and sustainability reporting: Economic analysis and literature review. *Review of Accounting Studies*, 26(3): 1176–1248. <https://doi.org/10.1007/s11142-021-09609-5>
- Clarkson, P. M., Ponn, J., Richardson, G. D., Rudzicz, F., Tsang, A., & Wang, J. (2020). A textual analysis of US corporate social responsibility reports. *Abacus*, 56(1): 3–34. <https://doi.org/10.1111/abac.12182>
- Danso, F. K., Adusei, M., Sarpong–Danquah, B., & Prempeh, K. B. (2024). Board expertise diversity and firm performance in sub–Saharan Africa: Do firm age and size matter? *Future Business Journal*, 10(98): 1–18. <https://doi.org/10.1186/s43093-024-00386-6>
- Develay, E. & James, E. (2024). CSR committees and the voluntary disclosures of climate change information in France. *Finance Research Letters*, 69, 106241. <https://doi.org/10.1016/j.frl.2024.106241>
- Dragomir, V. D., Dumitru, M., & Feleaga, L. (2022). The predictors of non–financial reporting quality in Romanian state–owned enterprises. *Accounting in Europe*, 19(1): 110–151. <https://doi.org/10.1080/17449480.2021.2018474>
- Driss, H., Drobetz, W., El Ghoul, S., & Guedhami, O. (2024). The sustainability committee and environmental disclosure: International evidence. *Journal of Economic Behavior and Organization*, 221, 602–625. <https://doi.org/10.1016/j.jebo.2024.02.019>
- Dutta, P. & Dutta, A. (2021). Impact of external assurance on corporate climate change disclosures: New evidence from Finland. *Journal of Applied Accounting Research*, 22(2): 252–285. <https://doi.org/10.1108/JAAR-08-2020-0162>
- Erin, O., Adegboye, A., & Bamigboye, O. A. (2022). Corporate governance and sustainability reporting quality: Evidence from Nigeria. *Sustainability Accounting, Management and Policy Journal*, 13(3): 680–707. <https://doi.org/10.1108/SAMPJ-06-2020-0185>

- Feng, X. (2020). Evaluate human resource management challenges faced by investment banks: A case study of Goldman Sachs. *Journal of Chinese Human Resource Management*, 12(1): 50–64. <https://doi.org/10.47297/wspchrmWSP2040-800504.20211201>
- Feng, X. (2021). The role of ESG in acquirers' performance change after M&A deals. *Green Finance*, 3(3): 287–318. <https://doi.org/10.3934/gf.2021015>
- Hao, J. & Rezaee, Z. (2025). The impact of mandatory governance characteristics on firms' graph disclosure quality: Evidence from the European Union directive. *The International Journal of Accounting*, 60, 2541003. <https://doi.org/10.1142/S1094406025410033>
- Hossain, A., Masum, A. A., Saadi, S., & Benkraiem, R. (2023). Generalist CEO and carbon emissions. *Journal of Economic Behavior and Organization*, 213, 68–86. <https://doi.org/10.1016/j.jebo.2023.04.006>
- Hossain, M., Raghunandan, K., & Rama, D. V. (2020). Abnormal disclosure tone and going concern modified audit reports. *Journal of Accounting and Public Policy*, 39(4): 106764. <https://doi.org/10.1016/j.jaccpubpol.2020.106764>
- Huang, H., Huang, J., Jiang, J., Lee, E., & Zhao, Y. (2024). Effective or symbolic? The influence of board ESG committee on corporate ESG performance. *Journal of Sustainable Finance and Accounting*, 2, 100008. <https://doi.org/10.1016/j.jsfa.2024.100008>
- Li, J., Guo, C., Lv, S., Xie, Q., & Zheng, X. (2024). Financial fraud detection for Chinese listed firms: Does managers' abnormal tone matter? *Emerging Markets Review*, 62, 101170. <https://doi.org/10.1016/j.ememar.2024.101170>
- Ludwig, P. & Sassen, R. (2022). Which internal corporate governance mechanisms drive corporate sustainability? *Journal of Environmental Management*, 301, 113780. <https://doi.org/10.1016/j.jenvman.2021.113780>
- Makkonen, T. (2022). Board diversity and firm innovation: A meta-analysis. *European Journal of Innovation Management*, 26(7): 1–22. <https://doi.org/10.1108/EJIM-09-2021-0474>
- Nageri, K. I. (2025). The role of boardroom heterogeneity as a strategic governance mechanism: A dynamic panel analysis of gender, nationality, and educational diversity in shaping corporate R&D and innovation outcomes. *International Journal of Applied Research in Business and Management*, 6(1): 1–18. <https://doi.org/10.51137/wrp.ijarbm.428>
- Petrzell, S. & Badia, F. (2024). The quality assessment of stakeholder engagement disclosure in the EU mandatory non-financial reporting framework. *Journal of Applied Accounting Research*, 25(1): 126–148. <https://doi.org/10.1108/JAAR-11-2022-0290>
- Radu, C. & Smaili, N. (2022). Alignment versus monitoring: An examination of the effect of the CSR committee and CSR-linked executive compensation on CSR performance. *Journal of Business Ethics*, 180(1): 145–163. <https://doi.org/10.1007/s10551-021-04904-2>
- Ruiz, S., Romero, S., & Fernandez-Feijoo, B. (2021). Stakeholder engagement is evolving: Do investors play a main role? *Business Strategy and the Environment*, 30(2): 1105–1120. <https://doi.org/10.1002/bse.2674>
- Samani, N., Overland, C., & Sabelfeld, S. (2023). The role of the EU non-financial reporting directive and employee representation in employee-related disclosures. *Accounting Forum*, 47(2): 279–303. <https://doi.org/10.1080/01559982.2022.2057045>
- Sierra-Morán, J., Cabeza-García, L., González-Álvarez, N., & Botella, J. (2024). The board of directors and firm innovation: A meta-analytical review. *BRQ Business Research Quarterly*, 27(2): 123–140. <https://doi.org/10.1177/23409444211039856>
- Soliman, M. & Ben-Amar, W. (2022). Corporate social responsibility orientation and textual features of financial disclosures. *International Review of Financial Analysis*, 84, 102400. <https://doi.org/10.1016/j.irfa.2022.102400>
- Stuart, A. C., Fuller, S. H., Heron, N. M., & Riley, T. J. (2022). Defining CSR disclosure quality: A review and synthesis of the accounting literature. *Journal of Accounting Literature*, 45(1): 1–47. <https://doi.org/10.1108/JAL-08-2021-0090>
- Tingbani, I., Chithambo, L., Taurigana, V., & Papanikolaou, N. (2020). Board gender diversity, environmental committee and greenhouse gas voluntary disclosures. *Business Strategy and the Environment*, 29(6): 2194–2210. <https://doi.org/10.1002/bse.2495>
- Wang, R., Zhou, S., & Wang, T. (2020). Corporate governance, integrated reporting and the use of credibility-enhancing mechanisms. *The European Accounting Review*, 29(4): 631–663. <https://doi.org/10.1080/09638180.2019.1676897>
- Wen, H., Ho, K. C., Gao, J., & Yu, L. (2022). The fundamental effects of governance characteristics quality in boosting the growth of ESG investing. *Journal of International Financial Markets, Institutions and Money*, 81, 101655. <https://doi.org/10.1016/j.intfin.2022.101655>
- Xu, J., Wu, W., & Feng, X. (2025). The impact of ESG performances on analyst report readability: Evidence from China. *International Review of Financial Analysis*, 102, 104056. <https://doi.org/10.1016/j.irfa.2025.104056>

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Tobin's q	1												
2. ROA	0.58**	1											
3. Female representation	0.01	0.05*	1										
4. Ethnic minority representation	0.11**	0.11**	-0.00	1									
5. Innovation intensity	0.35**	0.24**	0.01	0.20**	1								
6. Firm size	0.58**	0.38**	0.05*	0.01	0.18**	1							
7. Firm age	0.24**	0.13**	0.05†	0.07**	-0.23**	0.27**	1						
8. Board size	0.24*	0.13*	0.08*	0.04†	0.18*	0.45*	0.26*	1					
9. Board age	0.15**	0.09**	-0.01	0.14**	0.18**	0.12**	0.05*	0.02	1				
10. Leverage	0.10**	-0.01	-0.05*	-0.04*	0.13**	0.11**	0.07**	-0.02	0.01	1			
11. % of independent directors	0.13**	0.06**	-0.03	0.01	-0.02	0.03	0.05*	0.03	0.03	-0.04*	1		
12. % of directors attending less than 75 % of board meetings	0.03	0.01	0.06**	0.02	0.04*	-0.03	0.07**	0.03	-0.03	-0.01	0.00	1	
13. Female representation*Innovation intensity	0.36**	0.24**	0.05*	0.19**	0.99**	0.18**	0.23**	0.17**	0.18**	0.13**	-0.02	0.05*	
14. Ethnic minority representation*Innovation intensity	0.21**	0.17**	-0.02	0.47**	0.68**	0.12**	0.12**	0.09**	0.13**	0.09**	-0.00	0.03	0.68**

Source: Authors' computation

* $p < .05$, ** $p < .01$

Table 3: Correlation Matrix

Appendix-II

Variables	Panel A: Tobin's q					Panel B: ROA		
	(1)	OLS (2)	(3)	FE (4)	(5)	OLS (6)	(7)	FE (8)
Female representation		0.15* (1.99)	0.14† (1.93)	-0.04 (-0.67)		0.03* (2.24)	0.03* (2.42)	0.01 (0.86)
Female representation*innovation intensity			5.57** (2.79)	0.87 (0.59)			0.39* (0.96)	0.26 (0.98)
Innovation intensity	3.74** (7.51)	3.73** (7.47)	-2.81 (-0.91)	-5.02 (2.92)	0.22* (2.29)	0.22* (2.25)	-0.17 (-0.41)	-0.48 (-1.27)
Firm size	-0.22** (-13.31)	-0.22** (-12.36)	-0.22** (-13.34)	-0.47** (-8.67)	-0.02** (-6.80)	-0.02** (-6.82)	-0.02** (-6.82)	-0.04** (-4.13)
Firm age	-0.03† (-1.28)	-0.03† (-1.28)	-0.03† (-1.28)	1.51** (4.89)	-0.00 (-0.53)	-0.00 (-1.15)	-0.00 (-0.55)	0.13** (3.33)
Board size	0.07 (0.79)	0.07 (0.74)	0.07 (0.73)	0.01 (0.13)	0.00 (0.31)	0.00 (0.22)	0.00 (0.22)	-0.01 (-0.96)
Board age	-0.15 (-0.46)	-0.15 (-0.46)	-0.14 (-0.44)	-0.23 (-0.51)	0.03 (0.58)	0.03 (0.58)	0.03 (0.59)	0.12* (2.15)
Leverage	0.21† (1.90)	0.21 (1.93)	0.20 (1.86)	0.00 (0.01)	-0.02 (-1.49)	-0.02† (-1.43)	-0.02† (-1.46)	-0.16** (-5.02)
% of independent directors	-0.10 (-0.78)	-0.10 (-0.82)	-0.10 (-0.83)	-0.18 (-1.57)	0.00 (0.25)	0.00 (0.25)	0.00 (0.15)	0.00 (0.37)
% of directors attending less than 75 % of board meetings	-0.04 (-0.08)	0.00 (0.01)	-0.05 (-0.08)	-0.08 (-0.23)	-0.06 (-0.93)	-0.05 (-0.74)	-0.05 (-0.76)	0.05 (1.04)
Industry Fixed Effects	YES	YES	YES	NO	YES	YES	YES	NO
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2,183	2,183	2,183	2,183	2,187	2,187	2,187	2,187
Number of companies	487	487	487	487	487	487	487	487
R-squared	0.47	0.47	0.48	0.13	0.26	0.27	0.27	0.11
Adjusted R-squared	0.47	0.47	0.47	0.13	0.26	0.26	0.26	0.10
F-statistic	52.26	50.45	48.13	22.94	16.07	15.98	15.43	7.464

Source: Authors' computation

† $p < .10$, * $p < .05$, ** $p < .01$

Table 4: Gender Diversity and Firm Performance

Variables	Panel A: Tobin's q					Panel B: ROA		
	(1)	OLS (2)	(3)	FE (4)	(5)	OLS (6)	(7)	FE (8)
Ethnic minority representation		0.10** (2.69)	0.11** (2.89)	0.03 (0.60)		0.01* (2.36)	0.01* (2.41)	0.01 (1.24)
Ethnic minority representation*innovation intensity			-1.91* (-2.39)	0.12 (0.12)			-0.01 (-0.07)	-0.05 (-0.25)
Innovation intensity	3.74** (7.51)	3.52** (6.75)	4.46** (6.40)	-0.29 (-0.15)	0.22* (2.29)	0.20* (2.00)	0.20 (1.35)	-0.15 (-0.63)
Firm size	-0.22** (-13.31)	-0.22** (-13.63)	-0.22** (-13.81)	-0.48*** (-8.72)	-0.02* (-6.80)	-0.02** (-6.99)	-0.02** (-6.96)	-0.04** (-4.20)
Firm age	-0.03 (-1.28)	-0.03 (-1.13)	-0.02 (-0.99)	1.49** (4.80)	-0.00 (-0.53)	-0.00 (-0.38)	-0.00 (-0.37)	0.13** (3.35)
Board size	0.07 (0.79)	0.06 (0.63)	0.06 (0.69)	-0.01 (-0.12)	0.00 (0.31)	0.00 (0.17)	0.00 (0.17)	-0.01 (-1.00)
Board age	-0.15 (-0.46)	-0.05 (-0.15)	-0.025 (-0.08)	-0.22 (-0.47)	0.03 (0.58)	0.04 (0.84)	0.04 (0.85)	0.12* (2.17)
Leverage	0.21† (1.90)	0.21† (1.96)	0.22* (2.00)	0.01 (0.06)	-0.02 (-1.49)	-0.02 (-1.46)	-0.02 (-1.45)	-0.16** (-4.98)
% of independent directors	-0.10 (-0.78)	-0.11 (-0.89)	-0.12 (-0.97)	-0.18 (-1.60)	0.00 (0.25)	0.00 (0.13)	0.00 (0.13)	0.00 (0.43)
% of directors attending less than 75 % of board meetings	-0.04 (-0.08)	-0.05 (-0.09)	-0.06 (-0.11)	-0.04 (-0.11)	-0.06 (-0.93)	-0.06 (-0.96)	-0.06 (-0.96)	0.05 (0.99)
Industry Fixed Effects	YES	YES	YES	NO	YES	YES	YES	NO
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2,183	2,183	2,183	2,183	2,187	2,187	2,187	2,187
Number of companies	487	487	487	487	487	487	487	487
R-squared	0.47	0.48	0.48	0.13	0.26	0.27	0.27	0.11
Adjusted R-squared	0.47	0.47	0.48	0.12	0.26	0.26	0.26	0.10
f-statistic	52.26	51.29	49.82	22.69	16.07	16.44	15.72	7.43

Source: Authors' computation

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 5: Ethnic Diversity and Firm Performance

Appendix-IV

Variables	Panel A: Tobin's q		Panel B: ROA	
	OLS (1)	FE (2)	OLS (3)	FE (4)
Female representation	0.13 [†] (1.83)	-0.05 (-0.73)	0.03* (2.34)	0.01 (0.79)
Ethnic minority representation	0.11** (2.94)	0.03 (0.58)	0.01* (2.45)	0.01 (1.25)
Female representation*innovation intensity	4.48** (6.49)	0.93 (0.55)	0.20 (1.35)	-0.07 (-0.32)
Ethnic minority representation*innovation intensity	-1.89* (-2.39)	-0.18 (-0.20)	-0.01 (-0.05)	-0.07 (-0.35)
Control variables	YES	YES	YES	YES
Industry Fixed Effects	YES	NO	YES	NO
Year Fixed Effects	YES	YES	YES	YES
Observations	2,183	2,183	2,187	2,187
Number of companies	487	487	487	487
R-squared	0.48	0.13	0.27	0.11
Adjusted R-squared	0.48	0.12	0.27	0.10
f-statistic	48.64	21.07	15.73	6.98

Source: Authors' computation

[†] $p < .10$, * $p < .05$, ** $p < .01$ **Table 6: Horse Race Between Two Types of Diversity and Firm performance**

Variables	Panel A: Gender diversity				Panel B: Ethnic diversity			
	Tobin's q		ROA		Tobin's q		ROA	
	OLS (1)	FE (2)	OLS (3)	FE (4)	OLS (5)	FE (6)	OLS (7)	FE (8)
% of female directors	0.59** (3.69)	0.23 (1.40)	0.03 (1.31)	0.02 (1.11)				
% of female directors*innovation intensity	5.09 (1.42)	-1.45 (-0.29)	-0.81 (-0.65)	0.46 (0.62)				
% of ethnic minority directors					1.09** (3.45)	0.11 (0.25)	0.15** (3.22)	0.08† (1.65)
% of ethnic minority directors*innovation intensity					-17.36** (-3.11)	5.61 (0.64)	-0.77 (-0.83)	0.46 (0.41)
Control variables	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	NO	YES	NO	YES	NO	YES	NO
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2,183	2,183	2,187	2,187	2,183	2,183	2,187	2,187
Number of companies	487	487	487	487	487	487	487	487
R-squared	0.48	0.13	0.27	0.11	0.49	0.13	0.28	0.11
Adjusted R-squared	0.48	0.13	0.26	0.10	0.48	0.12	0.27	0.10
f-statistic	49.51	22.79	16.38	7.43	51.07	23.25	16.61	7.57

Source: Authors' computation

† $p < .10$, ** $p < .01$ *Table 7: The Alternative Measure of Board Diversity and Firm Performance*

Appendix-VI

Variables	Panel A: Tobin's q		Panel B: ROA	
	OLS (1)	FE (2)	OLS (3)	FE (4)
% of female directors	0.56** (3.52)	0.24 (1.43)	0.03 (1.35)	0.02 (1.06)
% of ethnic minority directors	1.12** (3.54)	0.08 (0.17)	0.15** (3.17)	0.08 (1.60)
% of female directors*innovation intensity	4.77 (1.23)	-1.04 (-0.20)	-0.55 (-0.44)	0.55 (0.74)
% of ethnic minority directors*innovation intensity	-13.79* (-2.39)	6.08 (0.68)	-0.83 (-1.04)	0.58 (0.51)
Control variables	YES	YES	YES	YES
Industry FE	YES	NO	YES	NO
Year FE	YES	YES	YES	YES
Observations	2,183	2,183	2,187	2,187
Number of companies	487	487	487	487
R-squared	0.49	0.13	0.28	0.11
Adjusted R-squared	0.49	0.12	0.27	0.10
f-statistic	48.20	20.65	16.20	6.74

Source: Authors' computation

* $p < .05$, ** $p < .01$ **Table 8: Horse Race Between Two Types of Diversity and Firm Performance (Alternative Measures)**

Variables	Panel A: primary measures				Panel B: alternative measures			
	Tobin's q	ROA	Tobin's q	ROA	Tobin's q	ROA	Tobin's q	ROA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female representation	0.46 (1.51)	0.06 [†] (1.69)						
Female representation *innovation intensity	15.51 (1.16)	1.71 (1.06)						
Ethnic minority representation			0.11* (2.54)	0.01 [†] (1.90)				
Ethnic minority representation*innovation intensity			-1.73 (-1.58)	-0.02 (-0.15)				
% of female directors					0.58* (2.46)	0.03 (1.17)		
% of female directors*innovation intensity					5.54 (0.84)	-1.02 (-1.27)		
% of ethnic minority directors							1.08** (3.24)	0.13** (3.23)
% of ethnic minority directors*innovation intensity							-17.01** (-2.56)	-0.99 (-1.24)
innovation intensity	-12.13 (-0.91)	-1.49 (-0.93)	3.99** (5.02)	0.21* (2.16)	2.91** (3.96)	0.28** (3.17)	3.81** (5.84)	0.22** (2.84)
Firm size	-0.24** (-14.01)	-0.02** (-8.44)	-0.24** (-14.23)	-0.02** (-8.51)	-0.25** (-14.23)	-0.02** (-8.53)	-0.24** (-14.28)	-0.02** (-8.59)
Firm age	-0.04 (-1.42)	-0.00 (-0.99)	-0.03 (-1.12)	-0.00 (-0.88)	-0.05 [†] (-1.76)	-0.00 (-1.15)	-0.03 (-0.97)	-0.00 (-0.67)
Board size	0.09 (0.70)	0.02 (1.35)	0.09 (0.75)	0.02 (1.37)	0.10 (0.86)	0.02 (1.53)	0.10 (0.80)	0.02 (1.48)
Board age	-0.08 (-0.21)	0.01 (0.19)	0.04 (0.12)	0.02 (0.39)	0.08 (0.20)	0.01 (0.31)	0.03 (0.08)	0.02 (0.45)
Leverage	0.19 [†] (1.81)	-0.01 (-1.09)	0.20 [†] (1.93)	-0.01 (-1.08)	0.19 [†] (1.88)	-0.01 (-0.96)	0.21* (2.04)	-0.01 (-1.00)
% of independent directors	0.03 (0.11)	-0.01 (-0.41)	0.00 (0.01)	-0.01 (-0.34)	-0.04 (-0.15)	-0.01 (-0.41)	-0.01 (-0.06)	-0.01 (-0.49)
% of directors attending less than 75 % of board meetings	1.71 (0.90)	-0.48* (-2.12)	1.60 (0.85)	-0.49* (-2.16)	1.58 (0.84)	-0.49* (-2.14)	1.73 (0.92)	-0.49* (-2.17)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2,183	2,187	2,183	2,187	2,183	2,187	2,183	2,187
Number of Companies	487	487	487	487	487	487	487	487
R-squared	0.58	0.38	0.59	0.38	0.59	0.38	0.59	0.39
Adjusted R-squared	0.56	0.35	0.57	0.35	0.57	0.35	0.57	0.36
f-statistic	29.44	12.70	30.02	12.73	29.84	12.70	30.57	13.23

Source: Authors' computation

[†] $p < .10$, * $p < .05$, ** $p < .01$

Table 9: Board Diversity and Firm Performance Under Between Estimators

Appendix-VIII

Variables	Panel A: Tobin's q			Panel B: ROA		
	Static OLS	Dynamic OLS	Arellano-Bond One step	Static OLS	Dynamic OLS	Arellano-Bond One step
	(1)	(2)	(3)	(4)	(5)	(6)
Tobin's q_{t-1}		0.76** (35.71)	0.33** (2.51)			
ROA $_{t-1}$					0.65** (21.60)	0.23* (2.98)
Ethnic minority representation	0.11** (2.89)	0.04* (2.40)	0.00 (0.19)	0.01* (2.41)	0.01* (2.48)	-0.00 (-0.30)
Ethnic minority representation*innovati on intensity	-1.91* (-2.39)	0.23 (0.46)	2.00† (1.81)	-0.01 (-0.07)	0.01 (0.14)	-0.32 (-0.94)
Innovation intensity	4.46** (6.40)	0.75† (1.93)	-1.65 (-1.02)	0.20 (1.35)	0.13† (1.86)	0.11 (0.42)
Control variables	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	NO	YES	YES	NO
Year FE	YES	YES	YES	YES	YES	YES
Observations	2183	2,180	1,691	2187	2,185	1,695
Number of companies	487	487	460	487	487	461
R-squared	0.482	0.714		0.270	0.569	
Adjusted R-squared	0.476	0.711		0.263	0.564	

Source: Authors' computation

† $p < .10$, * $p < .05$, ** $p < .01$

Table 10: Ethnic Diversity and Firm Performance