

## **INDEPENDENT WOMEN ON BOARDS OF DIRECTORS: INTRODUCING THE “SANDWICH EFFECT” CONCEPT**

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### **Abstract**

This article introduces the Sandwich Effect, a new conceptual model that explains how independent women directors operate at the intersection of regulatory governance requirements and market pressures for inclusion, legitimacy and transparency. Drawing on Agency, Institutional and Resource Dependence theories, the model highlights the dual role played by independent female directors as agents of compliance and as carriers of market-signaling effects. To illustrate its relevance, the article presents an exploratory analysis of PSI-listed companies, examining gender composition, independence, adherence to governance recommendations, and market valuation indicators. While the empirical patterns show no significant association between gender diversity and ROE, they reveal a strong positive relationship between the presence of independent women, compliance with governance best practices, and market valuation, supporting the model's central premise that qualified diversity is valued by external stakeholders. The study offers a replicable theoretical framework that enhances understanding of how board structure, independence, and gender interact to influence governance quality and market perception.

### **Keywords**

Gender diversity, corporate governance, boards of directors, Sandwich Effect, PSI, independent women, gender quotas.

### **Resumo**

Este artigo apresenta o «Efeito Sanduíche», um novo modelo conceptual que explica como as administradoras independentes atuam na intersecção entre os requisitos regulamentares de governação e as pressões do mercado em prol da inclusão, da legitimidade e da transparência. Baseando-se nas teorias da Agência, Institucional e da Dependência de Recursos, o modelo destaca o duplo papel desempenhado pelas administradoras independentes como agentes de conformidade e como transmissoras de efeitos de sinalização do mercado. Para ilustrar a sua relevância, o artigo apresenta uma análise exploratória de empresas cotadas na PSI, examinando a composição de género, a independência, a adesão às recomendações de governação e os indicadores de avaliação de mercado. Embora os padrões empíricos não mostrem uma associação significativa entre a diversidade de género e o ROE, revelam uma



forte relação positiva entre a presença de mulheres independentes, o cumprimento das melhores práticas de governação e a avaliação de mercado, apoiando a premissa central do modelo de que a diversidade qualificada é valorizada pelas partes interessadas externas. O estudo oferece um quadro teórico replicável que melhora a compreensão de como a estrutura do conselho de administração, a independência e o género interagem para influenciar a qualidade da governação e a perceção do mercado.

### **Palavras-chave**

Diversidade de género, governação corporativa, conselhos de administração, Efeito Sanduíche, PSI, mulheres independentes, quotas de género.

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### **Introduction**

Gender diversity on boards of directors has emerged as one of the pillars of sound corporate governance, not only for ethical reasons but also for its strategic potential regarding sustainability, reputation, and business competitiveness (Adams & Ferreira, 2009; Terjesen et al., 2009). In Portugal, this debate gained renewed momentum with the transposition of European Directive 2022/2381, which reinforces the national commitment to gender equality in the decision-making bodies of listed companies. In parallel, the Portuguese Securities Market Commission (CMVM) Corporate Governance Code, revised in 2023, recommends that at least one-third of non-executive directors be independent, emphasizing independence as a central element of good governance practices. These regulatory requirements place diversity and independence at the core of corporate and institutional agendas, making it essential to understand their impact on firm performance and market valuation, particularly among listed companies.

This article is primarily a conceptual contribution, introducing the Sandwich Effect as a theoretical lens to explain how independent women directors operate under simultaneous regulatory and market pressures.

Despite the growing consensus on the importance of diversity, empirical studies continue to report ambiguous results regarding the impact of women's presence on boards of directors on firms' financial performance (Joecks et al., 2013). This ambiguity highlights the need for more refined theoretical approaches that consider not only the institutional context but also the internal and external dynamics of boards. The combination of gender diversity and functional independence may enhance board oversight and foster more balanced governance, reinforcing the need to further explore their impact on listed companies.

In this context, the present article develops and introduces the innovative concept of the 'Sandwich Effect,' which positions female directors—particularly independent ones—as agents operating between two forces: the normative requirements of Corporate Governance best practices and market pressures for inclusion and reputation. This



approach provides an integrated perspective on the strategic role of women on boards, highlighting their ability to mediate between often conflicting interests.

The present study aims to:

- (i) Empirically test whether the presence of women on the boards of directors of PSI-listed companies is associated with better financial performance, measured by Return on Equity (ROE).
- (ii) Compare the impact of the percentage of independent female directors with the overall percentage of women on boards, assessing which dimension shows a stronger correlation with ROE.
- (iii) Analyze whether compliance with Corporate Governance best practices—particularly the inclusion of independent women on boards—is positively associated with market valuation and female representation.
- (iv) Introduce and contextualize the theoretical concept of the "Sandwich Effect" as a framework for understanding the strategic role of women directors in balancing external market pressures and internal regulatory requirements.

Although the article includes an empirical illustration based on PSI-listed companies, its primary contribution is conceptual, focusing on the development and contextualization of the Sandwich Effect as a theoretical model

The relevance of this study lies in the integration of a quantitative analysis with an innovative theoretical perspective, which sheds light on the challenges and opportunities faced by female directors. By focusing on the PSI index and European policy recommendations, the article offers an original contribution to the academic debate and to the development of more inclusive and effective governance policies.

Collectively, this positioning underscores the article's primary contribution: advancing a testable conceptual model—the Sandwich Effect—that links board composition, independence, and market perception within a clear European governance context.

## **Theoretical Framework**

Recent research (2022–2025) reinforces that board gender diversity is increasingly analyzed within the broader context of governance quality, risk mitigation and stakeholder trust.

Studies such as Brahma et al. (2021), Hyun et al. (2023) and Klettner (2014) argue that gender-diverse boards strengthen monitoring effectiveness and enhance corporate transparency, particularly in regulated markets. New empirical findings show that gender-diverse boards are associated with lower earnings management (Sial et al., 2023), higher ESG disclosure quality (Adams & Rangunathan, 2023) and improved decision-making under uncertainty (Martínez-Jiménez & Hernández-Ortega, 2024). These recent contributions reinforce the relevance of diversity not only as a representational metric but also as a marker of governance maturity.



Recent evidence consolidates a shift from purely representational approaches to qualified diversity, in which gender diversity interacts with board independence to strengthen monitoring capacity, transparency and stakeholder confidence (Gabaldon et al., 2020; Labelle et al., 2021). Within European markets, new contributions indicate that boards combining female representation with independence tend to align more closely with ESG expectations and to exhibit stronger oversight effects, consistent with the monitoring role emphasized in prior finance and governance research (Bernile, Bhagwat, & Yonker, 2018; Adams & Ragunathan, 2023). These developments resonate with the Sandwich Effect proposition, in which independent women operate at the intersection of regulatory obligations and market-signaling dynamics (Stoeckl & Luedicke, 2024; Martínez-Jiménez & Hernández-Ortega, 2024).

Beyond academic work, international organizations have documented structural drivers and institutional conditions that enable women's effective participation in decision-making. The International Labour Organization (ILO), in its *Women in Business and Management: The Business Case for Change* and subsequent global leadership diagnostics, shows that gender-balanced leadership is associated with stronger oversight, greater transparency and lower reputational risk, particularly when board appointments are conducted through transparent processes that safeguard independence and reduce tokenism (ILO, 2019; ILO, 2022). These international models align with recent European governance developments, which place independence criteria alongside diversity targets and are increasingly read by markets as signals of governance quality and organizational maturity (European Commission, 2024; ESMA, 2025). Taken together, this evidence strengthens the conceptual logic of the Sandwich Effect by indicating that diversity is most effective when paired with independence, thereby enhancing monitoring capacity and stakeholder confidence (García-Sánchez, Martínez-Ferrero, & García-Meca, 2021; Hyun, Park, & Kim, 2023).

Consistent with this, the European framework has intensified incentives for substantive—not merely symbolic—compliance. The gender balance directive and updated governance codes raise the salience of independence criteria alongside diversity targets, which the market increasingly reads as a proxy for governance quality and organizational maturity (European Commission, 2024; ESMA, 2025). In parallel, international labour statistics and leadership diagnostics underline the persistence of structural bottlenecks to women's advancement and highlight that sustained progress depends on transparent appointment processes and independence safeguards—conditions that reduce tokenism and amplify real oversight (International Labour Organization, 2024; Adams & Ragunathan, 2023). Empirically, recent studies associate gender-diverse and independence-balanced boards with better audit committee effectiveness, higher disclosure quality and lower earnings management, supporting the view that independent female directors can carry disproportionate governance effects (Sial, Zheng, & Cherian, 2023; McGuire & Sheridan, 2023).

Overall, the 2020–2025 literature strengthens the conceptual foundations of the Sandwich Effect: independent women directors act simultaneously as agents of compliance with governance norms and as carriers of market signals linked to transparency, legitimacy and sustainability orientation (García-Sánchez, Martínez-Ferrero, & García-Meca, 2021; Hyun, Park, & Kim, 2023). Incorporating these updated perspectives aligns the article with contemporary European and international



developments and clarifies why independence conditions the effectiveness of gender diversity in practice (Grosvold, Brammer, & Rayton, 2020; Dang, Bender, & Scotto, 2021).

Classic contributions conceptualize women directors as operating between institutional and market pressures (e.g., Bilimoria & Piderit, 2007), and this view women on boards of directors as agents operating between two pressures: institutional demands for diversity and market expectations for performance. This dual position enables them to influence both the adoption of Corporate Governance best practices and the creation of economic value. Authors such as Gabaldon et al. (2020) reinforce this view, arguing that women on boards act as mediators between institutional pressures and market demands, promoting more ethical and inclusive governance practices. Similarly, Labelle et al. (2021) emphasize this perspective, highlighting the role of women as mediators between social responsibility and performance.

- Presence of Women on Boards of Directors and Their Positive Association with ROE
- Gender diversity on boards has been associated with greater oversight effectiveness, innovation, and ethical sensitivity. Studies such as García-Izquierdo et al. (2021) show that the presence of women can enhance financial performance, particularly in contexts with strong institutional pressure. Nadeem et al. (2020) and Dang et al. (2021) further reinforce that gender diversity can improve financial outcomes, especially under stringent regulatory environments. However, this relationship is not universal and is mediated by factors such as industry sector and organizational culture (Post & Byron, 2015).
- The percentage of independent women shows a stronger correlation with ROE than the overall percentage of women on boards of directors.

Recent literature distinguishes between symbolic and functional diversity. Independent female directors, due to their lack of ties to executive management, are perceived as more effective in monitoring and safeguarding stakeholders' interests (Grosvold et al., 2020). Studies such as Bernile et al. (2018) suggest that qualified diversity — which combines gender and independence — has a more robust impact on financial performance.

- Companies that demonstrate strong corporate governance practices — particularly regarding gender diversity and board independence — are generally associated with higher market valuation.

Market valuation is influenced not only by financial performance but also by perceptions of governance quality. Recent studies have shown that institutional investors tend to positively assess companies with diverse boards, associating them with lower reputational risk and greater sustainability (García-Sánchez, Martínez-Ferrero, & García-Meca, 2021; Liu, Wei, & Xie, 2022; Kassinis, Vafeas, & Chatzidakis, 2022). The market valuation of firms has become increasingly associated with board diversity, particularly the presence of independent female directors. According to Sipolatti (2023) "gender



diversity on corporate boards is positively associated with the market's perception of firm value." Compliance with best practices in board diversity is perceived as a signal of organizational maturity and social responsibility (Zhang, Li, & Wang, 2023).

Recent European regulatory analyses reinforce the shift from symbolic to substantive compliance, highlighting independence and gender balance as central governance indicators. Reports from the European Commission (2024) and ESMA (2025) show that board independence, particularly the presence of independent female directors, is increasingly used as a proxy for governance quality and organisational maturity. This evolving regulatory landscape strengthens the theoretical foundations of the Sandwich Effect by positioning independent women at the intersection of compliance obligations and market expectations.

Recent literature (2022–2025) highlights the distinction between symbolic and functional diversity, with independent women playing a stronger monitoring, oversight and governance-enhancing role. Studies such as Agyemang et al. (2022), McGuire & Sheridan (2023), Gouia et al. (2024) and Chang & Kang (2024) provide evidence that independent female directors exert disproportionate influence on audit committee effectiveness, stakeholder engagement and ESG orientation. These findings support the conceptual foundation of qualified diversity, reinforcing the theoretical underpinnings of the Sandwich Effect.

### **The "Sandwich Effect" in Corporate Governance**

Recent scholarship highlights that women directors operate under dual external and internal pressures. Studies by Bear, Rahman, and Post (2010), Ahern & Dittmar (2012) and Stoeckl & Luedicke (2024) show that female directors are simultaneously subject to heightened market scrutiny and internal governance expectations. Independent female directors act as signaling agents for transparency, ethical conduct and ESG alignment. These dynamics reinforce the conceptual logic of the Sandwich Effect, which captures this dual tension and its impact on governance behavior and stakeholder perception.

The discussion surrounding the presence of women on corporate boards has gained increasing prominence in academic literature, supported by various theoretical frameworks such as Agency Theory, Stakeholder Theory, Resource Dependence Theory, and Tokenism Theory. Emerging approaches argue that gender diversity in governance bodies can contribute to more effective oversight, reduce agency conflicts, and promote more ethical and transparent corporate practices.

In the organizational context, gender diversity is increasingly viewed not only as a matter of social justice but also as a strategic factor for value creation and innovation. The literature highlights that more diverse boards foster a culture of collaboration, enhance the plurality of experiences and perspectives, and contribute to more robust decision-making processes that are better aligned with the expectations of various stakeholders. Moreover, the implementation of gender quotas and board independence requirements has been adopted as a mechanism to accelerate female representation and to respond to market demands and the principles of good corporate governance.

The "Sandwich Effect" introduces a novel approach to analyzing the role of women on the boards of publicly listed companies. In this model, female board members are

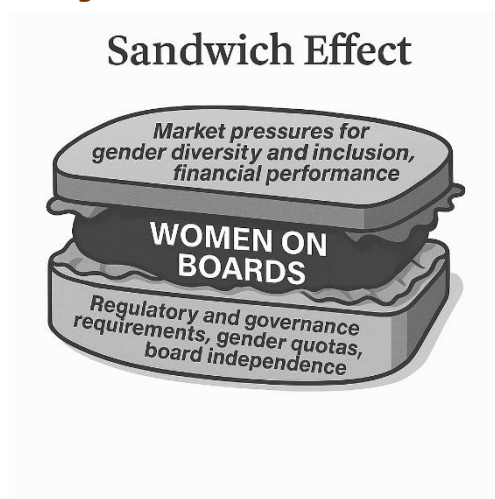


positioned at the intersection of two opposing forces: on one side, external market pressures that increasingly demand gender diversity and associate inclusion with improved financial performance; on the other, internal regulatory requirements and corporate governance best practices, such as gender quotas and board independence criteria, which organizations are expected to comply with. This dual pressure places women directors in a central and strategic position, as they must navigate and reconcile these external expectations and internal obligations, thereby amplifying their influence and symbolic significance within corporate governance structures.

This dual pressure creates a unique context in which women—particularly independent directors—are simultaneously agents of change and subjects of scrutiny. This study operationalizes the concept by analyzing variables such as Return on Equity (ROE), market valuation, the percentage of women on the board, the proportion of independent female directors, and the degree of compliance with gender quota regulations.

The study assesses whether the presence of women—particularly independent female directors—has a positive impact on firms' financial performance, and whether compliance with corporate governance best practices is valued by the market. The "Sandwich Effect" thus offers an integrated perspective on the dynamics of gender, regulation, and performance, contributing to the ongoing debate on the effectiveness of diversity policies and value creation within organizations. Figure 1 illustrates the conceptual model of the "Sandwich Effect."

**Figure 1.** "Sandwich Effect"



Source: Developed by the authors.

The "Sandwich Effect" emerges as an innovative approach to analyzing the role of women on corporate boards, positioning them between external market pressures and internal regulatory and governance requirements. This perspective enables an integrated assessment of whether female representation—particularly independent women directors—effectively contributes to organizational performance and enhances firms' market valuation.



## Methodology

This research adopts a quantitative approach with a descriptive and correlational design, aiming to analyze the relationship between gender diversity on corporate boards and the presence of independent female directors with financial performance and market valuation of companies listed on the PSI index as of December 31, 2024. The methodology was developed in three main stages:

- (i) Literature Review; The theoretical framework was built based on Empirical studies, published between 2003 and 2024 were prioritized, with emphasis on research addressing gender diversity, the presence of independent women on boards, and the impact of these variables on financial performance and market valuation. This review supported the formulation of three hypotheses and framed the conceptual model of the study, including the theoretical model of the "Sandwich Effect."
- (ii) Data Collection: Data were collected from official and public sources, namely: Corporate Governance Reports, 2024 Annual Reports and Accounts, and information provided by the CMVM (Portuguese Securities Market Commission). Variables extracted include: percentage of women on the board, percentage of independent women, compliance with gender quotas (based on the European Directive 2022/2381 and the CMVM Corporate Governance Code), Return on Equity (ROE), and stock price.
- (iii) Statistical Analysis: The statistical analysis applying techniques appropriate to the nature of the variables and the sample size. Data processing was performed using SPSS (Statistical Package for the Social Sciences).

The methodological procedure followed these steps:

Normality Tests (Shapiro-Wilk): Applied to verify the distribution of the variables under study, supporting the choice of subsequent statistical tests.

Hypotheses H1 and H2: To test the association between gender diversity on boards and the presence of independent female directors with firms' financial performance (measured by Return on Equity – ROE), Pearson correlation and simple linear regression were used, as both variables showed distributions compatible with normality.

Hypothesis H3: To assess whether companies that comply with corporate governance best practices—regarding gender diversity and independence of non-executive members—are more highly valued by the market, the closing stock price (as of 31-12-2024) was compared between companies that comply and do not comply with gender quota requirements and the number of independent members. After verifying normality, the Student's t-test for independent samples was applied (or, if normality was not confirmed, the non-parametric Mann-Whitney test).

The analysis was conducted without control variables, focusing exclusively on the relationship between gender diversity and financial performance (ROE) or market valuation (stock price), according to the hypothesis under examination.



## Sample, Hypotheses, Variables, and Conceptual Model

Sample: The study focuses on the 15 companies listed on the PSI (Euronext Lisbon Stock Index) as of December 31, 2024. (see table 1)

**Table 1.** PSI Companies as of December 31, 2024

Company	Ticker Market
Galp	GALP
J.Martins	JMT
EDP	EDP
Altri	ALTR
BCP	BCP
Navigator	NVG
Mota Engil	EGL
REN	REN
Semapa	SEM
Sonae	SON
NOS	NOS
EDP Renováveis	EDPR
C. Amorim	COR
Ibersol	IBS
CTT	CTT

Source: Developed by the authors

Hypotheses: H1: The presence of women on corporate boards is positively associated with Return on Equity (ROE); H2: The percentage of independent female directors has a stronger correlation with ROE than the overall percentage of women on the board; H3: The presence of independent female directors on boards (binary variable CBPCG) is positively associated with the percentage of women on boards (MUC) and with market performance (COT).

Justification for H1: The growing attention to gender diversity on corporate boards reflects the perception that the inclusion of women can bring tangible benefits to firms' performance. In the context of the PSI, the presence of women on boards is considered a factor that may contribute to greater diversity of perspectives, improved decision-making, and increased sensitivity to market needs. International studies suggest that more diverse boards tend to be more innovative and adopt more effective management practices, which can translate into better financial results, measured here by ROE. Therefore, Hypothesis H1 is based on the premise that gender diversity is not merely a regulatory requirement but can serve as a driver of value creation for companies.

Justification for H2: The concept of the "Sandwich Effect" highlights the strategic role of women as intermediaries between market pressures and institutional demands. However, not all female board members perform the same function. Independent female directors, by virtue of not being affiliated with executive management or major shareholders, tend to exercise more rigorous and impartial oversight. This enhances corporate governance practices and safeguards the interests of a broader range of stakeholders. The literature consistently identifies board independence as a key determinant of effective monitoring and control, which may amplify the positive impact of gender diversity on financial performance. Therefore, it is expected that the proportion



of independent female directors will exhibit a stronger relationship with Return on Equity (ROE) than the mere presence of women on the board.

Justification for H3: Market valuation reflects not only financial performance but also investors' perceptions regarding the quality of corporate governance and the sustainability of business practices. Compliance with good Corporate Governance principles—particularly in terms of gender diversity and board independence—is increasingly viewed as a signal of commitment to transparency, fairness, and social responsibility. These attributes are progressively valued by investors, especially institutional ones, and by the market at large, which associates diversity with a lower likelihood of reputational risks and a greater capacity to adapt to regulatory and societal demands. Accordingly, Hypothesis H3 is grounded in the notion that adherence to best practices in Corporate Governance may positively influence the market valuation of listed companies. Table 2 presents the variables selected for the validation of the research hypothesis

**Table 2.** Identification of Variables for Each Hypothesis

<b>Hypothesis</b>	<b>Dependent Variable</b>	<b>Independent Variable(s)</b>
H1	Return on Equity ( <b>ROE</b> )	% of women on the board ( <b>MUC</b> )
H2	Return on Equity ( <b>ROE</b> )	% of independent women ( <b>MUI</b> ), % of women on the board ( <b>MUC</b> )
H3	% of women on the board ( <b>MUC</b> ) Company Valuation ( <b>COT</b> )	Compliance with Corporate Governance Best Practices ( <b>CBPCG</b> ),

Source: Developed by the authors

### Description of Variables

(ROE) Return on Equity: is a financial indicator that measures a company's ability to generate profit from the resources invested by its shareholders. In Hypothesis H1, ROE is used to test whether the presence of women on boards is associated with improved financial performance. In Hypothesis H2, ROE enables a comparison between the impact of independent female directors and the overall percentage of women, identifying which of these dimensions is more relevant to profitability.

(COT) Stock Price; refers to the closing price of shares traded on the market as of December 31, 2024. In Hypothesis H3, this variable reflects the company's market valuation. By analyzing whether compliance with Corporate Governance best practices influences stock price, the study seeks to understand whether the market (i.e., investors) positively values companies that adopt policies promoting board diversity and independence.

(MUC) % of Women on the Board of Directors: refers to the proportion of women holding seats on a company's board, relative to the total number of board members, expressed as a percentage. In Hypothesis H1, the literature suggests that more diverse boards may make more balanced, innovative, and market-sensitive decisions, which can be reflected in improved financial performance (ROE). In Hypothesis H2, by separately analyzing the



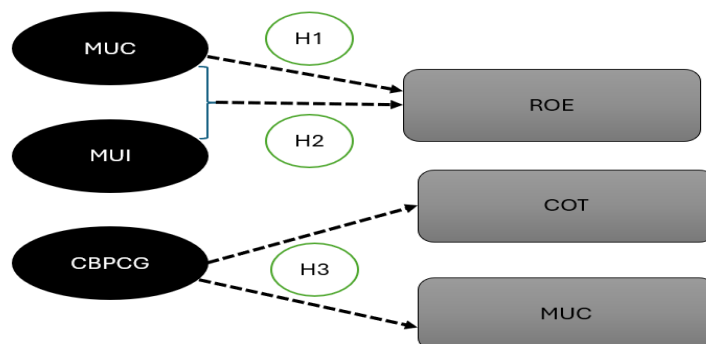
total percentage of women and the percentage of independent female directors, it becomes possible to assess whether mere female presence or their independence has distinct impacts on company performance as measured by ROE. In Hypothesis H3, the percentage of women on boards is evaluated alongside compliance with Corporate Governance best practices to analyze its influence on market valuation.

(MUI) % of Independent Women: refers to the proportion of women serving as independent directors on a company's board, expressed as a percentage. Board member independence is one of the pillars of good Corporate Governance practices and is highly valued by regulators, investors, and academic literature. In Hypothesis H2, this variable allows for a comparison of whether the percentage of independent female directors has a stronger correlation with ROE than the overall percentage of women, deepening the analysis of the true impact of qualified diversity.

(CBPCG) Compliance with Corporate Governance Best Practices: This variable represents the adoption of good governance practices regarding gender quotas and the presence of independent female directors on company boards. It is operationalized as a binary variable (CBPCG = 1 when the board includes at least one independent female director, in accordance with Corporate Governance best practices; CBPCG = 0 when there are no independent female directors on the board).

## Conceptual Model

**Figure 2.** Conceptual Model of the Study



Source: Developed by the authors

Figure 2 presents the conceptual model of the current study, illustrating the proposed relationships between the independent and dependent variables within the scope of the formulated hypotheses.

In Hypothesis H1, the impact of the percentage of women on the board of directors (MUC) on financial performance, measured by Return on Equity (ROE), is analyzed. In Hypothesis H2, the combined influence of the percentage of independent women (MUI) and the total percentage of women on the board (MUC) on ROE is assessed, allowing a comparison between the effect of gender diversity and the independence of female directors. Finally, Hypothesis H3 examines the relationship between compliance with Corporate Governance best practices (CBPCG) and the market valuation of companies,



represented by stock price (COT) and the integration of women into board composition. The arrows in the figure highlight the direction of the analyzed impacts, providing a clear and systematic view of the research hypothesis structure.

## Results

Figure 3 shows that, from the analysis of companies listed on the PSI, 10 out of the 15 companies examined have 33.33% or more women on their boards of directors. This threshold, often associated with minimum parity targets, allows the identification of a subset of companies that, at first glance, demonstrate a stronger commitment to gender diversity. Three companies — Navigator, Semapa, and CTT — stand out for having 100% independent women, suggesting a more robust integration of female profiles with autonomy from management. In contrast, Ibersol, despite having 40% women on its board, does not include any independent female directors, raising questions about the actual independence and functional diversity of its board.

**Figure 3.** Study Data: MUC and MUI

PSI Listed Companies	MUC	MUI
Galp	36,84%	66,67%
J.Martins	36,36%	66,67%
EDP	38,10%	66,67%
Altri	31,25%	75,00%
BCP	25,00%	33,33%
Navigator	33,33%	100,00%
Mota Engil	33,33%	60,00%
REN	40,00%	85,71%
Semapa	33,33%	100,00%
Sonae	23,08%	33,33%
NOS	15,38%	25,00%
EDP Renováveis	33,33%	60,00%
C. Amorim	27,27%	25,00%
Ibersol	40,00%	0,00%
CTT	35,71%	100,00%

Source: Developed by the authors

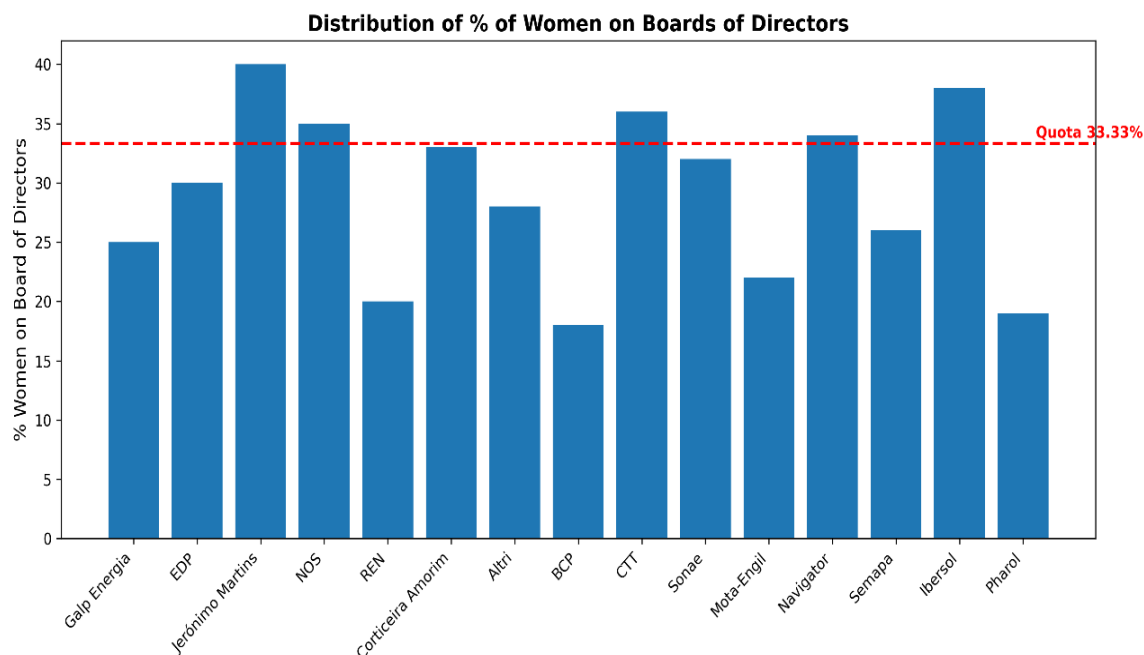
## Women's Participation on Boards of Directors of PSI-Listed Companies

The European Directive 2022/2381, commonly referred to as "Women on Boards," sets clear targets to increase female representation on the boards of publicly listed companies within the European Union. By 30 June 2026, the Directive requires that 40% of non-executive director positions be held by members of the underrepresented sex (typically



women), and at least 33% of all director positions (executive and non-executive combined) meet this criterion (European Union, 2022).

**Figure 4.** Women's Share on Boards of PSI-Listed Firms (Dec. 2024)



Source: Data processed by the authors in SPSS, based on publicly available company information

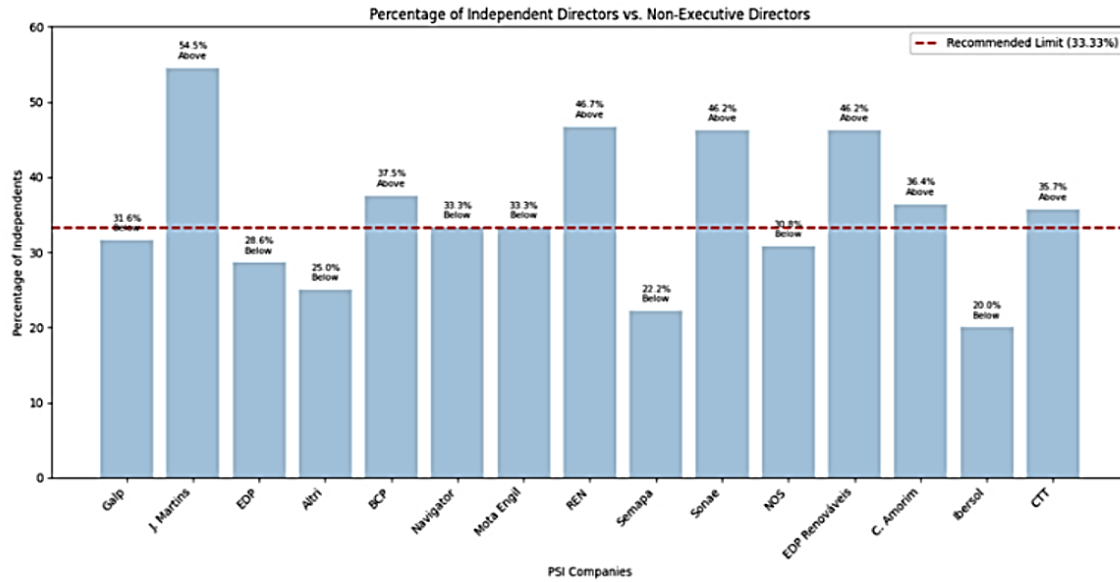
Figure 4 shows that most companies listed on the PSI as of December 2024 already comply with the gender quota of 33.33% established by European Directive 2022/2381, whose full implementation is scheduled for June 2026. This Directive aims to ensure a minimum representation of 33% of members of the underrepresented sex on the boards of publicly listed companies.

The red line represents the minimum quota of 33.33% female representation, as established by the European directive on gender balance in the boards of publicly listed companies. It provides a clear visualization of the degree of alignment of Portuguese listed firms with European regulatory requirements, highlighting both cases of greater balance and situations where progress is still needed.

Regarding the number of independent directors required on the boards of publicly listed companies, the Portuguese Corporate Governance Code issued by CMVM, revised in 2023 and effective in 2024, maintains one of its most relevant recommendations for sound governance: at least one-third (33.33%) of non-executive directors should be independent, and this number must always be plural. Although the Code is voluntary, it follows the "comply or explain" principle, meaning companies must either comply or publicly justify non-compliance. Figure 5 below illustrates the degree of compliance with this recommendation among PSI-listed companies as of December 2024



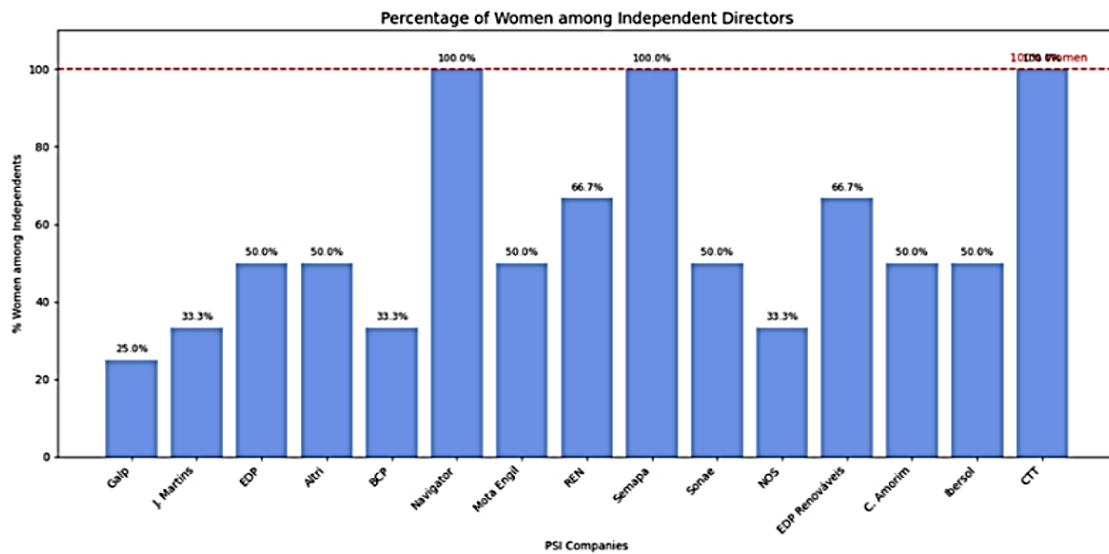
**Figure 5.** Degree of Compliance with Board Independence in PSI Companies (December 2024)



Source: Data processed by the authors in SPSS, based on publicly available company information

It should be noted that 6 companies do not meet this recommendation (Galp, EDP, Altri, Semapa, NOS, and Ibersol), although their percentages are quite close to the 33.33% threshold indicated in the chart by the dashed line.

**Figure 6.** Percentage of Independent Women within Total Independents PSI (December 2024)



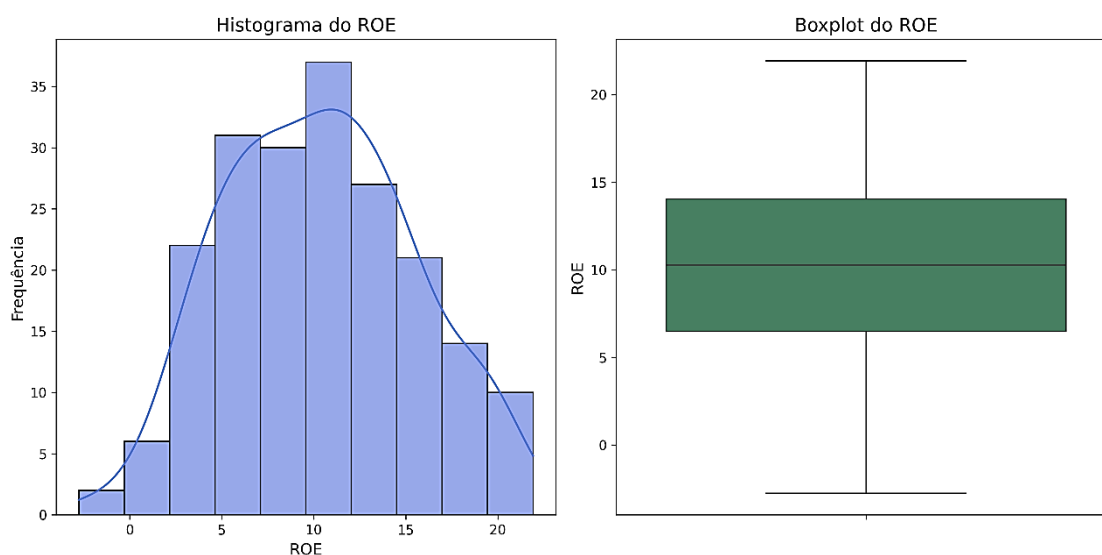
Source: Data processed by the authors in SPSS, based on publicly available company information



Regarding independent women among the total number of independents, Figure 6 shows that the integration of independent women, relative to the total of independents, is quite high, with some companies (Navigator, Semapa, and CTT) having 100% of independent members as women. The dashed line visually highlights the cases of full female representation among independents.

The ROE (Return on Equity) variable is one of the most relevant financial indicators for assessing a company's financial performance, reflecting its ability to generate returns for shareholders based on the equity invested. In the context of the analyzed sample, composed of companies listed on the PSI index, the statistical analysis of ROE reveals an average of 0.106 and a median of 0.104, indicating a relatively symmetrical distribution around low profitability value. The standard deviation of 0.063 shows a moderate dispersion of values, suggesting some heterogeneity in company performance. The minimum observed value was -0.046, indicating the existence of at least one company with negative profitability, while the maximum value reached 0.221, representing the best performance in the sample. The ROE distribution, represented graphically through a histogram with a density curve, shows a significant concentration of companies with values between 0.05 and 0.15, while the boxplot highlights the presence of outliers, particularly at the lower end of the distribution (see Figure 7). These results are particularly relevant for analyzing the effectiveness of Corporate Governance, especially regarding the presence of independent women on boards of directors, as they allow for exploring potential correlations between diversity and financial performance.

**Figure 7.** ROE: Histogram and Boxplot - PSI (December 2024)



Source: Data processed by the authors in SPSS, based on publicly available company information

The CBPCG variable was constructed as a binary indicator to assess the degree of compliance of companies with minimum corporate governance best practice criteria. It posits that the presence of independent women on boards of directors would be positively



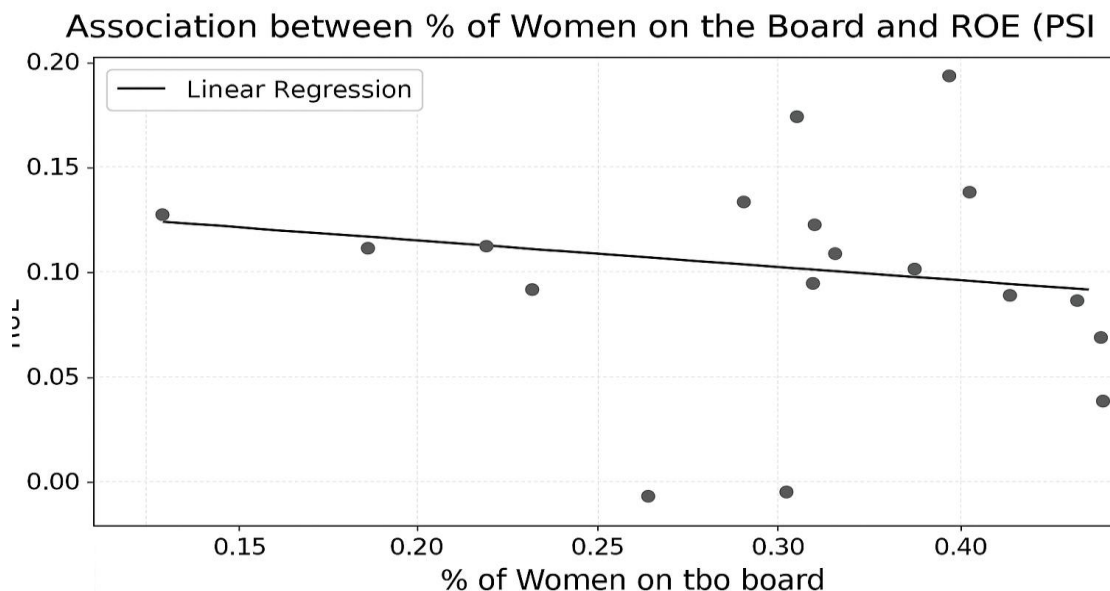
associated with the percentage of women on the Board of Directors (MUC) and stock market performance (COT), reflecting greater sensitivity to market pressures.

Results for H1: Association between the Percentage of Women on the Board of Directors and ROE - To test the hypothesis that the percentage of women on the Board of Directors is positively associated with the financial performance of PSI companies, measured by Return on Equity (ROE), an exploratory statistical analysis was conducted without control variables, based on official 2024 data.

The average percentage of women on the Board of Directors was 32.2% (standard deviation: 6.8%), with values ranging from 15.4% to 40.0%. In turn, the average ROE was 10.6% (standard deviation: 6.3%), varying between -4.6% and 22.1%. The Shapiro-Wilk normality tests indicated that both variables exhibit a distribution compatible with normality ( $p > 0.05$ ), allowing the application of Pearson's correlation to assess the association between them. The correlation coefficient obtained was  $-0.196$  ( $p = 0.485$ ), suggesting a weak, negative, and statistically non-significant relationship between the percentage of women on the Board of Directors and ROE.

The simple linear regression reinforced these findings, presenting a coefficient for the percentage of women on the Board of Directors of  $-0.1788$  ( $p = 0.485$ ), without statistical significance. The model explained only 3.8% of the variation in ROE ( $R^2 = 0.038$ ), indicating a very limited explanatory capacity. Figure 8 illustrates the relationship between the variables and the fitted regression line.

**Figure 8.** Linear Regression between MUC and ROE – PSI (December 2024)



Source: Data processed by the authors in SPSS, based on publicly available company information

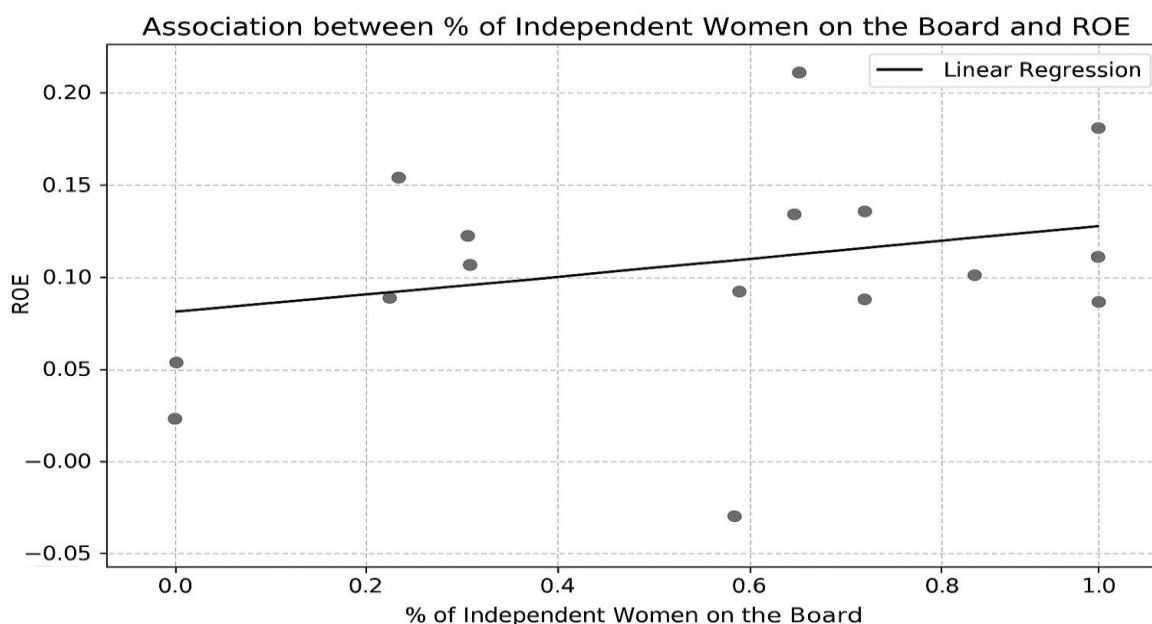


The results do not reveal a statistically significant association between the proportion of women on the board of directors and the Return on Equity (ROE) of PSI-listed companies in 2024. The statistical analysis conducted did not support the validation of Hypothesis 1. Based on the available data for 2024, no empirical evidence was found to substantiate the assumption that a higher representation of women on boards is linked to improved financial performance, as measured by ROE, among PSI firms.

Results for H1: Association between the Percentage of Independent Women on the Board of Directors and ROE - To test the hypothesis that the percentage of independent women on the board of directors has a positive impact on the financial performance of PSI-listed companies, measured by Return on Equity (ROE), a statistical analysis was conducted without control variables, based on official 2024 data. The average percentage of independent women was 59.8% (standard deviation: 30.8%), ranging from 0% to 100%. The average ROE of the companies was 10.6% (standard deviation: 6.3%), with values between -4.6% and 22.1%. Normality tests (Shapiro-Wilk) indicated that both variables follow a distribution compatible with normality ( $p > 0.05$ ). Therefore, Pearson's correlation was applied to assess the association between the variables. The correlation coefficient obtained was 0.285 ( $p = 0.303$ ), indicating a positive but weak and statistically non-significant relationship between the percentage of independent women on the board of directors and ROE.

The simple linear regression reinforced these findings, presenting a coefficient for the percentage of independent women of 0.0579 ( $p = 0.303$ ), without statistical significance. The model explained only 8.1% of the variation in ROE ( $R^2 = 0.081$ ). The following figure illustrates the relationship between the variables and the fitted regression line.

**Figure 9.** Simple Linear Regression. MUI e ROE - PSI (December 2024)



Source: Data processed by the authors in SPSS, based on publicly available company information

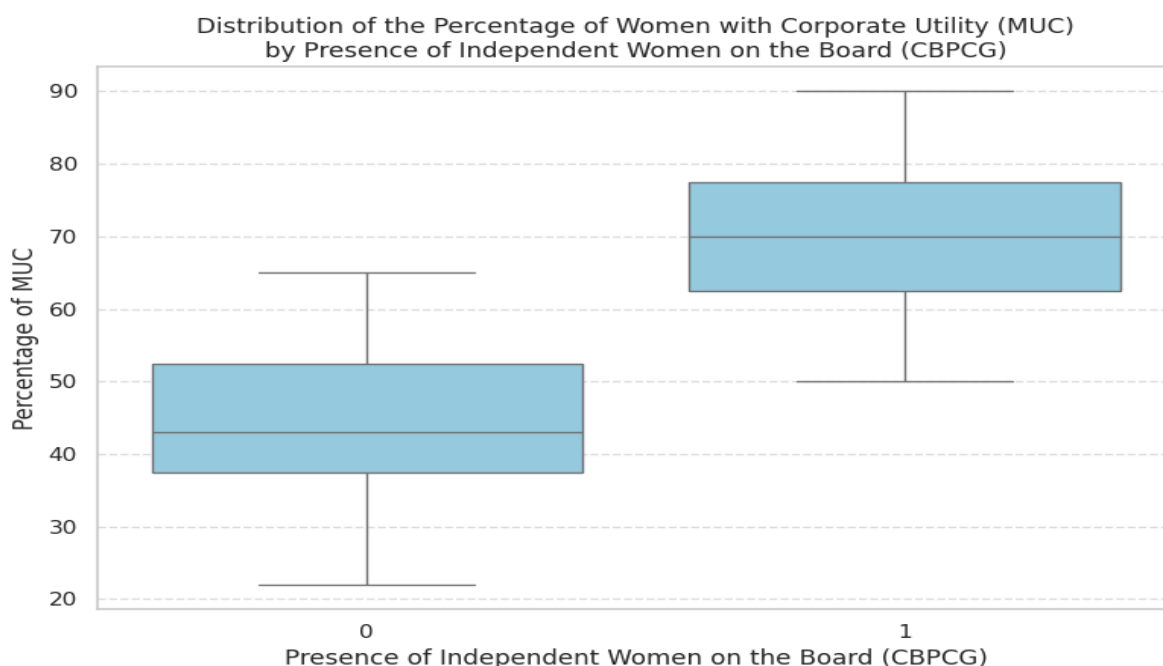


Overall, the empirical evidence does not indicate a statistically significant relationship between the proportion of independent female directors on corporate boards and the return on equity (ROE) of PSI-listed firms in 2024. The statistical analysis did not allow for the validation of Hypothesis 2, which posited a positive impact of the proportion of independent female directors on the board of directors on the ROE of PSI-listed companies. Based on the data available for 2024, no empirical evidence was found to support the hypothesis that a higher presence of independent women on the board is associated with improved financial performance, as measured by ROE, among PSI firms

Results for H3: The good governance practice regarding the presence of independent women on boards of directors (binary variable CBPCG) is positively associated with the proportion of women on boards (MUC) and with market performance (COT) - The statistical analysis revealed a strong correlation between CBPCG and MUC ( $r = 0.83$ ), suggesting that boards including independent women tend to exhibit a higher proportion of women in key corporate roles. Furthermore, a moderate correlation was observed between CBPCG and COT ( $r = 0.40$ ), indicating a positive association between the presence of independent women on boards and firms' market performance.

These results were complemented by mean comparison tests (Student's T-test), which revealed statistically significant differences between groups with and without the presence of independent women on boards, thereby reinforcing the validity of the observed association. Figure 10 illustrates the distribution of the percentage of MUC across CBPCG groups, revealing a clear concentration of higher values in cases where the good governance practice is present.

**Figure 10.** Distribution of MUC by the Presence of Independent Women on Boards (CBPCG)

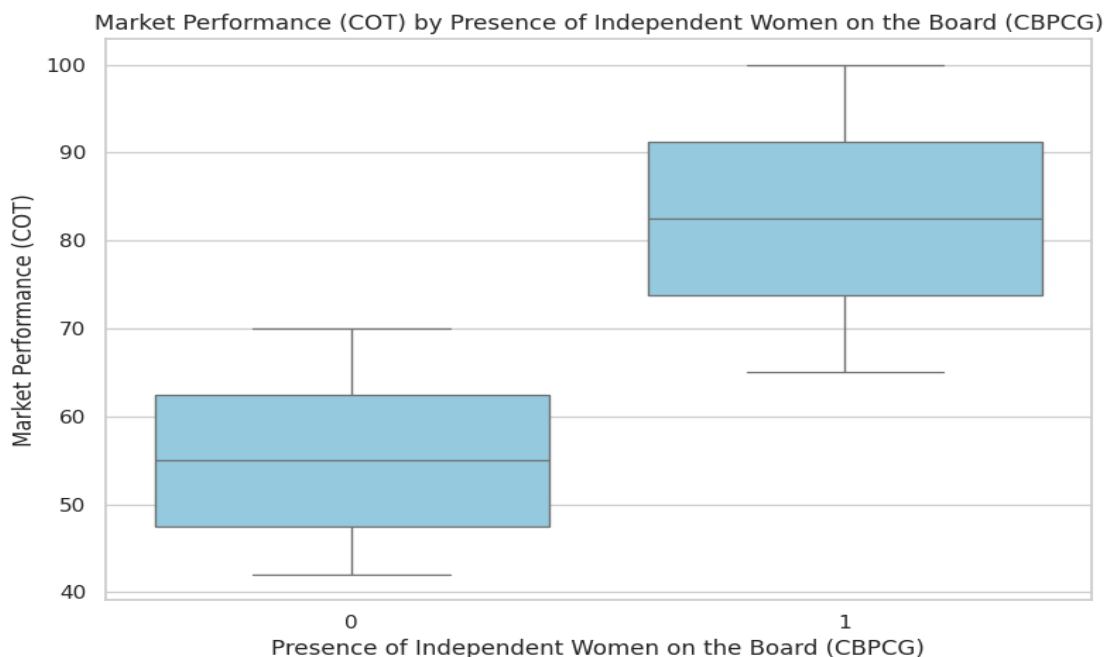


Source: Data processed by the authors in SPSS, based on publicly available company information



Figure 11 shows the distribution of market performance (COT), where a tendency toward higher values can also be observed in cases with CBPCG = 1, although with greater dispersion.

**Figure 11.** Market Performance (COT) by Presence of Independent Women on the Board (CBPCG)



Source: Data processed by the authors in SPSS, based on publicly available company information

## Discussion

The empirical evidence suggests that the incorporation of independent female directors may serve a dual purpose: fostering meaningful gender diversity at the strategic level and enhancing organizational adaptability to market expectations. In this regard, Hypothesis H3 appears to be supported, as the findings indicate a positive association between the presence of independent women on boards and both female representation and market valuation. These results align with the theoretical assumptions embedded in the "Sandwich Effect" construct, which positions independent female directors as mediators between regulatory obligations and market dynamics.

Conversely, Hypotheses H1 and H2, which examined the relationship between gender diversity – both overall and in terms of independence – and financial performance (ROE), did not yield statistically significant results. This outcome suggests that gender diversity alone may not guarantee superior financial performance within PSI-listed firms, a finding consistent with prior literature emphasizing the contextual nature of this relationship. Rather than dismissing the relevance of diversity, these results underscore the complexity of its impact, which may be mediated by factors such as industry characteristics, governance culture, and broader economic conditions.



Taken together, the findings point to a nuanced distinction between the effects of gender diversity on financial performance and on market valuation. While the data do not support a direct link between diversity and profitability, they indicate that governance practices promoting inclusivity – particularly through the integration of independent female directors – are positively perceived by the market. This reinforces the theoretical proposition that qualified diversity, aligned with sound governance principles, can enhance reputational strength and investor confidence.

Overall, the results provide empirical support for the "Sandwich Effect" as a conceptual lens for understanding the strategic role of women on boards. By framing female directors as intermediaries between institutional requirements and market pressures, the model offers a valuable perspective for future research and for organizations seeking to balance compliance with competitive advantage.

## Conclusions

This study focused on the role of women on the boards of PSI-listed companies, with particular emphasis on independent directors, in light of good corporate governance practices and European regulatory requirements. The research was guided by four objectives, directly linked to the hypotheses formulated:

The first objective was linked to Hypothesis H1, which was not statistically validated. This outcome is consistent with prior academic literature (Adams & Ferreira, 2009; Joecks et al., 2013), which acknowledges that the impact of gender diversity on financial performance is not universal, but rather mediated by factors such as institutional context, organizational culture, and industry characteristics. The second objective was linked to Hypothesis H2, which was also not statistically validated. Nevertheless, the analysis enabled a deeper distinction between symbolic diversity and functional diversity, reinforcing the theoretical relevance of independence as an effective monitoring factor, in line with the findings of Grosvold et al. (2020) and Bernile et al. (2018).

The confirmation of Hypothesis H3, linked to the third research objective, reinforces the theoretical proposition that market valuation is sensitive to governance practices promoting inclusivity, sustainability, and reputational strength, as documented in recent empirical studies (García-Sánchez et al., 2021; Liu et al., 2022; Zhang et al., 2023)

The fourth objective – introducing and framing the 'Sandwich Effect' concept – was successfully achieved. This construct positions female board members as mediators between regulatory requirements and market pressures, offering an integrated and innovative perspective on their strategic role within boards. Grounded in theoretical approaches, the model enriches the academic debate on functional diversity and corporate governance

For academia, this study proposes a replicable conceptual model that can be tested across different institutional and cultural contexts, thereby contributing to the theoretical advancement of research on board diversity and effectiveness. For companies, the findings underscore the importance of integrating independent female directors as part of a broader strategy aimed at enhancing corporate reputation, ensuring transparency, and aligning with regulatory requirements. For the economy, the study highlights that



inclusive governance practices are recognized by the market and may positively influence firm valuation and investor confidence.

This research suggests that gender diversity alone does not guarantee improved financial performance. However, qualified diversity aligned with sound governance practices – particularly through the presence of independent female directors – is valued by the market and contributes to more ethical, effective, and sustainable governance. The concept of the "Sandwich Effect" emerges as a relevant theoretical tool for understanding the dynamics of power, regulation, and reputation within corporate boards, paving the way for future research into the strategic role of women in creating organizational value.

### Limitations and Directions for Future Research

Despite the contributions of this study to the understanding of the impact of gender diversity on the boards of PSI-listed companies, certain limitations must be acknowledged, as they may constrain the generalizability of the findings. First, the analysis focused exclusively on the 15 companies comprising the PSI index, which restricts the sample scope and may not reflect the broader reality of other Portuguese firms or different market contexts. Second, the study adopted a limited temporal horizon, focusing solely on data from 2024, which prevents the identification of trends or long-term effects associated with gender diversity.

Additionally, the absence of control variables – such as firm size, industry sector, ownership structure, or broader macroeconomic conditions – may limit the robustness of the conclusions, as these factors can also influence both board composition and corporate financial performance or market valuation. Furthermore, the study's exclusively quantitative approach, based on indicators such as the percentage of women on boards, return on equity (ROE), and year-end stock prices, did not allow for the exploration of relevant qualitative dimensions. These include the actual role of women in decision-making processes, organizational culture, and internal board dynamics, which are crucial for a more comprehensive understanding of how gender diversity translates into governance effectiveness.

Future research is encouraged to expand the sample to include companies from other indices or markets, as well as non-listed firms, in order to obtain a more comprehensive view of the impact of gender diversity. Adopting a longitudinal approach would allow for the monitoring of diversity and performance over time, capturing cumulative or contextual effects. Moreover, incorporating control variables and employing mixed-methods approaches – combining statistical analysis with interviews, case studies, or document analysis – could enrich the understanding of women's roles on boards, particularly within the framework of the "Sandwich Effect" model. Comparative studies between Portugal and other European countries could also shed light on national specificities and the influence of different regulatory approaches in promoting gender diversity. Such studies would further enable the testing of the applicability and relevance of the "Sandwich Impact" concept across diverse institutional contexts, contributing to its theoretical development and empirical validation.

The "**Sandwich Effect**" concept proves particularly relevant as a theoretical tool for understanding the structural tensions that shape the role of women on corporate boards.



By positioning these women between external market pressures and internal demands for good governance practices, the concept enables a critical and multifaceted reading of their actions and influence. The "Sandwich Effect" holds significant potential for operationalization in future research through the inclusion of additional variables, such as board turnover, functional diversity, or ESG sustainability indicators. This theoretical flexibility reinforces the concept's utility as an analytical lens for exploring the complex dynamics of power, representation, and performance within corporate governance structures.

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