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DIVERSIDADE DE GÊNERO E DIVULGAÇÃO AMBIENTAL, SOCIAL E DE GOVERNANÇA: EVIDÊNCIAS DO MERCADO BRASILEIRO

GENDER DIVERSITY AND ENVIRONMENTAL, SOCIAL AND GOVERNANCE DISCLOSURE: EVIDENCE FROM THE BRAZILIAN MARKET

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RESUMO

Objetivo: Analisar a relação entre a diversidade de gênero na estrutura de governança e seus efeitos na divulgação da ESG das empresas brasileiras nos últimos 10 anos (2011-2020).

Método: Utilizamos um modelo de regressão com dados de painel de efeitos fixos sobre uma amostra de 96 empresas listadas no B3. Utilizamos dois representantes da diversidade: o impacto de uma massa crítica de mulheres (representação mínima - três mulheres) e a porcentagem de mulheres sobre o número total de membros de cada estrutura de governança.

Principais resultados: A participação feminina em cargos de alta gestão permanece baixa. Os resultados mostraram que a divulgação do ESG das entidades analisadas não foi influenciada pela característica de gênero dos membros da estrutura de governança.

Contribuições: Os resultados empíricos específicos por órgão de governança fornecem novos *insights* ligados à influência do gênero em diferentes mercados e são relevantes para novas investigações nessa temática emergente.

Palavras-chave: Diversidade de gênero. Divulgação ESG. Governança Corporativa. Sustentabilidade. Brasil.

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ABSTRACT

Purpose: To analyze the relationship between gender diversity in governance structure and its effects on Brazilian companies' ESG disclosure over the last 10 years (2011-2020).

Method: We used a regression model with fixed effects panel data on a sample of 96 companies listed on B3. We used two proxies for diversity: the impact of a critical mass of women (minimum representation - three women) and the percentage of women over the total number of members of each governance structure.

Main findings: female participation in top management positions remains quite low. The results showed that the ESG disclosure of the analyzed entities is not influenced by the gender characteristic of the governance structure members.

Theoretical, practical/social contributions: The specific empirical results per governance body provide new insights linked to the influence of gender in different markets and are relevant for further investigations into this emerging theme.

Keywords: Gender Diversity. ESG Disclosure. Corporate Governance. Sustainability. Brazil.

1 INTRODUCTION

Environmental, Social, and Governance (ESG) disclosure has received attention from individual shareholders, institutional investors, governments, local communities, employees, and suppliers (Bravo & Reguera-Alvarado, 2019). As a result, companies have become more sophisticated in their disclosures to meet their stakeholders' information demands (Helfaya & Moussa, 2017).

In the last decade, the literature has investigated and presented evidence on factors related to the corporate governance structure composition of entities that can strengthen social and environmental responsibility practices (Silveira, & Donaggio, 2019). A considerable portion of the evidence internationally found indicates that greater gender diversity in firms' governance structure is capable of improving firms' socio-environmental and financial performance (Qureshi et al., 2020; Albitar et al., 2020), as well as generating positive reputational impacts (Bear, Rahman, & Post, 2010).

In some countries, gender diversity has been supported by the issuance of regulations and policies requiring the mandatory presence of women on boards (Coluccia, Fontana & Solimene, 2019). Consequently, there has been an evolution in papers that analyze the relationship between women's presence and the companies' socio-environmental and financial performance (Bear et al., 2010; Ntim & Soobaroyen, 2013; Boulouta, 2013; Brugni et al. 2018; Silveira, & Donaggio, 2019; Martins & Júnior, 2020; Prudêncio, Forte, Crisóstomo & Vasconcelos, 2021).

In general, the literature published in high-impact journals addressing ESG disclosure has focused on developed economies (Cheng et al., 2014). Even though emerging markets represent a significant proportion of businesses around the world, there is still no scientific consensus on the relationship between women's board presence and ESG disclosure.

Some evidence from emerging countries has shown that increasing women's presence in the corporate governance structures tends to favor social and environmental disclosure, their engagement with sustainability and climate change issues (Garcia et al., 2017; Wasiuzzaman & Mohammad, 2020), in addition to generating positive impacts on financial performance (Bektur & Arzova, 2020). However, for Brazilian companies, the scientific evidence remains contradictory or inconclusive.

Overall, the existing research has focused on the gender diversity of board members, with the argument that a board with "diverse" members can make better decisions due to the different viewpoints and contributions each member can make to business decisions (IBGC, 2015). This argument is usually grounded in agency theory, as the board plays a significant role in resolving agency issues and ensuring a balance between the shareholders' interests and management (Coluccia, et al., 2019). However, to date, no research has investigated the influence of other spheres of corporate governance such as Fiscal council and statutory management might also play in Brazilian firms.

Thus, considering that empirical findings remain contradictory or inconclusive in different markets regarding the effects of gender diversity on the governance structure of firms, we seek to contribute to filling this gap. Therefore, this study aims to analyze the relationship between gender diversity in the governance structure of Brazilian stock exchange (B3) listed companies and ESG disclosure in the period from 2011 to 2020.

This study is timely, as it is the first to investigate the minimum representation of women as suggested by previous literature (Post, Rahman, & Rubow, 2011; Ben-Amar et al., 2017), in addition to considering three spheres of governance structure composition: Board of Directors, Statutory Board, and Fiscal Council. Therefore, the results provide further insight into the investigated relationship by considering new proxies and a holistic deepening of the entities' governance structure.

2 LITERATURE REVIEW

2.1 CORPORATE GOVERNANCE STRUCTURE AND GENDER DIVERSITY

In the context of the separation of control from ownership of capital, the corporate governance structure's objective is to respond to the dysfunctionality that arises from the pursuit of self-interest (Jensen & Meckling, 1976). The idea is to prevent managers from maximizing their interests to the detriment of shareholders' interests. The literature on corporate governance has focused on analyzing the mechanisms that can circumvent the problem and align interests in organizations.

Within this perspective, some studies hypothesized that specific configurations of governance mechanisms could create greater environmental awareness in the organization. Gender diversity, the presence of independent members, the existence of an environmental committee, the board size, the average age of members, and the number of board meetings are mechanisms that have been tested in the literature as characteristics that may favor the companies' social and environmental performance (Cucari, Esposito de Falco & Orlando, 2017; Bravo et al., 2019)

The minority participation of women relative to men in companies' corporate governance structure as well as in higher positions is the focus of several national and international research studies (Birindelli et al., 2018; Coluccia et al., 2019; Qureshi et al., 2020; Buallay et al., 2020; Prudencio et al., 2021). Results obtained for the scenarios most distinct from each other indicate that regardless of developed or developing economies, women's representativeness in the governance structure is substantially lower than men's (Brugni et al., 2018; Silveira, & Donaggio, 2019; Prudêncio et al., 2021).

Thus, many studies suggest that the increase of women tends to positively impact the organizational performance of firms as it provides a greater diversity of ideas and individual characteristics that favor the decision-making process (Ntim & Soobaroyen, 2013; Coluccia et al., 2019; Wasiuzzaman & Mohammad, 2020). Although empirically there is no consensus on

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the effective improvement of performance and socio-environmental disclosure as a consequence of the presence of women in corporate decision-making processes, previous studies indicate that gender diversity in companies favors the reaching of these goals (Silveira, & Donaggio, 2019; Qureshi et al., 2020; Albitar et al., 2020).

The Brazilian Institute of Corporate Governance (IBGC, 2015) recommends that there should be gender diversity on the company's Board of Directors to provide a plurality of ideas, thus valuing members' characteristics with richer debates and, therefore, better decision-making (Martins & Júnior, 2020).

Despite evidence of benefits arising from the individual, ethical, and social differences of women's participation in entities' governance structure (Santos, Santos, & Leite Filho, 2019; Silveira, & Donaggio, 2019; Martins & Junior, 2020; Prudêncio et al., 2021), there is still no specific evidence confirming that increased female participation can influence the ESG disclosure of Brazilian companies. Thus, it is necessary to test the following hypothesis:

H1: There is a positive relationship between the percentage of women in the governance structure and the Brazilian companies' ESG disclosure.

2.2 EFFECTS OF GENDER DIVERSITY ON ESG DISCLOSURE

Previous studies generally point out that greater gender diversity on boards is related to better corporate social responsibility indicators, better ethical and social reputation, greater compliance with laws and regulations, and better quality of disclosed reports (Silveira, & Donaggio, 2019). The central idea is that women can provide different viewpoints in discussions, which would improve decision-making processes, including ESG disclosure decisions and strategies. Therefore, more women (diversity) in the governance structure would increase the quality of the decision-making process and this would potentially have a positive impact on performance (Qureshi et al., 2020; Bektur & Arzova, 2020).

In Brazil, Martins and Junior (2020) showed that the presence of women on corporate boards reduced the possibility of fraudulent financial reporting and bankruptcy. When it comes to social and environmental performance and disclosure, Post et al. (2011) found that companies whose boards were composed of three or more women scored higher on environmental responsibility. These results support the critical mass theory, in which women and racial or ethnic minorities will only have an impact on board decisions when they move from being mere "trophies" to a relevant minority of the board (Silveira, & Donaggio, 2019).

Ben-Amar, Chang, and McIlkenny (2017) confirm the results of Post et al. (2011) and indicate that a low representation of women in the governance structure tends to minimize the female voice before majority members. However, considering the number of women equal to or greater than three, it would be possible to obtain an audible critical mass within the group (Ben-Amar et al., 2017).

Cucari et al. (2017) in analyzing the association between environmental, social, and governance (ESG) disclosure and board gender diversity of 54 Italian companies between the years 2011 and 2014, found that increasing the number of women on the board negatively impacted companies' ESG disclosure.

Liao et al. (2015) found a positive relationship between the percentage of women on Boards of Directors and environmental disclosure. Ben-Amar et al. (2017) investigated 541 Canadian companies between the years 2008 and 2014 and found that female Board membership was positively related to voluntary disclosure of climate change information.

Bravo and Reguera-Alvarado (2019) analyzed the link between female representation on Audit Committees and the specific information attributes of ESG disclosures of 93 Spanish companies over the period 2012 to 2015. The authors found a positive association between gender diversity and the quality of ESG reporting. Furthermore, Bravo and Reguera-Alvarado (2019) suggest that gender diversity needs to reach a critical mass of at least two women before it begins to influence board disclosures on greenhouse gas (GHG) emission levels and climate change strategies. In Brazil, Santos et al. (2019), when analyzing the relationship between the presence of women on the Audit Committee and social and environmental disclosure, found no statistically significant relationship.

In this perspective of analyzing the influence of a critical mass of women, Husted & Sousa-Filho (2019) examined the effect of board structure on ESG disclosure of Latin American companies. The authors found a negative relationship and, when controlling for companies that had a critical mass of three women, the relationship was not statistically significant, given that few companies had more than one woman on the board.

Wasiuzzaman and Mohammad (2020) investigated the effect of board gender diversity on the transparency of environmental, social, and governance (ESG) disclosures in Malaysia. The results indicated that ESG disclosure improved significantly with the increasing presence of women on boards.

Buallay et al. (2020) analyzed 2,116 banks over 10 years (2007-2016). The results of the descriptive analysis showed that board diversity tends to be higher in larger and less leveraged banks. Cross-country analysis showed that Central America has the highest levels of board diversity. Meanwhile, in Europe, banks have the highest levels of environmental and social disclosure. They also showed a higher level of governance disclosure among Australian banks. A regression model partially corroborated gender diversity on the board as a causal factor of corporate governance disclosure with a positive and significant effect on the level of ESG disclosure results (Buallay et al., 2020).

Birindelli et al. (2018), in conducting a study of 108 U.S. and European banks over the period 2011 to 2016, found that diversity and gender balance positively impact ESG performance. This study seeks to investigate the possible relationship between gender diversity and ESG disclosure and contribute to filling the research gap on this topic in Brazil. Therefore, to identify whether there is an influence of gender diversity (in the governance structure of Brazilian companies) on ESG disclosure, this research proposes to test the following hypothesis:

H2: There is a positive relationship between the minimum representation of three women in the corporate governance structure and the Brazilian companies' ESG disclosure.

3 METHODOLOGY

3.1 SAMPLE AND PERIOD OF ANALYSIS

The initial sample encompassed 96 companies from various industries, listed on B3. This delimitation was due to the availability of ESG data within the period 2011 to 2020, totaling 687 observations. Therefore, we have an unbalanced panel.

The industrial, transportation, financial, and retail industries are the most representative, with 21.9%, 16.7%, 15.6%, and 9.4% share, respectively. The other industries are less representative of the total sample, ranging from 1% to 6.3%. The accumulated representativity of the Industrial, Public Utilities, and Financial industries was 54.2% for the

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total sample. Table 1 shows the number of companies per industry and their representativeness in the sample.

Table 1
Sample from the population with ESG Score by industry

Industry	Freq.	Representativeness (%)
Industrial	21	21,9%
Public Utilities	16	16,7%
Financial	15	15,6%
Retail	9	9,4%
Transportation	6	6,3%
Construction	6	6,3%
Real state, rental, and Leasing	6	6,3%
Telecommunication	4	4,2%
Mining and extractivism	3	3,1%
Healthcare and social assistance	3	3,1%
Wholesale Trade	2	2,1%
Education	2	2,1%
Serv. Adm. Support and Waste Management and Remediation	1	1,0%
Agriculture, Forestry, Fishing & Hunting	1	1,0%
Professional, Scientific & Technical Services	1	1,0%
Total	96	100%

The data relating to the composition of the firm's corporate governance structure were collected from the GetDFPData database (Perlin & Vancin, 2019) and directly from the Reference Form (FR items 12.5/6). For this analysis, we analyzed the composition data of the Board of Directors, the Board of Executive Officers, and the Fiscal Council, given the responsibility of each body for the transparency and credibility of the corporate information disclosed. By analyzing the three bodies, the research achieves a level of depth that complements the results of previous research and provides more specific evidence from the Brazilian context.

ESG score data were collected from the Thomson Reuters database. Financial data were extracted from the Economática® database. The delimitation of the analysis period, from 2011 to 2020, considers the availability of ESG data - published from 2011 to 2020. However, we emphasize that for the year 2020, the scores of some companies were not disclosed, a fact that contributes to the unbalanced panel.

3.2 RESEARCH VARIABLES

All variables considered in this analysis were selected based on the theoretical framework previously analyzed. The dependent variable of this study is social and environmental and corporate governance disclosure, whose proxy is the ESG score. It represents the market judgment on firms' environmental, social, and governance disclosure (Coluccia et al., 2019). The scores measure a company's transparency and range from 1 to 100 so a higher score indicates more disclosure and transparency of information (Wasiuzzaman & Mohammad, 2020). We chose to use the variable's natural logarithm both because it reduced the impact of outliers in the data and because it provided a better fit to the model.

Table 2 shows the research variables (without any treatment), the database, the authors who used them, and the expected relations for each one of them.

Table 2
Research Variables

Variable	Description	Reference	Expected relationship
lnesg	Dependent variable: Natural logarithm of firm i's ESG score in year t.	Cucari et al. (2017); Garcia et al. (2017); Birindelli et al. (2018); Coluccia, et al. (2019); Buallay et al. (2020); Qureshi et al. (2020); Wasiuzzaman e Mohammad (2020)	
wcadm	Women as a percentage of total members of the firm's board of directors	Cucari et al. (2017); Birindelli et al. (2018); Coluccia, et al. (2019); Buallay et al. (2020); Qureshi et al. (2020); Wasiuzzaman and Mohammad (2020)	+
wcfisc	Women as a percentage of the total members of the firm's Fiscal board		
wdiret	Women as a percentage of the total number of members of the firm's statutory management		
drepadm	Dummy that takes value 1 if the number of women is equal to 3 or more on the board of directors or represents all members in the year; and 0 otherwise.	Cucari et al. (2017); Ben-Amar, Chang and McIlkenny (2017); Birindelli et al. (2018); Bravo and Reguera-Alvarado (2018).	+
drepfisc	Dummy that takes value 1 if the number of women is equal to 3 or more on the Fiscal board or represents all members in the year; and 0 otherwise.		
drepdiret	Dummy that takes value 1 if the number of women is equal to 3 or more on the statutory board or represents the entire membership in the year; and 0 otherwise.		
tmcadm	The number of board members of firm i in year t.	Boulouta (2013); Cucari et al. (2017); Birindelli et al. (2018); Bravo and Reguera-Alvarado (2018); Qureshi et al. (2020); Wasiuzzaman and Mohammad (2020)	**+**
tmcfisc	The number of fiscal council members of firm i in year t.		
tmdiret	The number of statutory board members at firm i in year t.		
lnatot	Firm Size. Natural logarithm of firm i's Total Assets in year t.	Boulouta (2013); Cucari et al. (2017); Birindelli et al. (2018); Bravo and Reguera-Alvarado (2018); Coluccia, et al. (2019); Qureshi et al. (2020); Wasiuzzaman e Mohammad (2020); Buallay et al. (2020);	**+**
Roe_w	Financial Performance. Winsorized rate of return obtained by the ratio between net income and shareholders' equity of firm I, in year t	Birindelli et al. (2018); Bektur and Arzova (2020); Wasiuzzaman and Mohammad (2020); Manta et al. (2020).	**+/-**
Finance	Dummy that assumes value 1 if it is a financial institution; and 0 otherwise.	Birindelli et al. (2018); Buallay et al. (2020); Manta et al., 2020.	+

Concerning the variables of interest related to diversity in the firm's corporate governance structure, we considered two proxies that have the potential to influence the entities' financial reports: the percentage of women's participation among the total members

of each body, and the minimum representation of three women in each body (Ben-Amar et al., 2017; Birindelli et al., 2018; Bravo & Reguera-Alvarado, 2019; Martins &Júnior, 2020).

Among the control variables, we considered those that affect disclosure according to previous literature on the subject under discussion. The size of the entity considering that large companies enjoy lower information production costs compared to small and medium-sized companies. In addition, large companies that are concerned with improving their "social appreciation" seek to satisfy the expectations of various users and therefore produce more information (Qureshi et al., 2020).

A further control variable is the Return on Equity (ROE). A company's financial performance has a positive effect on voluntary disclosure in meeting social demands (Helfaya & Moussa, 2017; Birindelli et al., 2018; Bektur & Arzova, 2020; Wasiuzzaman & Mohammad, 2020; Manta et al., 2020). It is natural to think that the best-performing companies are more likely to invest economic resources in social and environmental action activities and to engage in the preparation and disclosure of voluntary information (Coluccia et al., 2019).

Because it presents distinct characteristics from the other sectors in the presentation of the financial statements, we control for the financial sector employing the variable (finance). The objective is to avoid potential influence and distortion in the estimation results. Finally, we have included the variables tmcadm, tmcfisc, and tmdiret to control for the size of each governance body.

3.3 ECONOMETRIC MODEL

We chose the panel data methodology because this model is already consolidated in the international literature that studies the relationship between gender diversity in corporate governance structure and the disclosure of ESG data (Coluccia et al., 2019; Qureshi et al., 2020; Bektur & Arzova, 2020; Wasiuzzaman e Mohammad, 2020).

The selection of the most appropriate model to investigate the proposed relationship considers the variables already tested in the literature reviewed. We detail the model built using Equation 1.

$$lnesg_{i,t} = \hat{\alpha}_{it} + \hat{\beta}_1 wcadm_{i,t} + \hat{\beta}_2 wcfisc_{i,t} + \hat{\beta}_3 wdiret_{i,t} + \hat{\beta}_4 drepadm_{i,t} +$$

$$\hat{\beta}_5 drepfisc_{i,t} + \hat{\beta}_6 drepdiret_{i,t} + \hat{\beta}_7 tmcadm_{i,t} + \hat{\beta}_8 tmcfisc_{i,t} + \hat{\beta}_9 tmdiret_{i,t} +$$

$$\hat{\beta}_{10} lnatot_{i,t} + \hat{\beta}_{11} roe\_w_{i,t} + \hat{\beta}_{12} financ + \varepsilon_{i,t} \tag{1}$$

Where: lnesg is the natural logarithm of the firm's ESG score; wcadm is the percentage of women on the firm's Board of Directors; wcfisc is the percentage of women on the firm's ficsal board; wdiret is the percentage of women on the firm's Statutory Board; drepadm is a dummy variable that assumes 1 if the firm has 3 or more women on the Management Board or its entirety in year t and 0 otherwise; drepfisc is a dummy variable that assumes 1 if the firm has 3 or more women on the Fiscal Board or its entirety in year t and 0 otherwise; drepdiret is a dummy variable that assumes 1 if the firm has 3 or more women on the Statutory Board or represents its totality in year t and 0 otherwise; tmcadm is the number of members of the Board of Directors of firm i in year t; tmcfisc is the number of members of the Fiscal Council of firm i in year t; tmdiret is the number of members of the Statutory Board of Directors of firm i in year t; roe_w is the rate of return on equity (winsorized) of firm i in year t; lnatot is

the natural logarithm of firm i's total assets in year t; financ is a dummy variable that takes value 1 if the entity is a financial institution; and 0 otherwise and ε is the model's error term.

We performed statistical tests to determine the model used in this study, among them the Chow, Breusch-Pagan (LM), and Hausman tests. For the detection of heteroskedasticity, multicollinearity, and autocorrelation problems, we applied the tests: Variance inflation factor (VIF), Modified Wald test, and Wooldridge test, respectively. We tested the distribution of residuals for normality by employing the Doornik-Hansen test.

4 RESULTS

4.1 RESULTS PRESENTATION

Table 3 presents the descriptive statistics for the quantitative variables. The first panel presents the joint statistics for all the sectors sampled. The second panel presents these statistics only for the financial sector. This segregation aims to ensure the proper analysis of the sample studied, considering the heterogeneity of the sectors involved.

Table 3
Summary statistics of quantitative variables

Variables	Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation (CV)
Panel 1 – General sample					
esg	49.10	20.54	0.65	89.50	0.42
lnesg	3.76	0.63	0.14	4.54	0.17
wcadm	0.09	0.10	0.00	0.50	1.06
wcfisc	0.09	0.13	0.00	1.00	1.46
wdiret	0.09	0.16	0.00	1.00	1.78
tmcadm	10.18	4.90	0.00	32.00	0.48
tmcfisc	5.45	3.71	0.00	17.00	0.68
tmdiret	7.18	10.38	0.00	95.00	1.45
lnatot	16.69	1.55	11.43	21465.00	0.09
roe_w	9.03	26.26	-135.50	83.00	2.91
Panel 2 – Financial Industry					
esg	52.29	24.89	6.69	**93.44**	**0.48**
lnesg	3.81	0.60	1.90	4.54	0.16
wcadm	0.09	0.09	0.00	0.33	0.93
wcfisc	0.07	0.09	0.00	0.33	1.33
wdiret	**0.11**	0.18	0.00	1.00	1.59
tmcadm	9.18	2.07	6.00	16.00	0.23
tmcfisc	5.53	4.39	0.00	17.00	0.79
tmdiret	**16.46**	23.55	1.00	**95.00**	1.43
lnatot	18.09	1.93	14.88	21.47	0.11
roe_w	18.71	16.56	-35.70	83.00	0.88

Note. The variables are defined in Table 2.

The companies' average ESG score is close to the median in the sample (49.62 points), however, the coefficient of variation reveals the high dispersion of ESG data (42%) from the mean. This high dispersion is understandable considering that the sample involves both financial and non-financial institutions. In addition, ESG disclosure is voluntary. Panel 2 shows data specific to the financial sector.

The variables that measure the percentage of women in the governance structure of the companies (wcadm, wcfisc, and wdiret) presented averages lower than 10%. This reveals the low female participation in these bodies. The variables tmcadm, tmcfisc, and tmdiret,

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representing the total number of members in each governance structure body, presented high dispersion about the averages, with 10, 5, and 7 members respectively. This result, associated with the large disparity between the minimum number of members (0) in the non-financial sectors and the maximum number (95 members) in the financial sector, reflects the heterogeneous composition of these bodies among the companies and sectors in the sample.

The minimum number of members from the financial sector was zero only for the Fiscal Council. The Board of Directors had a minimum of six members, and the Executive Board had one member. For the other sectors, the minimum number of components was zero in each of the three bodies, and the maximum number of members for the Board of Directors was 32, for the Fiscal Council 12, and for the Executive Board 22 members.

About the size of each governance body, the Board of Directors of companies in the Telecommunications, Transportation, and Utility industries had, on average, the largest number of members (size). The percentage of women on the Board was higher in the Professional Services (18%), Administration and Management (15%), and Retail Trade (13%) sectors. Concerning the minimum representation of three women, the Telecommunications, Transportation, Industrial, Retail Trade, Mining, Public Utilities, and Financial sectors were those that presented a non-zero average. However, the highest frequency occurred in companies in the Public Utilities and Industrial sectors. In general, the minimum representativeness occurred in a few companies in the sample.

The Fiscal Council had, on average, a larger number of members in the Public Utilities (7.7), Telecommunications (6.6), and Educational Services sectors, with 6.4 members. On average, the percentage of women in this body stood out in the Educational Services sector, with 19%, followed by the Public Utilities and Telecommunications industries, both with 13%. The minimum representation of three women did not occur in the Adm. Services, Agriculture, Education, Mining, Professional Services, and Wholesale Trade industries. However, it occurred more frequently in the Public Utilities and Industrial sectors.

The Board of Directors had the highest average number of members in the Financial (16.5 members) and Professional Services sectors, with 12.2 members. The remaining industries had an average number of members ranging from three to seven. Companies in the Retail Trade and Real Estate sectors had the highest average percentage of women on the board, with 18% each. Next, the Construction, Mining, and Health industries presented a percentage of female participation of around 12%, and in the Financial sector, this percentage was 11%. The minimum female representation of three women was a highlight in the Financial sector companies, occurring more frequently than in the other industries. Additionally, the industries that also presented an average different from zero were Real Estate, Construction, Retail Trade, Transportation, Health Care, and Public Utilities.

Employing descriptive statistics, we verified that the financial sector presents an ESG maximum score higher than the other industries (93.44 points), which implies greater disclosure of these aspects by these institutions. In addition, the sector stood out about the characteristics of its Board of Directors. Additionally, the sector is among those with the highest percentage of women in the body (11%), and with 23% of the institutions with female representation (minimum of three).

Regarding the roe_w variable, we highlight that the minimum negative value before treatment (-754.7) is due to the company Ecorodovias Infraestrutura e Logística in the year 2020. An atypical year whose road restrictions due to the pandemic of the new coronavirus may have contributed to this result. To control for outlier effects, we applied the winsorization

technique for this variable in the 1st and 99th percentiles (Wasiuzzaman & Mohammad, 2020).

After the initial analysis, we performed the initial estimations through the panel data model. Based on the tests applied (de Chow, Hausman, Breusch Pagan), we chose the fixed effects model. In addition to the specification tests for the final model, we also applied the validation tests to check for multicollinearity, heteroscedasticity, autocorrelation, and non-normality problems in the distribution of residuals.

We applied the Wooldridge test to check whether the residuals were correlated across firms. The result revealed the existence of first-order autocorrelation (F 1.81 = 33.485 and a p-value = 0.0000). The model also showed heteroscedastic residuals, according to the result of the Modified Wald test, with a p-value = 0.0000. In this sense, we used a robust variance-covariance matrix to minimize the problem.

The Doornik-Hansen test indicated the existence of non-normality in the distribution of the model's residuals (p-value = 0.0000). Finally, multicollinearity was not found among the explanatory variables, since the VIF (Variance Inflation Factor) test showed a value lower than 5.

Since the residuals presented heteroscedasticity and autocorrelation, we used the Generalized Factorial Least Squares technique. To test whether the company's ESG disclosure level is a function of the tested variables, we estimated regression analysis based on 698 observations for 10 years. The final regression results are described in Table 4.

Table 4
Regression model results

Explanatory variable	Dependent Variable: lnesg			
	Pooled	Fixed Effects	Random Effects	Fixed Effects FGLS
wcadm	0,5961***	-3412**	-0,3383**	-0,0673
	(0,012)	(0,025)	(0,027)	(0.339)
wcfisc	-0,1552	-0,2069	-0,2477*	-0,0203
	(0,467)	(0,128)	(0,072)	(0.676)
wdiret	-0,1329	-0,02209	-0,8529	0,0938*
	(0,406)	(0,838)	(0,436)	(0.099)
drepadm	-0,1603**	-0,0214	-0.0248	0,0210
	(0,054)	(0,659)	(0,616)	(0.207)
drepfisc	-0,0049	0,0970*	0,1109*	-0,0069
	(0,961)	(0,089)	(0,057)	(0.691)
drepdiret	-0,2142*	-0,2221**	-0,2117***	-0,0171
	(0,077)	(0,002)	(0,004)	(0,441)
Tmcadm	0,2724***	0,0081*	0,0105***	0,0098***
	(0,000)	(0,062)	(0,011)	(0.000)
Tmcfisc	-0,0251***	-0,0043	-0,0029	-0,0082**
	(0,000)	(0,468)	(0,603)	(0,002)
Tmdiret	0,0043*	0,0017	0,0101**	-0,0008
	(0,073)	(0,774)	(0,02)	(0,307)
lnatot	0,1747***	-0,09038***	-0,0286	0,0555***

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	(0,000)	(0,000)	(0,151)	(0,000)
roe_w	0,0020*	-0,00083*	-0,0007	-0,0003*
	(0,009)	(0,081)	(0,147)	(0,094)
finance	-0,2590***	Omitted	-0,0268	0,1016***
	(0,000)		(0,863)	(0,001)
_cons	0,7022**	5,3212***	4,1149***	3,1122***
	(0,005)	(0,000)	(0,000)	(0,000)

R2 Adjust	0,25	Chow	$F_{87,599}$ = 27,63
VIF	1,71	Breush-Pagan for RE	736,78***
Breush-Pagan	χ 2 = 61,24***	Hausman	44,91***
Reset	F = 4,31	Woold–autocorrel	F (1,81) = 33,485***
Doornik-Hansen	D-H = 250.1169***	Wald:	χ 2 = 2.0+28***

Note. The variables are defined in Table 2.
***Significant at a level of 1%/** Significant at a level of 5%/* Significant at a level of 10%.

The results show that the percentage of women in the total number of members of the Board of Directors and Fiscal Council did not present a statistically significant result. In the Board of Directors, the percentage of women was significant at 10%. The minimum representation of three women was not significant in influencing the companies' ESG scores and disclosures.

The control variables company size (lnatot) and Board of Directors size (tmcadm) showed a positive and significant relationship with ESG disclosure, at the 5% significance level. The Fiscal Council size showed a negative and significant relationship with lnesg, while the Statutory Board size did not show a statistically significant result. The control variable finance showed a positive and significant coefficient. Finally, the roe_w variable showed a negative and significant relationship at 10% with the ESG score.

5 RESULTS DISCUSSION

Table 5 summarizes the research hypotheses with the expected and observed relationship for each of them.

Table 5
Summary of Research Hypotheses Results

Hypothesis	Variable	Expected Relationship	Observed Relationship	Conclusion
H1	wcadm	+	non-significant	Rejected
	wcfisc		non-significant	
	wdiret		non-significant	
H2	drepadm	+	non-significant	Rejected
	drepfisc		non-significant	
	drepdiret		non-significant	

Our results reveal that the percentage of women in relation to the total number of members of both the Board of Directors and the Fiscal Council did not show a statistically significant result. In the Board of Directors, the women percentage was significant at 10%. Thus, the first hypothesis proposed in this research was rejected (There is a positive

relationship between companies' ESG disclosure and gender diversity in the governance structure of Brazilian companies).

Similarly, the minimum representation of three women did not show significant influence on the disclosure of companies with ESG issues, leading to the rejection of the second proposed hypothesis (There is a positive relationship between the minimum representation of three women in the corporate governance structure and the ESG disclosure of Brazilian companies).

These results contradict part of the international literature that observed a positive and significant relationship between female presence and ESG disclosures, mainly in developed markets (Birindelli et al., 2018; Bravo & Reguera-Alvarado, 2019; Coluccia et al., 2019; Buallay et al., 2020; Qureshi et al., 2020; Wasiuzzaman & Mohammad, 2020. However, it resembles that found by Husted & Sousa-Filho (2019) for a general sample of Latin American firms.

Husted & Sousa-Filho (2019) indicated two paths that may cause different results from those previously found in the literature. The first is that the low female participation and representativeness (female critical mass) in companies in Latin American countries may contribute to the relationship being different from that found for European or American countries (positive and significant).

The second argument is that Latin American countries are characterized by high levels of collectivism. Collectivist cultures favor a preference for the in-group (of the firm) as opposed to the out-group (external stakeholders). Considering the high number of family-owned companies in Brazil, the most relevant group for the owners is the family. Thus, by prioritizing the interests of the family over the interests of other stakeholders, a divergent result may reflect the lack of importance given to external interests, for which ESG disclosure is more relevant.

Both the first and second arguments seem to fit the results found in this research. Because female participation in governance bodies is low, the statistical significance of the variables of interest may be compromised. The direct implication of this is that only when a larger number of companies include greater gender diversity in the composition of these bodies will scientific studies be able to identify the influence of gender diversity on ESG disclosure.

Regarding the cultural factor, even if there were greater female participation in the governance structure and a critical mass of women, family interests would still prevail to the detriment of the stakeholder's interests. In this sense, Brazilian corporate governance diverges, specifically concerning the presence of women in the governance structure. Consequently, the mechanism driving the relationship between gender diversity and ESG disclosure is not entirely clear.

It was identified that the percentage of female participation remains low (less than 10%) in each governance body, regardless of whether the company belongs to the financial or non-financial industry. The minimum value of zero indicates that in some companies, both in the financial and non-financial sectors, there is no female participation in the governance structure. The maximum participation value represented 100, which reveals that some companies have a Fiscal Board and Board of Directors composed only of women, as is the case of MRV Engenharia about the Fiscal Board, and MMX Mineração, Cosan, PDG Realty, and Qualicorp about the Board of Directors. In the Board of Directors, female participation reached the maximum of 50% of members only in the company MMX Mineração in the year 2019. This

result for Brazil is similar to the findings of Cucari et al. (2017), Birindelli et al. (2018), and Wasiuzzaman and Mohammad (2020).

In the initial data analysis, we found that financial institutions had higher average ESG scores than other industries. In the literature, there is evidence that banks use social and environmental disclosures for legitimacy reasons, which may not be characteristic of all sectors that comprise the sample (Cornett, Erhemjamts & Tehranianian, 2016; Prates et al., 2019; Manta et al., 2020).

The average ESG score presented by companies listed on the Brazilian stock exchange is close to the results of Garcia et al. (2017) for the countries that make up the BRICS. However, it proves to be lower than the average reported by European companies - 59.55 points (Qureshi et al., 2020) and higher than the average presented by Italian companies (32.80) and Malaysian (21,54) (Cucari et al., 2017; Wasiuzzaman & Mohammad, 2020).

The control variables of company and board size showed a positive and significant relationship with ESG disclosure. Thus, the larger the company and the number of members of the Board of Directors, the greater the ESG disclosure tends to be. Large companies tend to care about their image and reputation, and about meeting the expectations of various users, producing more information at lower costs (Cornett et al., 2016; Prates et al., 2019; Qureshi et al., 2020 Manta et al., 2020). These results denote the relevant role that the board of directors has in the ESG performance of companies.

The control variable finance showed a positive and significant coefficient, suggesting that banks tend to engage in ESG disclosures and practices for reputational and legitimacy reasons, as per previous national and international literature investigating this sector (Cornett et al., 2016; Prates et al., 2019; Qureshi et al., 2020 Manta et al., 2020). The roe_w variable showed a negative and significant relationship at 10% with the ESG score. Even though the coefficient is small (-0.0003), this result may be an indication that financial performance does not necessarily imply a higher ESG score. Birindelli et al. (2018) found the same relationship for banks in the years close to the subprime crisis.

6 CONCLUDING REMARKS

In this paper, we fulfilled the proposed objective of analyzing the relationship between gender diversity in the governance structure of firms and its effects on the ESG disclosure of companies listed on B3 in the last 10 years (2011-2020). Through a longitudinal analysis, we reject the two tested hypotheses and infer that such a relationship was not observed. However, we emphasize that the results are restricted to the sample and period analyzed.

From the results found for Brazil, this research is timely in providing more specific evidence that female participation does not imply greater ESG disclosure by companies. Both interest variables were not statistically significant in explaining ESG disclosure. To investigate deeply the relationship, we analyzed the data by governance sphere (body), an analysis not previously performed in other studies. Despite the control variables used, the results indicated that gender did not contribute to ESG disclosure in Brazilian firms. We speculate that individual aspects such as professional experience, education, and macroeconomic aspects such as country culture may influence strategies and choices in top management positions and could be investigated in future research, for example from an institutionalist perspective. In addition, female participation in top management positions remains quite low.

Brazilian companies' findings are divergent from international research findings that investigated well-developed markets, such as the U.S. Despite this disconnection, such divergence is understandable, given that cultural characteristics can also interfere in the

analyses carried out in samples from Latin American countries, as is the case of Brazil (Husted & Sousa-Filho, 2019). Moreover, in Brazil, the capital market is in development, as is the demand for ESG information and its disclosure.

In terms of academic contribution, this study adds to the numerous efforts that international research has made to deepen the knowledge about strengthening strategies of companies through gender diversity in the corporate governance of these entities and transparency in voluntary disclosures of non-financial information.

Regarding practical contribution, these results are relevant for companies as they draw attention to the importance of individual and human characteristics in the composition of a company's governance structure. Companies concerned with environmental and social issues and good governance practices should ensure that members of their governance structure, regardless of gender, are equipped with both the technical skills appropriate to the position they hold, and the knowledge and skills addressed to emerging ESG and sustainability issues. In this way, disclosures are likely to be more transparent on these aspects.

However, we highlight the limitations of this study. The number of companies with ESG scores is still relatively low, which ends up limiting the analysis to the available data and jointly across sectors. Another limiting point is the information disclosed in the reference forms, as there are uninformed and even inconsistent data, which also tends to limit the analysis.

The evidence brought forward may contribute to the development of new empirical research, especially in countries where the theme is still in early development, such as Brazil. However, limited access to ESG data in emerging markets remains the biggest barrier to research development (Garcia et al., 2017). Future studies can investigate the relationship by considering other theoretical lenses such as institutional theory, as well as adding more proxies of socio-environmental performance, and cultural and individual aspects.

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