

MASTER IN ECONOMICS OF BUSINESS AND STRATEGY

Board Gender Diversity and Risk Taking: The Role of Business Group Affiliation

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ABSTRACT

This dissertation investigates the relationship between board gender diversity and corporate risk-taking, examining how this relationship varies depending on business group affiliation. The literature presents mixed evidence: some studies link greater diversity to a more cautious stance, while others associate it with bolder decisions and increased risk propensity.

The study adds a contextual perspective by considering business group affiliation, this means, networks of legally independent firms connected through ownership ties, shared directors, and internal capital markets, as a factor that can either amplify or constrain the impact of board characteristics. In affiliated firms, the availability of internal resources and group stability can encourage riskier decisions, whereas centralized control may limit board influence.

Using a panel of Eurozone-listed firms (2020–2024), this study shows that greater board gender diversity is associated with higher levels of risk-taking, with this relationship being stronger in group-affiliated firms. In standalone firms, the effect is weaker and sometimes statistically insignificant.

The study concludes that the impact of board gender diversity on risk-taking depends on the organizational context, highlighting the importance of considering business group membership in corporate governance analysis.

Keywords: Board Gender Diversity, Risk-Taking, Business Group Affiliation

RESUMO

Esta dissertação investiga a relação entre a diversidade de género no conselho de administração e a tomada de risco empresarial, analisando como esta relação varia consoante a afiliação a grupos empresariais. A literatura apresenta resultados mistos: alguns estudos associam maior diversidade a uma postura mais cautelosa, outros a decisões mais arrojadas e propensão acrescida ao risco.

Este estudo introduz uma perspetiva contextual ao considerar a afiliação a grupos empresariais, ou seja, a associação a redes de empresas legalmente independentes mas interligadas por laços de propriedade, administradores e mercados internos de capitais, como fator que pode ampliar ou mitigar o impacto das características do conselho no risco da tomada de decisão. Em empresas afiliadas, a disponibilidade de recursos internos e a estabilidade proporcionada pelo grupo podem incentivar decisões mais arriscadas, enquanto a centralização do poder pode limitar a influência dos conselhos.

Com base num painel de empresas cotadas da Zona Euro (2020–2024) este estudo mostra que maior diversidade de género no conselho está associada a níveis mais elevados de tomada de risco, sendo esta relação mais forte nas empresas afiliadas a grupos empresariais. O estudo conclui, portanto, que o impacto da diversidade de género na tomada de risco depende do contexto organizacional, reforçando a importância de considerar a pertença a grupos empresariais na análise da governação corporativa.

Palavras-chave: Diversidade de Género no Conselho de Administração, Tomada de Risco, Afiliação a Grupos Empresariais

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1. Introduction

This study investigates how board gender diversity influences corporate risk-taking in public firms across the Eurozone. Corporate boardrooms, as pivotal centers of decision-making and governance, play a crucial role in shaping firm performance and strategic direction, influencing whether a company takes calculated risks or adopts a more conservative approach. According to Younas et al. (2019), firms with a higher proportion of independent directors tend to engage in more cautious risk-taking and demonstrate better governance. Similarly, Chen et al. (2019) suggests that gender-diverse boards are more mindful of reputation risks, opting for more conservative tax strategies, while simultaneously being more open to assuming necessary financial risks to support long-term growth.

In recent years, the diversity within corporate boards has garnered significant attention, not only as an issue of fairness and equal opportunity, but also as a potential driver of enhanced decision-making, oversight, and strategic innovation. Research by An et al. (2021) highlights that boards with greater overall diversity contribute significantly to corporate innovation, particularly by fostering more novel and impactful innovations. Diverse boards bring a wider range of perspectives that drive innovation, especially in industries where perspectives outside the dominant group are underrepresented. Furthermore, Griffin et al. (2021) demonstrates that gender-diverse boards tend to promote more disruptive and exploratory innovations, as the different viewpoints provided by female directors lead to more balanced decision-making processes and improved governance.

Board diversity, particularly gender diversity, is hypothesized to profoundly shape corporate behavior, particularly in the context of risk-taking (Loukil & Yousfi, 2016; Muhammad et al., 2023).

Risk-taking, a cornerstone of corporate strategy and management literature, is often conceptualized as a balance between opportunity and threat in decision-making under uncertainty (Highhouse et al., 1996). For instance, March and Shapira (1987) highlight that managerial perceptions of risk, framed as an interplay of potential gains and losses, are crucial for understanding strategic decisions in uncertain environments.

Whether manifested through financial leverage, operational choices, or innovation (Bromiley et al., 2015), risk-taking significantly influences a firm's long-term sustainability (Younas et al., 2019). However, unlike more straightforward performance metrics, risk-taking is highly context-dependent and shaped by firm-specific goals and external conditions (W. Zhang et al., 2021). Nonetheless, empirical evidence regarding the impact of board gender diversity on corporate risk-taking remains inconclusive.

Some studies find that diversity increases risk-taking behaviors (e.g., Saeed et al., 2021; Safiullah et al., 2022), while others report that it reduces risk-taking (e.g., Bhat et al., 2020; Loukil & Yousfi, 2016). Furthermore, other studies highlight that the effect may be non-linear and context-dependent, with risk levels varying based on the existing degree of board diversity (e.g., Liu et al., 2022). For instance, Safiullah et al. (2022) report that gender-diverse boards in Spanish firms are associated with higher operational risk-taking, while not increasing insolvency risk, thereby challenging stereotypes about female directors' risk aversion. Conversely, Loukil and Yousfi (2016), finds that the presence of women on corporate boards of Tunisian-listed firms is positively associated with higher cash holdings, suggesting a risk-avoidance behavior in liquidity management.

These mixed findings highlight the complex and context-dependent nature of the diversity risk nexus. As such, this complexity calls for a deeper examination of the contextual and structural factors that may impact the way gender-diverse boards influence corporate risk-taking (Liu et al., 2022; Maxfield & Wang, 2024). One such factor is business group affiliation, a characteristic that has been largely overlooked in prior research in this context.

Business groups are defined as collections of interconnected yet legally independent firms that often share ownership ties, directors, and internal markets for resources (Mukherjee et al., 2018). They can also create governance dynamics that can amplify or constrain the influence of board diversity on firm performance (Aggarwal et al., 2019). Drawing on Aggarwal et al. (2019), who show that business group affiliation moderates the effect of board diversity on firm performance, and the broader literature on board gender diversity and risk (Safiullah et al., 2022), it is plausible to hypothesize that business groups create governance dynamics that could amplify or constrain the influence of board diversity on risk-taking.

While business group affiliation may facilitate access to internal capital markets (Santioni et al., 2017) and reduce the cost of debt through a co-insurance effect (Byun et al., 2013), which may indirectly facilitate risk-taking, it can constrain board independence (Uddin et al., 2023), aligning decisions with group-level interests and, in turn, potentially limiting the governance benefits associated with board diversity (Aggarwal et al., 2019).

In this context, Agency Theory and Resource Dependence Theory provide useful interpretative lenses to guide us to examine whether business groups facilitate or constrain risk-taking behavior, depending on governance structures and access to resources.

This study addresses the research gap by examining whether, and how business group affiliation moderates the relationship between board gender diversity and corporate risk taking. Existing studies often focus on standalone firms or treat business groups as homogeneous entities, overlooking the heterogeneity within group-affiliated firms (e.g., Muhammad et al., 2023; Safiullah et al., 2022; C. Zhang & Luo, 2021).

Prior research on board gender diversity and corporate risk-taking tends to overlook firm affiliation to business groups and the heterogeneity among group-affiliated firms, as these dimensions are not considered in studies such as Muhammad et al. (2023), Safiullah et al. (2022) and C. Zhang and Luo (2021).

By hypothesizing that business group affiliation significantly influences the diversity-risk nexus, this study seeks to answer two key questions: **RQ1)** *How does board gender diversity influence corporate risk-taking?* **RQ2)** *Does business group affiliation affect this relationship?*

2. Literature review and hypothesis development

2.1. Board gender diversity and risk taking

Board gender diversity has been shown to influence a range of corporate outcomes (Brahma et al., 2021; Conyon & He, 2017), including firms' approach to risk (Jizi & Nehme, 2017). Although empirical findings diverge, there is broad consensus that gender composition in the boardroom plays a meaningful role in shaping risk related behaviors (Abou-El-Sood, 2021; Jane Lenard et al., 2014; Khaw et al., 2016; Poletti-Hughes & Briano-Turrent, 2019; Safiullah et al., 2022; Teodósio et al., 2021; C. Zhang & Luo, 2021).

Empirical studies, however, do not converge on a single directional impact. For instance, some research supports a risk-reducing role of female board participation. Jane Lenard et al. (2014) found that firms with more gender-diverse boards exhibit significantly lower variability in stock returns and other performance indicators such as ROA, cash flow, and Tobin's Q, suggesting that gender diversity contributes to more stable corporate performance and reduced firm risk. Similarly, Khaw et al. (2016) demonstrated that Chinese firms with male-only boards are more prone to excessive risk-taking, especially following the NTS reform that reduced state ownership. Their findings highlight that gender diversity in the boardroom is negatively associated with corporate risk-taking, suggesting that female directors play an important role in restraining excessive risk-taking behavior. Loukil and Yousfi (2016) showed that Tunisian firms with gender-diverse boards exhibit lower financial risk, as female directors are associated with higher cash holdings and lower use of long-term debt. This suggests risk-averse behavior, where gender-diverse boards are more conservative in managing liquidity and financing. Additionally, while the impact on strategic risk-taking is more nuanced, the results show that gender-diverse boards are less likely to pursue high-risk investments, particularly in firms with politically connected women or large boards.

Complementing these board-level findings, Faccio et al. (2016) investigated the impact of CEO gender on corporate investment behavior and the efficiency of capital allocation. They find that firms led by female CEOs invest significantly less in response to value-added growth and marginal Q, suggesting greater risk aversion among female executives. While their focus is on top executive roles rather than board composition, the results support broader evidence that gender influences risk.

However, not all findings point to risk aversion. Several studies report a positive association between diversity and risk-taking. For instance, Safiullah et al. (2022) examined Spanish listed firms and find that gender diversity on corporate boards is positively associated with operational risk, measured by the standard deviation of the return on assets, while the association with insolvency risk, measured by the Z-score, is not statistically significant. Contrary to traditional assumptions that female directors are more risk-averse, the study suggests that women may exhibit greater risk-taking behavior, possibly as a way to assert leadership in male-dominated environments. Poletti-Hughes and Briano-Turrent (2019) found that greater gender diversity on corporate boards is positively associated with venturing risk, suggesting that the presence of women contributes to more strategic and forward-looking risk-taking.

However, the effect is not uniform across all firms: in family firms, risk-taking is more closely linked to non-independent female directors and is reflected in higher performance hazard risk. These findings highlight that the impact of gender diversity on corporate risk depends on contextual factors such as ownership structure and director affiliation. Moreover, (Ahern & Dittmar, 2012) investigated the effects of a mandatory gender quota introduced in Norway in 2003, which required publicly listed companies to have at least 40% female representation on their boards. The authors found that the quota led to a significant increase in corporate risk-taking. Specifically, affected firms showed higher financial leverage, greater acquisition activity, and lower cash reserves following the reform.

In addition, Adams and Funk (2012) analyzed a large sample of Swedish corporate directors and find that female directors are slightly more risk-loving than their male counterparts, challenging the conventional view that women in leadership are inherently more risk-averse. While the study does not measure the impact of board gender composition on firm-level outcomes, it suggests that the presence of women on boards may introduce different risk profiles and decision-making perspectives, thereby supporting the idea that gender diversity can meaningfully influence corporate behavior through individual-level heterogeneity.

Several studies suggest that the effect of diversity is contingent on firm-specific and contextual factors. Shi et al. (2021), using data from the Philippines, found a statistically significant negative relationship between board gender diversity and the volatility of the return on assets, a metric used in the paper as a proxy for risk-taking. This result suggests

that firms with more gender-diverse boards tend to experience more stable performance outcomes, indicating a potential risk-reducing effect of diversity in this specific dimension. However, the study also reveals that gender diversity does not have a significant effect on other risk proxies, such as leverage, the annual growth rate of assets, and even shows a weak negative association with firm current ratio, implying that greater gender diversity may be linked to lower short-term liquidity and thus higher short-term financial risk.

Similarly, C. Zhang and Luo (2021), using a sample of publicly listed family firms in China, found a statistically significant positive relationship between board gender diversity and firms' Z-score, a metric used as a proxy for lower financial risk. Their results suggest that gender-diverse boards are associated with more risk-averse behavior, particularly in the context of family ownership. Notably, gender diversity was the only individual board diversity variable to show a significant effect on risk-taking, reinforcing the idea that female board members contribute to more cautious decision-making. Moreover, their findings highlight that the relationship between board diversity and risk is especially pronounced in firms with strong socioemotional priorities, suggesting that the governance context moderates how gender diversity influences risk-related outcomes.

In addition, Bruna et al. (2019) investigated the impact of board gender diversity on firm risk using a sample of French listed companies between 2006 and 2010. The authors found no statistically significant relationship between the presence of female directors and corporate risk-taking. However, the authors emphasize that this result is highly context dependent. They pointed to several structural and contextual factors that may explain the lack of effect: the limited decision-making power of boards compared to executive roles, the low representation of women during the study period, and the symbolic inclusion of women without real influence. These findings suggest that gender diversity alone is not enough to influence risk-taking unless supported by meaningful inclusion, critical mass, and a conducive institutional context.

Adding to this growing body of evidence, Saeed et al. (2021) conducted an empirical analysis of Indian firms and find that the relationship between board gender diversity and corporate risk-taking is highly context sensitive. In high-tech firms, where innovation and uncertainty prevail, the presence of women on corporate boards is positively associated with firm risk-taking, as measured by leverage, R&D expenditure, and Altman's Z-score. However, this

positive association is negatively moderated in family-owned high-tech firms, where the presence of women directors may not translate into genuine decision-making influence. This dynamic suggests that family ownership can suppress the risk-enhancing effect of board gender diversity, suggesting that the effect of gender diversity on risk-taking cannot be generalized, but rather depends on organizational and institutional contexts.

This multiplicity of findings is echoed in the meta-review by Teodósio et al. (2021), that examined the relationship between gender diversity on corporate boards and top management teams and firms' risk-taking behavior. Their findings indicate that gender diversity consistently contributes to a reduction in operational and failure risks. However, when it comes to financial, strategic, and market-based risks, the evidence is considerably more mixed. Specifically, they reported that while some studies within their review associate greater female representation with lower leverage, reduced earnings volatility, and fewer legal and reputational risks, other studies show null effects or even risk-increasing outcomes. Teodósio et al. (2021) also emphasized that the heterogeneity of results is often shaped by contextual factors such as the firm's industry, geographical location, and whether the sample includes listed or non-listed firms. As such, the authors argued for a multidimensional, context-sensitive, and methodologically robust approach to understanding the impact of gender diversity on corporate risk-taking.

Taken together, these findings underscore that board gender diversity has a real but nonuniform impact on corporate risk-taking.

Given mixed evidence, we propose the following hypotheses:

H1a: Board gender diversity is *negatively* associated with corporate risk-taking.

H1b: Board gender diversity is *positively* associated with corporate risk-taking.

2.2. Business groups and Risk-Taking

Business group affiliation has been extensively studied in corporate finance and strategy literature, including its role in shaping corporate risk-taking behaviors (Bhatia & Chakrabarti, 2025; Jha et al., 2025; Nguyen & Nivoix, 2009). Business groups, broadly defined as networks of legally independent firms connected through formal and informal ties (Colli & Colpan,

2016; Khanna & Yafeh, 2007), exist across various institutional settings and influence firm decision-making through mechanisms such as internal capital markets, strategic coordination, and mutual support among affiliates (Carney et al., 2011).

The influence of business group affiliation on corporate risk-taking can be understood through some theoretical lenses. The Agency Theory, as formulated by Jensen and Meckling (1976), conceptualizes the firm as a nexus of contracts in which managers (agents) are employed by owners (principals) to operate the business on their behalf. When ownership and control are separated, agents may act in their own interests rather than in those of the principals, leading to what is commonly known as agency conflicts. This theory may suggest that business groups can mitigate traditional principal-agent conflicts by concentrating ownership and establishing stronger internal oversight mechanisms such as interlocking directorates and cross-shareholdings (Yiu et al., 2007). However, agency conflicts within business groups, particularly principal–principal conflicts, can emerge when controlling shareholders prioritize personal or family interests over those of minority shareholders, often leading to suboptimal or riskier strategic decisions (Young et al., 2008). This duality implies that governance structures within business groups determine whether affiliation leads to risk mitigation or risk amplification.

Resource Dependence Theory complements this perspective by positing that organizations depend on external actors who control vital resources, leading to asymmetric power relations and external constraints on organizational action (Johnson, 1995). This theory may suggest that business groups provide affiliated firms with financial stability, strategic networks, and legitimacy, which reduce dependence on external markets and enable more diverse and proactive strategic actions (Arun Kumar & Manikandan, 2024). This supports the idea that business groups, by offering financial and cognitive resources, create a context that may encourage long-term strategic risk-taking. (Lin et al. (2019) showed that business group affiliates benefit from internal capital markets, strategic inter-firm ties, and greater institutional embeddedness, which provide them with financial stability, strategic resource access, and organizational legitimacy. These mechanisms reduce dependence on underdeveloped external markets. While the authors do not explicitly study corporate risk-taking, their findings suggest that such conditions can support long-term strategic decisions typically associated with higher levels of risk. Similarly, Mahmood et al. (2017) showed that

firms within business groups benefit from shared resources, internal capital markets, and preferential access to capital through centralized equity ties, which support coordinated financial allocation and improve performance. While the authors do not explicitly address risk-taking, one could argue that such internal mechanisms might also enable calculated risk-taking by reducing financial constraints (Mahmood et al., 2017).

Moreover, business group affiliation enhances firm innovation by facilitating internal capital allocation and inter-firm knowledge sharing (Hsieh et al., 2010). While Hsieh et al. (2010) does not explicitly examine risk-taking, innovation activities often involve high levels of uncertainty and strategic risk, suggesting that business groups may indirectly support risk-taking behaviors in affiliated firms. However, inefficient capital allocation within groups can lead to moral hazard problems, where weaker firms receive excessive funding, creating inefficiencies and distorting risk-reward trade-offs (Bhaumik et al., 2017). This trade-off suggests that business groups do not uniformly affect risk-taking. Instead, their impact depends on the efficiency of internal governance and capital allocation mechanisms.

Some studies argue that business group affiliation promotes higher risk-taking. Bhatia and Chakrabarti (2025) found that business group affiliation significantly mitigates the negative impact of economic policy uncertainty on corporate risk-taking, enabling affiliated firms to sustain higher risk levels compared to independent firms during periods of heightened uncertainty. In addition, Nguyen and Nivoix (2009) provided evidence that business group-affiliated firms in Japan face significantly higher systematic risk compared to unaffiliated firms. While this may not reflect intentional risk-seeking behavior, it demonstrates that affiliation does not shield firms from risk and may even amplify their exposure to market volatility. In this sense, affiliation can be interpreted as contributing to a form of structural risk-taking, suggesting that affiliation can be associated with higher risk-taking.

Contrastingly, some studies indicate that business groups serve as risk buffers, reducing financial distress and stabilizing firm risk profiles. Gama and Bandeira-de-Mello (2021), examining Brazilian business groups, found business group affiliation may reduce firms' risk-taking, particularly when affiliated firms are concentrated in the first corporate layer and exhibit limited diversification. In such cases, controlling shareholders tend to adopt more risk-averse behavior due to their higher ownership exposure and the reduced benefits of internal risk-sharing mechanisms. Furthermore, Purkayastha and Gupta (2023), although not

examined in isolation, risk-taking is explicitly identified as one of the entrepreneurial behaviors suppressed by business group affiliation. The authors found that affiliated firms, due to structural constraints and centralized governance, are less likely to engage in risk-taking compared to standalone firms. However, this negative effect is mitigated when firms are more internationalized or financially underperforming, as these conditions increase autonomy and access to group-level resources, enabling greater risk-taking.

While some studies explore how internal governance structures within business groups shape risk-taking behavior (Bhaumik et al., 2017; Gama & Bandeira-de-Mello, 2021), these works do not examine how group affiliation interacts with board-level characteristics. In this study, the focus is reversed: it investigates how the influence of board gender diversity on risk-taking may be moderated by business group affiliation. That is, it explores whether group membership strengthens or weakens the effect of board gender diversity on corporate risk-taking behavior. The contrasting perspectives in the literature underscore the need for a more granular analysis of how business groups function as risk facilitators or risk buffers, depending on contextual variables.

Accordingly, we propose the following hypotheses:

H2: In group affiliated firms (standalone firms) the effect of board gender diversity on risk taking is *stronger* (*weaker*).

3. Methodology

3.1. Data and sample selection

The sample for this study comprises data from publicly listed firms from the Eurozone, spanning the period from 2020 to 2024. The data were sourced primarily from Refinitiv Eikon, providing detailed financial, governance, and board diversity information.

Consistent with existing literature, firms from the banking and financial sectors were excluded due to their distinct regulatory environment and capital structure requirements (Aggarwal et al., 2019). Observations with missing data for any of the core variables, such as financial, governance or diversity, were excluded from the sample to ensure the completeness and reliability of the panel dataset. Following the data cleaning process, the initial sample of 3,010 publicly listed firms was reduced to a panel comprising 3,275 firm-year observations for 655 distinct listed firms. Among these firms almost 24% are affiliated with business groups.

3.2. Variables

3.2.1. Dependent Variables

This study employs two widely accepted proxies to capture firm-level risk. The first, asset return volatility, is measured through the standard deviation of the return on assets (ROA)— $SDROA_{it}$ (Bruna et al., 2019; Safiullah et al., 2022). According to John et al., (2008), this variable captures the degree of risk-taking in firms' operations through the volatility of returns, which is a standard proxy for risk in the financial economics literature. Consistent with prior research (e.g., Bruna et al., 2019; Faccio et al., 2016), ROA volatility is computed using overlapping five-year rolling windows. Higher volatility of returns is assumed to indicate greater corporate risk-taking (Bruna et al., 2019).

The second measure of firm-level risk taking is the Z-score, a widely used measure of insolvency risk (Safiullah et al., 2022; C. Zhang & Luo, 2021). According to Bhagat et al. (2015) the Z-score is computed as follows:

$$Z_Score_{it} = \frac{(ROA_{it} + CAR_{it})}{SDROA_{it}} \quad (1)$$

where, ROA_{it} is the return on assets of the i^{th} firm in the year t . CAR_{it} is the capital-to-asset ratio and the $SDROA_{it}$ is the standard deviation of ROA . According to Safiullah and Shamsuddin (2018), the Z-score represents the number of standard deviations by which a firm's return on assets (ROA) would have to fall from its expected value before the bank's equity is completely eroded. It is, therefore, an inverse measure of insolvency risk—i.e., lower Z-score indicates higher risk taking (C. Zhang & Luo, 2021).

Together, these two measures provide complementary perspectives of total risk and financial distress (Safiullah and Shamsuddin, 2018).

3.2.2. Main covariates

Gender diversity at the board level is measured using the Blau Index, a measure that has been increasingly adopted in literature studying gender diversity and corporate outcomes (Fan et al., 2019; Owen & Temesvary, 2018). While the literature offers various proxies for board gender diversity, including the absolute number of female directors, the proportion of female directors, or the presence of at least one woman on the board (Teodósio et al., 2021), these measures have significant limitations in capturing the true nature of diversity (Shi et al., 2021; Unite et al., 2019).

As highlighted by Unite et al. (2019), boards with a very high proportion of women (e.g., over 50%) may paradoxically exhibit lower gender diversity, as the composition becomes skewed toward one gender. This means that an increase in the number of female board members does not always translate into higher gender diversity, particularly in cases where female representation already exceeds 50%.

In contrast, the Blau Index captures both the number of gender categories and the evenness of their distribution across board seats. It is calculated as:

$$Blau_Gender_{it} = 1 - \sum_{g=1}^k p_g^2 \quad (2)$$

where p_g represents the proportion of board members in the g -th gender category (male or female), and k the total number of board directors. The index ranges from 0 to 0.5, where 0 indicates complete homogeneity (all-male or all-female board), and 0.5 represents the

maximum diversity achieved with an equal number of male and female directors (Safiullah et al., 2022).

By employing the Blau Index, this study ensures a more comprehensive, nuanced, and theoretically consistent assessment of gender diversity. It allows us to distinguish not only whether women are present on boards, but how balanced the gender composition truly is, thereby offering more meaningful insights into how gender diversity may influence corporate risk-taking.

Business group affiliation is captured by a binary variable, which takes the value of 1 for group-affiliated firms. i.e., firms whose ultimate parent, as identified in Refinitiv Eikon, is a different entity, indicating membership in a wider corporate group, and 0 for standalone (non-affiliated) firms. This variable is employed in the subsample analysis to test H2.

3.2.3. Controls

This study includes several control variables that have been identified in literature as influential factors on firm risk-taking and board dynamics. Firm size (*Firm_Size_{it}*) is measured as the natural logarithm of total assets. Leverage (*Leverage_{it}*), defined as the ratio of total debt to total assets, reflects a firm's financial risk and capital structure (Faccio et al., 2011).

Additionally, following Bruna et al. (2019), we include two board-related control variables: board size (*Log_Board_Size_{it}*), measured as the natural logarithm of the total number of directors serving on the board, and board independence (*Independent_Board_Members_{it}*), captured as the proportion of non-affiliated independent directors on the board. According to Agency Theory (Fama et al., 1983), independent directors tend to prioritize shareholder interests, which may encourage greater risk-taking by management.

See Table 1 for variables definition.

Table 1 Variables description

Variable	Definition
Dependent Variables	

SDROA	The standard deviation of return on assets (ROA) over a five-year overlapping window.
Z-score	The ratio of the summation of return on asset and capital-to-asset to asset return volatility.
Main Covariates	
Blau_Gender	An index of measuring gender diversity.
Business_Group_Affiliation	An indicator variable equal to 1 for a group-affiliated firm, and 0 for a standalone (non-affiliated) firm.
Controls	
Independent_Board_Members	Percentage of unaffiliated independent directors on the board.
Log_Board_Size	The natural logarithm of the total number of board members.
Firm_Size	The natural logarithm of total assets.
Leverage	The ratio of the total debt to total assets.

Together, these controls improve the robustness of our regression models by mitigating omitted variable bias and capturing firm-specific, governance-related, and institutional factors known to affect corporate risk-taking.

3.3. Descriptive Statistics

Table 2 presents the descriptive statistics for the variables employed in this study.

Table 2 Descriptive statistics

Variables	N	Mean	St. Dev.	Min	Max	Measure
Dependent Variable						
Z_Score	3275	24.727	27.083	-3.151	158.412	
SDROA	3275	0.042	0.051	0.002	0.318	
Main Covariates						
Blau_Gender	3275	0.41	0.122	0	0.5	
Business_Group_Affiliation	3275	0.24	0.427	0	1	
Controls						
Independent_Board_Members	3275	0.569	0.267	0	1	%
Log_Board_Size	3275	2.261	0.422	0.693	3.367	Log
Firm_Size	3275	22.101	1.7	15.555	27.174	Log
Leverage	3275	0.298	0.177	0	1.989	%

The dataset consists of a balanced panel of 655 firms observed over a five-year period, yielding a total of 3,275 firm-year observations. Of these, approximately 24% are affiliated with a business group, while the remaining 76% are standalone firms. A detailed breakdown of business group affiliation by country is presented in Table A1 in appendix.

Regarding firm risk-taking behavior, the Z-score—used as a proxy for insolvency risk—has a mean of 24.73 and a standard deviation of 27.08, with values ranging from −3.15 to 158.41. This wide dispersion reflects substantial heterogeneity in firms’ risk profiles. The alternative risk measure, the standard deviation of return on assets (SDROA), which captures performance volatility, has a mean of 0.042, a maximum of 0.318, and a standard deviation of 0.051. These figures indicate notable differences in financial stability and exposure to risk across the sample. Country-specific descriptive statistics for these risk measures are provided in Appendix, in Tables A2 and A3 respectively.

The primary explanatory variable, the Blau Gender Diversity Index, exhibits a mean of 0.41 with a standard deviation of 0.12, ranging from 0 to 0.5. This suggests that boards in the sample are, on average, moderately gender-diverse: most firms display some level of female representation, but very few achieve full gender parity. A Blau index of 0.5 represents perfect gender balance in a binary-gender context. Additional descriptive statistics on the distribution of board gender diversity across countries are reported in Appendix, Table A4.

On average, independent directors constitute 56.9% of board members, indicating a relatively high degree of board independence. The mean logarithm of board size is 2.26, corresponding to approximately 9–10 members. The logarithm of total assets (firm size) averages 22.10, while the mean leverage ratio is 0.30, with some firms reaching values close to 2—highlighting considerable variation in capital structure.

3.3.1. Correlation Matrix

To assess potential multicollinearity among explanatory variables, diagnostic tests were conducted in two stages: (i) examination of the pairwise correlation matrix, and (ii) computation of the Variance Inflation Factor (VIF). Table 3 presents the pairwise correlation coefficients, associated p-values, and significance levels. Although some variables show statistically significant correlations (e.g., Log_Board_Size and Firm_Size, $r = 0.5611$, $p < 0.01$), none exceed the conventional 0.70 threshold (Bruna et al., 2019), suggesting that collinearity is unlikely to pose a problem. The VIF analysis (Table 4) further supports this conclusion: all VIF values are well below the critical value of 10, with the highest being 1.69 for Log_Board_Size, and tolerance values ($1/\text{VIF}$) exceeding 0.5 in all cases. The mean VIF is 1.31, confirming a low degree of multicollinearity. Overall, the results from both

diagnostics confirm that multicollinearity is not a concern in this study, and all explanatory variables are retained in the regression models without adjustment.

Table 3 Correlation matrix

Variables	1	2	3	4	5	6	7
1. Z_Score	1						
2. SDROA	-0.456* 0.000	1					
3. Blau_Gender	0.119* 0.000	-0.12* 0.000	1				
4. Ind_Board_Members	-0.031* 0.069	0.077* 0.000	0.112* 0.000	1			
5. Log_Board_Size	0.114* 0.000	-0.183* 0.000	0.35* 0.000	-0.156* 0.000	1		
6. Firm_Size	0.146* 0.000	-0.302* 0.000	0.293* 0.000	0.1* 0.000	0.561* 0.000	1	
7. Leverage	-0.117* 0.000	0.063* 0.000	-0.013* 0.455	0.039* 0.023	0.028 0.019	0.04* 0.019	1

Notes: ***, ** and * denote to the statistical significance at 1%, 5% and 10% level respectively.

Table 4 Collinearity statistics

Variable	VIF	Tolerance
Log_Board_Size	1.69	0.593
Firm_Size	1.55	0.643
Blau_Gender	1.19	0.841
Ind_Board_Members	1.11	0.899
Leverage	1.00	0.996
Mean VIF	1.31	

Notes: This table represents the collinearity statistics of the gender diversity and firm-level control variables. The VIF < 10 indicates that there is no issue of multicollinearity among the variables.

3.4. Model

According to Adams and Ferreira (2009), analyzing the influence of female representation on governance raises endogeneity concerns due to potentially omitted and unobservable firm-specific characteristics. These latent factors may simultaneously affect both the likelihood of appointing female directors and the quality of governance practices, thereby biasing the estimated relationship between board gender diversity and governance outcomes. To mitigate this issue, and in line with prior literature, fixed effects regression models were employed (Adams & Ferreira, 2009; C. Zhang & Luo, 2021).

To study the relationship between board gender diversity and firm risk-taking, we propose the following empirical model:

$$Risk_{it} = \beta_0 + \beta_1 Blau_Gender_{it} + \beta_2 Independent_Board_Members_{it} + \beta_3 Log_Board_Size_{it} + \beta_4 Firm_Size_{it} + \beta_5 Leverage_{it} + \mu_i + \varepsilon_{it} \quad (3)$$

Where $Risk_{it}$ refers to the total risk and insolvency risk as measured by asset return volatility ($SDROA_{it}$) and Z-score (Z_Score_{it}). In the model specification, β_0 denotes the intercept, i indexes firms, and t indexes time (years). The coefficients of the regressors are represented by β_1 through β_5 . The terms μ_i , and ε_{it} correspond to firm-specific fixed effects, time fixed effects, and the stochastic error term, respectively.

To test our hypotheses, we estimate the model using firm fixed effects to control for time-invariant unobserved heterogeneity across firms. Standard errors are estimated using the robust variance-covariance matrix to account for potential heteroskedasticity. We estimate across three separate subsamples. First, we apply the model to the full sample of firm-year observations to examine the overall association between board gender diversity and firm risk-taking (H1). Then, to address H2a and H2b, we split the sample based on business group affiliation and re-estimate the model separately for group-affiliated firms and standalone firms. This approach allows us to assess whether the effect of board gender diversity on risk-taking differs depending on a firm's business group affiliation.

Before proceeding with the panel regression analysis, several preprocessing steps were undertaken to ensure the robustness and reliability of the econometric estimations. In

particular, the dependent variables, Z-score and the standard deviation of return on assets (*SDROA*), were winsorized at the 1% level to mitigate the influence of extreme outliers. This decision was based on the high standard deviations and the presence of extreme values in the distribution of these risk measures, which could unduly affect the regression results. Additionally, potential multicollinearity was assessed using pairwise correlation analysis and the Variance Inflation Factor (VIF). No severe multicollinearity was detected, and all explanatory variables were retained in the final specification.

4. Findings

To empirically test the hypotheses developed in this study, six fixed-effects panel regressions were estimated. These models examine the impact of board gender diversity—measured using the Blau Gender Diversity Index—on corporate risk-taking. Two distinct risk proxies are employed: the Z-score, which captures a firm's distance to default (with lower values indicating higher financial risk), and the Standard Deviation of Return on Assets (*SDROA*), which measures earnings volatility (with higher values reflecting greater risk). All regressions control for board size, firm size, the proportion of independent board members, and leverage. Standard errors are clustered at the firm level to account for potential autocorrelation and heteroskedasticity.

The results are summarized in three main tables. Table 5 estimates for the full sample (H1) with column (1) using the Z-score as the dependent variable and column (2) using *SDROA*. To assess whether business group affiliation moderates the relationship between board gender diversity and risk-taking (H2), the same model specifications were estimated separately for affiliated firms (Table 6) and standalone firms (Table 7), each with columns for Z-score and *SDROA*.

Table 5 Regression results for all firms (baseline estimates)

Variables	(1) Z-score	(2) SDROA
Blau_Gender	-7.858* (0.080)	0.033** (0.018)
Ind_Board_Members	6.258 (0.101)	-0.005 (0.44)
Log_Board_Size	5.639* (0.090)	-0.001 (0.829)
Firm_Size	-1.003 (0.627)	-0.024*** (0.000)
Leverage	-18.742*** (0.002)	-0.007 (0.606)
Constant	39.377 (0.385)	0.573*** (0.000)
R-squared	0.009	0.047
Prob > F	0.016	0.004
Observations	3,275	3,275

Notes: This table reports the results of the fixed-effects panel regression models for all firms, estimated with robust standard errors clustered at the firm level to address potential

heteroskedasticity and serial correlation within firms. The dependent variables are the Z-score, in column 1, and the Standard Deviation of Return on Assets (SDROA), in column 2, representing insolvency risk and earnings volatility, respectively. All specifications include firm fixed effects to control for time-invariant unobserved heterogeneity, as well as year fixed effects to capture macroeconomic shocks common to all firms. All variables are defined in Table 1. To mitigate the influence of extreme values, the dependent variables were winsorized at the 1st and 99th percentiles. Standard errors are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 5 presents results for the full sample of 655 firms over five years (3,275 firm-year observations). In column (1), the coefficient on the Blau Index is negative and marginally significant ($\beta = -7.858$; $p = 0.080$), indicating that greater board gender diversity is associated with a lower Z-score and, consequently, higher financial risk. This finding suggests that more gender-diverse boards are linked to riskier strategic profiles, potentially reflecting a greater propensity for innovative or bold decision-making. In column (2), where SDROA is the dependent variable, the Blau Index coefficient is positive and statistically significant ($\beta = 0.033$; $p = 0.018$), indicating higher earnings volatility in more gender-diverse boards. This reinforces the interpretation that such firms may be more exposed to operational or strategic risk. Taken together, the results for the full sample provide consistent support for H1b, which posits that greater board gender diversity is positively associated with corporate risk-taking.

To examine the moderating role of business group affiliation, the sample was split into group-affiliated and standalone firms. Comparing the results from Tables 6 (affiliated firms) and 7 (standalone firms) reveals that the Blau Gender Diversity Index has a consistently stronger effect on corporate risk-taking among affiliated firms.

In the Z-score specification, the coefficient for affiliated firms is negative and marginally significant at the 5% level ($\beta = -16.189$; $p = 0.052$), indicating that greater board gender diversity is associated with a notable increase in financial risk. By contrast, for standalone firms the coefficient is statistically insignificant, suggesting that gender diversity has no impact on their distance to default. This evidence supports the view that business group affiliation amplifies the relationship between board gender diversity and financial risk.

In the SDROA specification, affiliated firms show a stronger effect: the coefficient is positive and marginally significant ($\beta = 0.049$; $p = 0.073$), pointing to higher earnings volatility in more gender-diverse boards. For standalone firms, the coefficient remains positive but is

smaller in magnitude and only marginally statistically significant. The reduced effect among standalone firms suggests a more limited influence of gender diversity on operational and strategic risk when firms operate outside the context of business groups.

Overall, this cross-sample comparison indicates that the risk-enhancing effect of board gender diversity is considerably more pronounced among affiliated firms, providing support for H2.

Table 6 Regression results for group affiliated firms

Variables	(1) Z-score	(2) SDROA
Blau_Gender	-16.189* (0.052)	0.049* (0.073)
Ind_Board_Members	11.193 (0.225)	-0.009 (0.309)
Log_Board_Size	15.778** (0.033)	-0.008 (0.406)
Firm_Size	-4.608 (0.257)	-0.028*** (0.006)
Leverage	-32.006*** (0.006)	-0.032 (0.324)
Constant	101.299 (0.275)	0.662*** (0.004)
R-squared	0.032	0.112
Prob > F	0.043	0.007
Observation	785	785

Notes: This table reports the results of the fixed-effects panel regression models for group affiliated firms, estimated with robust standard errors clustered at the firm level to address potential heteroskedasticity and serial correlation within firms. The dependent variables are the Z-score, in column 1, and the Standard Deviation of Return on Assets (SDROA), in column 2, representing insolvency risk and earnings volatility, respectively. All specifications include firm fixed effects to control for time-invariant unobserved heterogeneity, as well as year fixed effects to capture macroeconomic shocks common to all firms. All variables are defined in Table 1. To mitigate the influence of extreme values, the dependent variables were winsorized at the 1st and 99th percentiles within each year. Standard errors are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Furthermore, beyond the effects of board gender diversity, several control variables also show statistically significant associations with corporate risk-taking.

Table 7 Regression results for standalone firms

Variables	(1) Z-score	(2) SDROA
Blau_Gender	-6.49 (0.207)	0.028* (0.078)
Ind_Board_Members	4.88 (0.237)	-0.004 (0.658)
Log_Board_Size	3.157 (0.373)	-0.000 (0.955)
Firm_Size	0.381 (0.870)	-0.022*** (0.003)
Leverage	-15.634** (0.015)	-0.016 (0.324)
Constant	13.456 (0.790)	0.662*** (0.004)
R-squared	0.006	0.035
Prob > F	0.116	0.082
Observation	2490	2490

Notes: This table reports the results of the fixed-effects panel regression models for standalone firms, estimated with robust standard errors clustered at the firm level to address potential heteroskedasticity and serial correlation within firms. The dependent variables are the Z-score, in column 1, and the Standard Deviation of Return on Assets (SDROA), in column 2, representing insolvency risk and earnings volatility, respectively. All specifications include firm fixed effects to control for time-invariant unobserved heterogeneity, as well as year fixed effects to capture macroeconomic shocks common to all firms. All variables are defined in Table 1. To mitigate the influence of extreme values, the dependent variables were winsorized at the 1st and 99th percentiles within each year. Standard errors are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Across all models, leverage is consistently and negatively related to the Z-Score, indicating that higher debt levels increase insolvency risk. This effect is particularly pronounced in group-affiliated firms, where the magnitude is more than double that observed in standalone firms.

Firm size exhibits a robust and negative association with SDROA in all samples, likely due to more diversified operations and greater resource buffers. However, firm size does not present a significant relationship with the Z-Score.

Board size is positively and significantly associated with the Z-Score in the full sample and in group-affiliated firms, but not in standalone firms. This indicates that larger boards may enhance financial stability, especially within business groups.

Finally, board independence does not display consistent statistical significance across specifications, suggesting that, within the within-firm variation observed in this study, the proportion of independent directors may not play a decisive role in shaping corporate risk profiles.

Overall, these results highlight that, in addition to board gender diversity, traditional financial and structural factors, particularly leverage, firm size, and board size, are important determinants of corporate risk-taking, with some effects varying depending on business group affiliation.

5. Discussion

The findings of this study offer valuable insights into the relationship between board gender diversity and corporate risk-taking with evidence indicating that this relationship differs across business group–affiliated and standalone firms.

Consistent with H1b, the results from the full sample reveal that board gender diversity, as measured by the Blau Index, is positively associated with corporate risk-taking. This is demonstrated through two complementary indicators of firm risk, distance from insolvency, and earnings volatility. Together, these results indicate that firms with more gender-diverse boards are more likely to engage in riskier behavior, both in terms of financial resilience and performance variability.

From an Agency Theory perspective, this finding suggests that gender-diverse boards may enhance the quality of monitoring and decision-making, reducing the incidence of “bad” risk but enabling the pursuit of “good” risk — that is, strategic initiatives with higher potential returns, even at the cost of greater short-term volatility. Rather than displaying uniform risk aversion, female directors in this context appear to be associated with a governance environment that supports bolder, growth-oriented decisions when these align with shareholder value.

From a Resource Dependence Theory standpoint, the presence of women on the board may expand the firm’s access to external resources, networks, and legitimacy, thereby lowering constraints on strategic action. This enhanced access to capital and information could facilitate investments in innovation or expansion, which inherently carry higher risk profiles, explaining the observed increase in both financial and operational risk metrics.

These results align with a strand of literature that questions the traditional assumption of female risk aversion. For instance, Safiullah et al., (2022) report that gender-diverse boards are associated with greater operational risk, while Poletti-Hughes and Briano-Turrent (2019) find that female presence on corporate boards is linked to more strategic and forward-looking risk-taking. Similarly, Ahern & Dittmar (2012) show that increased female participation, particularly when driven by institutional reforms, can lead to heightened

corporate risk-taking. Collectively, these findings support the view that gender diversity can encourage bolder and riskier strategic decisions.

In contrast, other studies, such as Jane Lenard et al. (2014) and Khaw et al., (2016), report a risk-reducing effect of board gender diversity, particularly in firms operating within more conservative governance settings or under stricter institutional constraints. These divergent findings underscore a key insight from the literature: the relationship between board gender diversity and risk-taking is not universal but is instead shaped by contextual factors.

Building on this premise, H2 examines one such contextual dimension, business group affiliation, as a potential moderator of the relationship between board gender diversity and corporate risk-taking. Specifically, H2 posits that the effects of board gender diversity are amplified when firms operate within a business group and reduced when firms are standalone entities. The underlying rationale is that the presence of internal capital markets, strategic coordination, and mutual financial support within business groups may increase both the willingness and the capacity to undertake riskier strategic initiatives.

The findings clearly demonstrate that business group affiliation amplifies the relationship between board gender diversity and corporate risk-taking. By contrast, standalone firms may be less structurally equipped to support or absorb higher levels of risk, even when the board is more diverse. From an Agency Theory angle, this amplification may occur because group structures can mitigate some traditional principal–agent problems by offering closer oversight and better resource allocation, thus enabling diverse boards to channel risk-taking into strategic opportunities rather than value-destructive ventures. The findings also align with the Resource Dependence Theory and the literature on business groups as risk facilitators (e.g., Bhatia & Chakrabarti, 2025; Mahmood et al., 2017). These studies argue that group affiliation offers firms access to internal resources, strategic stability, and insulation from external shocks, allowing for greater strategic flexibility, including higher risk tolerance.

Despite the valuable contributions of this study to the literature on board diversity and corporate risk-taking, several limitations should be acknowledged. This study employs fixed-effects regression, following Adams and Ferreira (2009), to address endogeneity concerns arising from unobserved, time-invariant firm characteristics that could bias the relationship between board diversity and risk-taking. However, as the authors note, fixed-effects models

cannot eliminate all endogeneity, particularly reverse causality. In this context, it remains possible that firms with higher inherent risk are more inclined to appoint gender-diverse boards, rather than the diversity itself causing increased risk. This threatens causal interpretation. Future research could address this concern with more robust identification strategies capable of isolating exogenous variation in board gender diversity.

Second, the scope of the sample, limited to listed firms within the Eurozone, enhances internal consistency but simultaneously constrains the generalizability of the findings. Institutional structures, regulatory environments, and cultural norms in other regions, particularly in emerging markets or Anglo-Saxon economies, may shape board dynamics and risk-taking behavior differently. Consequently, the conclusions drawn here may not be applicable across all institutional contexts. Future research could extend this analysis by incorporating cross-country cultural dimensions, such as those proposed by Hofstede, as control variables to capture the influence of national culture on the gender diversity–risk-taking relationship.

6. Conclusion

This study set out to examine the relationship between board gender diversity and corporate risk-taking in publicly listed firms across the Eurozone, and to investigate whether this relationship is contingent on business group affiliation. Drawing on Agency Theory and Resource Dependence Theory, we employed a fixed-effects panel regression model using two complementary risk measures: the Z-score, capturing financial stability, and the standard deviation of return on assets (SDROA), reflecting operational volatility.

We find evidence supporting the view that gender diversity on corporate boards is associated with higher corporate risk-taking. These findings challenge the conventional view of female risk aversion and align with strands of literature suggesting that gender-diverse boards may foster bolder, more innovative strategic choices.

The second key finding is that business group affiliation amplifies this relationship. For affiliated firms, the link between gender diversity and risk-taking is both stronger in magnitude and more consistently statistically significant than in standalone firms. This suggests that the governance and resource environment of business groups, characterized by internal capital markets, strategic coordination, and mutual support, can enhance the ability of diverse boards to implement risk-taking strategies.

These findings contribute to the literature by providing empirical evidence that gender diversity on board is not inherently risk averse. Furthermore, showing how it shapes the relationship between board gender diversity and corporate risk-taking, and addressing a gap in prior studies that have tended to treat group affiliation as homogeneous or overlook it entirely.

Nonetheless, the study is not without limitations. Potential endogeneity concerns and the focus on Eurozone listed firms, warrant caution in generalizing the findings. Future research should address these limitations by exploring causal identification strategies, incorporating broader measures of board characteristics, and extending the analysis to different institutional settings and economic cycles.

In sum, this study underscores that board gender diversity is a meaningful driver of corporate risk-taking, but its effects are far from uniform. The presence or absence of business group

affiliation can significantly shape this relationship, reinforcing the need for a contextualized approach to both academic research and corporate governance practice.

7. Appendix

Table A1. Business group affiliation by country

Country	Standalone firms	Affiliated firms	Total
Austria	17 (65.38%)	9 (34.62%)	26
Belgium	29 (76.32%)	9 (23.68%)	38
Cyprus	2 (100.00%)	0 (0.00%)	2
Finland	39 (90.70%)	4 (9.30%)	43
France	97 (77.60%)	28 (22.40%)	125
Germany	120 (75.95%)	38 (24.05%)	158
Greece	14 (73.68%)	5 (26.32%)	19
Ireland	33 (100.00%)	0 (0.00%)	33
Italy	29 (44.62%)	36 (55.38%)	65
Luxembourg	15 (71.43%)	6 (28.57%)	21
Malta	5 (100.00%)	0 (0.00%)	5
Netherlands	48 (90.57%)	5 (9.43%)	53
Portugal	8 (66.67%)	4 (33.33%)	12
Slovenia	1 (100.00%)	0 (0.00%)	1
Spain	41 (75.93%)	13 (24.07%)	54
Total	498 (76.03%)	157 (23.97%)	655

Notes: This table shows the distribution of firms by business group affiliation across countries. Of the 655 firms in the sample, 76.03% are standalone and 23.97% are group affiliated.

Table A2 Average Z-score by country

Country	Mean
Austria	23.25
Belgium	24.18
Cyprus	12.02
Finland	23.33
France	27.44
Germany	23.70
Greece	16.72
Ireland	26.81
Italy	34.24
Luxembourg	13.21
Malta	15.50
Netherlands	17.15
Portugal	41.59
Slovenia	64.58
Spain	29.88
Total	25.32

Notes: This table reports the average Z-score by country for the 655 firms in the sample. The Z-score measures the distance to default, with higher values indicating lower financial risk. The overall mean is 25.32, with substantial variation across countries.

Table A3. Average SDROA by country

Country	Mean
Austria	0.034
Belgium	0.086
Cyprus	0.047
Finland	0.047
France	0.038
Germany	0.042
Greece	0.064
Ireland	0.041
Italy	0.026
Luxembourg	0.062
Malta	0.095
Netherlands	0.056
Portugal	0.019
Slovenia	0.017
Spain	0.041
Total	0.044

Notes: This table presents the average Standard Deviation of Return on Assets (SDROA) by country for the 655 firms in the sample. SDROA measures earnings volatility, with higher values indicating greater operational risk. The overall mean is 0.044.

Table A4. Average blau index for gender diversity by country

Country	Mean
Austria	0.36
Belgium	0.45
Cyprus	0.27
Finland	0.42
France	0.47
Germany	0.36
Greece	0.24
Ireland	0.40
Italy	0.46
Luxembourg	0.33
Malta	0.31
Netherlands	0.41
Portugal	0.41
Slovenia	0.45
Spain	0.39
Total	0.41

Notes: This table reports the average Blau Index for board gender diversity by country for the 655 firms in the sample. The Blau Index ranges from 0 (no diversity) to 0.5 (equal representation of men and women). The overall mean is 0.41, with values ranging from 0.24 in Greece to 0.47 in France, indicating substantial cross-country variation in board gender diversity.

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