Nijmegen School of Management
Department of Economics and Business Economics
Master's Thesis Economics (MAN-MTHEC)

The Effect of Corporate Governance Mechanisms on Corporate Biodiversity Disclosure

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Nijmegen, 29 June 2024

Program: Master's Program in Economics
Specialisation: Corporate Finance and Control
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Chapter 1 – Introduction

This thesis aims to address the gap in research concerning the disclosure of a firm's biodiversity impact. Biodiversity is the combination of life forms and their interactions with one another, and with the physical environment that has made Earth habitable for humans. Ecosystems provide the basic necessities of life, offer protection from natural disasters and disease, and are the foundation for human culture (CBD, 2009). Biodiversity is essential for human survival, but due to the human attitude and behavior towards nature in recent decades, planet Earth is currently facing a serious environmental collapse. The rapid loss of biodiversity over the last decades might be an indicator that suggests that our planet is heading into a period of sixth mass extinction (Barnosky et al., 2011; Ceballos et al., 2017). Consequently, biodiversity loss and ecosystem collapse are now recognized as one of the top five global risks and have critical implementations for humanity (World Economic Forum, 2020).

Biodiversity issues pose several risks for firms, potentially affecting their competitiveness, profitability, and overall longevity (UNGC, 2012). Consequently, there is increasing pressure from stakeholders and institutions for firms to disclose and address their biodiversity impacts (GRI, 2007). Environmental, Social, and Governance (ESG) indicators are becoming increasingly important for investors when deciding which firms to include in their portfolios. By engaging in biodiversity disclosure, firms can mitigate risks, address stakeholder concerns, enhance financial performance, and improve long-term survival (de Villiers et al., 2011; Haque & Jones, 2020). However, despite the alarming decline of biodiversity, literature on biodiversity disclosure remains scarce (Adler et al., 2018; Atkins & Maroun, 2018; Blanco-Zaitegi et al., 2022).

The European Union, a frontrunner in climate policy efforts, introduced the EU Biodiversity strategic plan in 2011. This plan provided industries with guidelines, action plans, and targets for protecting biodiversity and ecosystems from 2011 to 2020 and beyond (EC, 2015). However, without regulatory requirements, biodiversity reporting remained optional for firms until 2023, when the Corporate Sustainable Reporting Directive (CSRD) was introduced. The CSRD mandates that sustainability reporting be as binding as financial reporting. The CSRD includes the European Sustainability Reporting Standards (ESRS), specifically ESRS E4, which focusses on biodiversity with the aim to strengthen the understanding in firms about their role and impact on biodiversity and thus help them align their business models with biodiversity protection and restoration (EC, 2023). Starting in 2024, around 49,000 European companies

must report according to the ESRS, with SMEs beginning in 2028. All types of companies in Europe have to measure and report their impact on biodiversity by 2030. Various standards, such as the Global Reporting Initiative (GRI), are adapting their requirements to these new developments. Consequently, the ripples of the CSRD will be felt globally, either directly or through the supply chains of European firms.
Implementing the CSRD poses significant challenges, as highlighted by a recent PWC survey (2023): technical complexity, resource scarcity, high time pressure, and lack of expertise. The technical complexity involves assessing impacts across the entire value chain, making data collection resource- and time-intensive. Thus, the CSRD presents significant challenges for firms regarding environmental footprint analysis, data collection, stakeholder engagement and strategic adaptation.

Without biodiversity reporting regulation, there can be information asymmetry between managers and shareholders and managers might have incentives to behave opportunistically (Brammer & Pavelin, 2006). In light of the pressures from stakeholders on firms to comply with Corporate Social Performance, firms choose to disclose their sustainability performance and adhere to the sustainability reporting guidelines to address the information asymmetry (Unerman et al., 2010). Complying with biodiversity reporting guidelines could therefore be a way for the management to navigate the increased pressure from both society and corporate governance mechanisms. (Samkin et al. 2014).

Corporate governance mechanisms, such as the board of directors, can reduce the information asymmetry between managers and stakeholders through effectively monitoring the management (Jensen & Meckling, 1976). Another essential function of the corporate governance mechanisms is that they are capable of strategically steering firms towards favorable directions (Shleifer & Vishny, 1997). As a result, these corporate governance mechanisms can ensure that firms consider sustainability issues when they are designing their strategies, if this is seen as a favorable direction. Thus, corporate governance mechanisms could be able to influence the corporate sustainability performance (Amran et al., 2014), including corporate biodiversity disclosure.

Given the early stages of biodiversity disclosure research (Atkins & Maroun, 2018), the relationship between corporate governance mechanisms and biodiversity disclosure has not been fully explored. Therefore, this thesis examines the following research question: How do

different corporate governance mechanisms impact corporate biodiversity disclosure? This research follows Haque & Jones (2020) by using the 'Disclosing of Biodiversity Initiatives (DBI)' score to measure a firms' corporate biodiversity disclosure. This score is based on a firm's disclosure of its biodiversity related policies, procedures and activities which are intended to minimize the firms' impact on the native biodiversity.

This thesis contributes to the existing literature on corporate governance mechanisms and corporate biodiversity disclosure in the following ways. Firstly, it examines the influence of specific corporate governance mechanisms (board of directors, sustainability committee, sustainable executive compensation policy, and stakeholder engagement) on biodiversity disclosure, a relationship not fully explored in prior research (Atkins & Maroun, 2018). Interactions effects between certain corporate governance mechanisms, which were the most theoretically justified, were added to this research to gain a deeper understanding of the possible relationship. Thus, this thesis adds to and complements existing literature on corporate governance and corporate biodiversity disclosure. Secondly, most research on corporate biodiversity disclosure have been qualitative. This thesis adds to the limited quantative biodiversity disclosure studies by examining firm-level determinants of corporate biodiversity disclosure. This research uses an international dataset with a more recent time range (2010-2022) than similar research (Haque & Jones, 2020).

Practically, this research provides insights for shareholders, stakeholders, and investors into how corporate governance mechanisms influence corporate biodiversity reporting. As all European firms must report their biodiversity impact by 2030, understanding which firms have the right governance structures to faster adapt to these standards is crucial. Additionally, given the complexity and cost of biodiversity reporting, this research highlights how governance mechanisms can facilitate smoother transitions to transparent biodiversity disclosure.

This thesis proceeds as follows: the second chapter 'Theoretical framework and hypotheses' provides a theoretical background for key concepts and develops the research hypotheses. The third chapter 'Research design and data' focuses on the research design, empirical model, data sample, and operationalization of variables. In the fourth chapter, the results of the fixed effects models will be presented and in the fifth chapter these findings will be discussed. This thesis will end with a conclusion which will address the limitations of this research and offer suggestions for future research.

Chapter 2 - Theoretical framework and hypotheses

Given Haque & Jones (2020) found engaging in corporate biodiversity disclosure can help firms to address stakeholder concerns, enhance their financial performance and improve long-term survival capabilities, biodiversity disclosure should be a crucial objective for the board of directors. Boards are ultimately responsible for corporate environmental strategy (Kassinis & Vafeas, 2002). This research follows the framework of Hillman & Dalziel (2003), which suggests that the board of directors has two primary functions. The first function is monitoring the management to ensure it acts in the shareholders' interests, aligning with the agency theory. The second function is facilitating access to important information and resources, based on the resource dependency theory. This research adds a third function for the board, which is the engagement with stakeholders. Stakeholder theory argues that companies should be accountable not only to shareholders but also to a wide range of stakeholders. As these three functions influence corporate biodiversity disclosure differently, they are categorized into three groups: director monitoring and incentivizing (agency theory), resource provision (resource dependency theory), and stakeholder engagement (stakeholder theory).

2.1 Monitoring and incentives

Agency theory describes the relationship between principals (shareholders) and agents (managers), where agents are given decision-making authority by principals to perform tasks on their behalf (Jensen & Meckling, 1976). Both parties aim to maximize their self-interest, leading to potential conflicts due to the agents having more information than the principals, a situation known as information asymmetry. This asymmetry is at the heart of the agency problem, especially evident in the divide between company ownership and management, where management may prioritize own interests over maximizing shareholder returns (Jensen & Murphy, 1990). The presence of a board of directors can reduce this information asymmetry by closely monitoring the firm management (Hillman & Dalziel, 2003). Directors who closely oversee the management are more likely to request explanations for management's strategic initiatives and to critique any misguided decisions (Baysinger & Hoskisson, 1990; McNulty & Pettigrew, 1999). Independent boards are more likely to be effective monitors as they are capable of objectively questioning and evaluating the firms' management (de Villiers et al., 2011). Monitoring developments around environmental disclosure strategy is important for independent boards, as they show a greater concern for the firm's attitude towards corporate social responsibility (CSR) (Ibrahim & Angetidis, 1995). One challenge for a board is that

management might be reluctant to pursue corporate biodiversity disclosure as it is a short-term expense which will only possibly yield a reward in the long term (Liao et al., 2015). However, independent boards are more likely to recognize the value of long-term environmental investments and resist management pressure to ignore these opportunities (McKendall et al., 1999). This research interprets board independence in three ways: concentration of independent board members, CEO-duality, and the interaction effect between these two variables.

A higher concentration of independent directors on a board could have a positive effect on the effective monitoring of a board. Independent directors are not involved with day-to-day operations (Liao et al., 2015) and do not have a material financial interest in the firm (Jo & Harjoto, 2011). Additionally, the career of an independent director is independent of the influence of the CEO, thereby reducing the CEO's power over them (Core et al., 1999). Due to this independence, independent directors are seen as accountability mechanisms, helping to ensure that firms pursue the interests of both shareholders and all stakeholders (Haniffa & Cooke, 2005). In the context of biodiversity disclosure, independent directors are assumed to be more sensitive to social demands because they find themselves in a better position to protect the interests of stakeholders compared to other directors (Ibrahim & Angetidis, 1995). They are seen as more capable to respect the firms' social obligations and are generally more committed to developing and maintaining corporate social responsibility (Zahra & Pearce, 1989). Tricker (1984) and Haniffa & Cooke (2005) also argue that independent directors are more likely to provide pressure on firms to engage in sustainability disclosure, ensuring alignment between organizational decisions, societal values and corporate legitimacy. Consistent with these findings, this research argues that boards with a higher concentration of independent directors are more likely to engage in biodiversity disclosure due to their heightened awareness of potential benefits for corporate legitimacy. Therefore, this thesis presents its first hypothesis:

> H1: The concentration of independent directors on a board has a positive relationship with corporate biodiversity disclosure.

CEO duality occurs when the chief executive officer (CEO) also holds the position of the board's chairman. Combining these roles places significant power in the hands of one individual, increasing information asymmetry between the CEO and the board and compromising the preferred system of checks and balances. This concentration of power results in weak accountability and creates a conflict of interest (Rechner & Dalton, 1991). Separating these roles would mean the CEO has no influence on the board of directors, allowing the board

to operate with less internal pressure and greater independence. The presence of CEO duality makes a frank and honest discussion in a board meeting difficult and may enable the CEO to advance personal agendas (Kelton & Yang, 2004). Having CEO-duality thus constraints board independence (Carver, 1990; Michelon & Parbonetti, 2012; Hussain et al., 2018). In situations where a CEO is faced with multiple investment opportunities, CEO duality reduces the likelihood of the board approving environmental investments with long-term payoffs. Conversely, separating the roles of CEO and board chairman allows the board to more freely promote investment opportunities with long-term social and financial benefits, such as biodiversity disclosure. This leads to the second hypothesis:

H2: CEO duality has a negative relationship with corporate biodiversity disclosure.

With CEO-duality, the CEO has a significant influence over the board's decisions, which decreases the board independence (Michelon & Parbonetti, 2012). A higher concentration of independent directors can offer a counterweight to this influence, as their career is not dependent on the influence of the CEO (Core et al., 1999). This counterweight will lead to more balanced decision making. Also, independent boards are more likely to recognize the value of long-term environmental investments and resist management pressure to ignore these opportunities (McKendall et al., 1999). Which is why this research states the next hypothesis:

H3: A higher concentration of independent directors can decrease the potential negative influence CEO-duality has on corporate biodiversity disclosure.

The monitoring role of the board of directors is about aligning the interests of management and shareholders. Shareholders are increasingly demanding that management engage in environmental initiatives and provide transparent disclosure of their environmental impact (Barko et al., 2022). However, since these initiatives often require short-term investments with long-term payoffs, management may be reluctant to engage in them (Liao et al., 2015). Incentive-based mechanisms could in such cases align the interests of management and shareholders (Jensen & Meckling, 1976). Recent research has seen a trend of linking executive compensation with sustainability issues in order to motivate executives to undertake social and environmental initiatives (Haque, 2017). Furthermore, Haque (2017) and Ji (2015) emphasize the importance of a sustainable executive compensation policy in order for executives to embrace long-term social and environmental perspectives. By introducing an executive sustainable compensation policy, a board of directors can align the interests of executives with

those of stakeholders, thereby improving a firm's provision of information about biodiversity impact and initiatives. Therefore, this study expects the following hypothesis:

> H4: The presence of an executive ESG compensation policy within a firm has a positive relationship with corporate biodiversity disclosure.

A more independent board can be more effective in enhancing corporate social responsibility (CSR) when complemented with a long-term incentive plan for executives, such as an ESG-compensation policy (Oh et al., 2018). Executives who are compensated for reaching ESG-goals are more motivated to engage in environmental incentives and disclosure, which reduces the agency problem between management and shareholders. This reduced need for monitoring allows independent board members to provide valuable resources for managing various stakeholders (Johnson & Greening, 1999). In such a scenario, independent directors have the opportunity to leverage more resources to manage external constituencies and improve a firm's social reputation. Therefore, this research proposes the following hypothesis:

> H5: The effect of board independence on corporate biodiversity disclosure is positively influenced by the presence of an executive ESG compensation policy.

2.2 Resource provision

Mallin & Michelon (2011) shows, with the resource dependency theory, that boards consist of human capital (i.e. expertise and experience) and relational capital (i.e. network ties) which assist firms in acquiring important resources and initiating new business relationships within an industry (Hillman et al., 2001; Hillman & Dalziel, 2003). Resource-rich directors with their extensive social networks are well-suited for a resource provision role as they are exposed to diverse practices, further building their expertise (Kor & Sundaramurthy, 2009). These directors are more likely to be informed about biodiversity initiatives and are thus better positioned to advocate for the introduction of biodiversity disclosure. This research identifies four board characteristics related to a director's ability to provide increased access to important resources: board size, board tenure, board corporate affiliations, and board gender diversity.

In line with the resource provision role of directors, larger boards increase the likelihood of having more resource-rich directors. Their presence enhances access to important resources and beneficial social corporate networks (Kor & Sundaramurthy, 2009). Larger boards also bring more experience and knowledge, resulting in better information exchange between the board and the CEO (Dalton et al., 1999). Additionally, having a larger board increases the probability

that directors have encountered previous requests for environmental initiatives and disclosures. These directors are more likely to counsel the board on the potential payoffs and challenges, reducing uncertainty when biodiversity disclosure is discussed at a board meeting. This results in the next hypothesis:

H6: Board size has a positive relationship with corporate biodiversity disclosure.

Directors with extended tenure on a board can be seen as valuable sources of organizational knowledge due to their familiarity with the firm's internal processes (Fischer & Pollock, 2004). This expertise can lead to better advice and improved access to important resources (Dowling & Pfeffer, 1975). Directors with longer tenures have also had more exposure to previous environmental challenges and opportunities. This experience enables a board to make better-informed decisions about biodiversity disclosure. Which is why this research adds the following hypothesis:

H7: Board tenure has a positive relationship with corporate biodiversity disclosure.

Board members are often allowed to have multiple corporate affiliations while serving on one board. Directors can serve on other boards, hold executive or advisory roles at other firms, or have ownership investments in different firms. While it can be argued that multiple affiliations might negatively impact the effectiveness of current board memberships, arguments from the resource dependency theory are positive (de Villiers et al., 2011). Directors can gain valuable expertise from their external experiences. Multiple corporate affiliations expose directors to a range of governance and strategic challenges, including those related to environmental issues. Since each firm addresses these challenges differently, directors with multiple corporate affiliations gain a broader understanding of how to manage environmental disclosure challenges. This knowledge enables directors to provide better advice and improve resource access for firms (Pfeffer & Salancik, 1978). This thesis expects that greater exposure to external experiences through multiple corporate affiliations increases the likelihood that directors will promote engagement in biodiversity disclosure, resulting in the following hypothesis:

H8: The number of corporate affiliations of a director on a board has a positive relationship with corporate biodiversity disclosure.

Larger boards increase the likelihood that valuable expertise about environmentally challenges is present, which can reduce uncertainty when biodiversity disclosure is discussed at a board meeting. However, the quality of this expertise depends on the directors' tenure and their

corporate affiliations. Longer tenure leads to better organizational knowledge (Fischer & Pollock, 2004) and increased exposure to environmental challenges. Similarly, more corporate affiliations increase exposure to different environmental challenges. Directors with longer tenure and more corporate affiliations are, therefore, in a better position to provide advice on environmental challenges and reduce uncertainty when biodiversity initiatives and disclosure are discussed at board level. Consequently, this thesis expects that the effect of board size on corporate biodiversity disclosure is influenced by board tenure and board corporate affiliations:

> H9: The positive effect of board size on corporate biodiversity disclosure is positively influenced by board tenure and corporate affiliations.

Mallin & Michelon (2011) highlight the important resource-provision role of female directors concerning human and social capital. Generally, women are more concerned with stakeholder welfare (Adams & Ferreira, 2009) and therefore more sensitive to stakeholders' concerns (Coffey & Wang, 1998; Liao et al., 2015), such as biodiversity risks. This makes female directors more likely to engage in sustainable corporate strategies and pursue long-term corporate goals to make a positive contribution to society (Braun, 2010; Mallin & Michelon, 2011; Liao et al., 2015; Glass et al., 2016). Female board members also encourage open discussions, information sharing, and increased participation, which minimizes conflict and improves the quality of board decisions, particularly regarding climate and biodiversity issues (Bear et al., 2010). By incorporating and valuing stakeholder perspectives in decision-making processes, female directors enhance the board's understanding of ethical and social demands (Hollindale et al., 2019). Building on this argument, a higher concentration of female directors on a board can provide more critical advice and resources, influencing the board's decision to engage in environmental strategies, biodiversity disclosure included. Therefore, this thesis hypothesizes the following:

> H10: the concentration of female directors on a board has a positive relationship with corporate biodiversity disclosure.

2.3. Stakeholder engagement

Stakeholder theory argues that firms should be accountable not only to shareholders but also to a wide range of stakeholders, such as employees, customers, suppliers and the environment. Stakeholders are increasingly pressuring firms to become more transparent about their sustainability activities (Mitchell et al., 1997) and to take greater responsibility for the environmental impact of their decisions (Braam & Peeters, 2018; Manning et al., 2019).

Stakeholder theory suggests that firms continuously interact and engage with these various stakeholder groups, as these groups have diverse interests and desires (Manetti, 2011). Dowling & Pfeffer (1975) suggest that firms strive to align their actions with the social values and norms of acceptable behavior within the larger social system they are part of. A disparity between these actions and social values can threaten organizational legitimacy, which is crucial for a firm's survival (Dowling & Pfeffer, 1975). Fortunately, organizational legitimacy is a resource that firms can influence (Woodward et al., 2001). Firms seek to gain this organizational legitimacy by engaging with different stakeholder groups, leading to the disclosure of social and environmental information (Deegan, 2007). Stakeholder engagement thus plays a vital role in understanding the stakeholders' expectations and maintaining organizational legitimacy. Following this argumentation, this thesis hypothesizes that active stakeholder engagement increases the likelihood of firms engaging in biodiversity disclosure:

> H11: Active stakeholder engagement has a positive relationship with corporate biodiversity disclosure.

Altering a company's board structure can significantly influence the involvement of directors in shaping the firm's strategy (Zahra & Pearce, 1989). By appointing a CSR committee within the board, a firm enhances stakeholder engagement and demonstrates a pro-active attitude towards dealing with sustainability issues (Ullmann, 1985). A CSR committee is typically responsible for planning, implementing, and reviewing the sustainability policies and reporting processes of social and environmental information (Post et al. 2002; Liao et al., 2015). Thus, the CSR committee ensures the quality of the company's sustainability reporting policies, thereby improving the range of disclosures available to the stakeholders. This leads to the following hypotheses:

> H12: The presence of board level CSR-committee has a positive relationship with the corporate biodiversity disclosure.
>
> H13: the positive effect of active stakeholder engagement on corporate biodiversity disclosure will be positively influenced by the presence of a board-level CSR-committee.

The positive effect of active stakeholder engagement on biodiversity disclosure can be further enhanced if there are board members who recognize the value of engaging with multiple stakeholder groups. As stated earlier, women are generally more concerned with stakeholder welfare (Adams & Ferreira, 2009) and are thus more sensitive to stakeholders concerns such as

biodiversity risks (Coffey & Wang, 1998; Liao et al., 2015). Female board members are more likely to incorporate stakeholder values in corporate decision-making (Hollindale et al., 2019). Independent board members are also more sensitive to social and are better positioned to protect the interests of stakeholder compared other directors (Ibrahim & Angetidis, 1995). They also show a greater interest in developing and maintaining a company's social responsibility (Zahra & Stanton, 1988). Therefore, this thesis argues that the positive effect of active stakeholder engagement on biodiversity disclosure can be enhanced by a higher concentration of independent or female board members, leading to the following hypotheses:

H14: the positive effect of active stakeholder engagement on corporate biodiversity disclosure will be positively influenced if the concentration of female board members increases.

H15: the positive effect of active stakeholder engagement on corporate biodiversity disclosure will be positively influenced if the concentration of independent board members increases.

Chapter 3 – Research design and data

3.1 Data and sample

A quantitative research method is applied in this study to test the hypotheses. A panel data set will be used for this quantitative research, of which all the data has been collected from London Stock Exchange Group (LSEG) database. This database offers the most comprehensive data on biodiversity disclosure, which is necessary to compute the dependent variable. Additionally, corporate governance and financial data of firms are extracted from the same database. The data set comprises a diverse range of listed firms from around the world, covering the last 13 years for which complete information is available, specifically from 2010 to 2022. The starting point of 2010 was chosen due to the scarcity of biodiversity-related data before this year. Including data before 2010 would result in too many missing variables needed for the dependent variable. The 13-year period is selected to ensure a robust number of firm-year observations, allowing for more comprehensive testing across a large number of firms. An international dataset is used the capture the diversity of corporate governance practices across different legal, cultural and economic contexts. This approach enhances the generalizability of these findings by identifying global trends, making the outcomes of this research more broadly applicable. This is particularly valuable as the new European biodiversity disclosure regulations could have ripple effects across the supply chains of European firms, impacting firms in other continents as well.

After collecting the biodiversity related data, the initial sample consisted of approximately 2,200 firms. However, many missing values were found for corporate governance variables and control variables. To clean this dataset, firms with consecutive missing values for one or multiple variables were excluded. Additionally, countries with less then 8 firms available were excluded from this dataset to prevent small sample sizes from creating noise and potentially skewing the overall findings, which could lead to less accurate conclusions. The final sample consists of 1,554 firms, resulting in a total of 20,202 firm-year observations, spread across 6 continents and 11 different industries. Table 1 shows the distribution of this sample based on country and industry. There are 29 countries in this sample of which the USA is the most represented country, followed by Japan and the UK. The industrial industry is the most represented industry.

Table 1 - Distribution of firm year observations of sample based on country and industry

Country	Obs.
Australia	1183
Belgium	169
Brazil	208
Canada	1118
Chile	143
China	689
Denmark	208
Finland	221
France	715
Germany	598
Hong Kong	689
India	468
Indonesia	182
Italy	208
Japan	3133
Malaysia	299
Mexico	104
Netherlands	234
Norway	117
Singapore	247
South Africa	338
South Korea	390
Spain	156
Sweden	364
Switzerland	416
Taiwan	1027
Thailand	117
UK	1820
USA	4641
Total	20202

Industry	Obs.
Academic & Educational Services	13
Basic Materials	3016
Consumer Cyclicals	2366
Consumer Non-Cyclicals	1885
Energy	1456
Financials	2145
Healthcare	1027
Industrials	4446
Real Estate	663
Technology	1937
Utilities	1248
Total	20202

3.2 Variables

3.2.1 Dependent variable

As stated earlier, this research follows a similar study (Haque & Jones, 2020) by using an overall measure of biodiversity related initiatives and activities disclosed by firms in their financial or sustainability reports and compiled by the LSEG database. This variable is called the disclosure of biodiversity initiatives (DBI) score. A higher score indicates greater transparency in the disclosure of a firm's biodiversity initiatives and impacts. The DBI score is based on the sum of seven dummy variables, each representing a firm's disclosure of specific biodiversity initiatives and impact. Each dummy variable receives a score of 1 if the corresponding question can be answered with a "yes" and 0 otherwise. The seven questions, also used in previous research, are presented in table 2.

Table 2 – Questioned used in the DBI score

#	**Question**	**Indicator**
1	Does the company report on its impact on biodiversity or on activities to reduce its impact on the native ecosystems and species, as well as the biodiversity of protected and sensitive areas?	Biodiversity impact
2	Does the company report or provide information on company-generated initiatives to restore the environment?	Restoration
3	Does the company report on initiatives to recycle, reduce, reuse, substitute, treat or phase out total waste that could damage biodiversity?	Total waste
4	Does the company report on initiatives to reduce, reuse, substitute or phase out toxic chemicals or substances that could damage the biodiversity?	Toxic waste
5	Does the company have a policy to reduce the impact of its operations on biodiversity on the level of emission reduction?	Emission reduction
6	Does the company report on initiatives to reduce the environmental impact on land owned, leased or managed for production activities or extractive use?	Reduction impact of supply chain
7	Does the company report on its environmental expenditures or does the company report to make proactive environmental investments to reduce future risks or increase future opportunities?	Proactive investments

These dummies are indicators of biodiversity policies, processes, restoration or protection activities, reduction of impact, toxic chemicals management, hazardous waste or wastewater management, land use practices, and environmental expenditure or investment monitoring (Haque & Jones, 2020). The goal of these indicators is to protect or minimize adverse effects on the native biodiversity of a firm. These indicators are in line with the GRI's biodiversity indicators, covering a firm's impact on biodiversity (GRI, 2007; Haque & Jones, 2020). While previous research used eight indicators, changes in the database have limited this study to incorporate only seven indicators in the DBI-score.

3.2.2 Independent variables

To test the hypotheses, various firm-specific measures for corporate governance mechanisms are used. First of all, the independence of a board is measured by dividing the amount of independent board members reported by the firm with the total board members. CEO duality is

measured with a dummy variable which has a value of 1 if the CEO and chairman of the board of directors are the same person, and 0 otherwise. Whether firms have a compensation policy for management bodies based on ESG goals is measured with a dummy variable. The dummy variable has a value of 1 if the firm has such a policy and otherwise 0. Board size is measured by taking the natural logarithm of the number of directors on the board. The variables board tenure and board corporate affiliations are measured by taking the natural logarithm of average tenure and the average number of corporate affiliations of a board. The logarithmic transformation helps to normalize the distribution of board size, board tenure and board corporate affiliations. Gender diversity within a board is measured by dividing the amount of female board members by the total amount of board members. A dummy variable is used to measure the CSR committee, where the value of 1 indicates that a firm has a board level committee that is responsible for decision-making on CSR strategy. It has a value of 0 if such a committee is not present. Finally, the stakeholder engagement is a dummy variable with value 1 if firms explain how they actively engage with their stakeholders and 0 otherwise. All these independent variables are extracted from the LSEG database.

3.2.3 Control variables

This research includes several control variables that prior studies have linked to corporate environmental disclosure and performance. Larger firms often face more public pressure regarding sustainability issues (Hickman, 2020) and are more likely to identify these issues as a separate management priority and manage it effectively (Al-Tuwaijri et al., 2004; Clarkson et al., 2008; Mckendall et al., 1999). Therefore, a positive relationship with biodiversity disclosure is expected. Firm size is measured by taking the natural logarithm of the total assets. Employees is measured by taking the natural logarithm of the total amount of employees. This research also controls for firm profitability as profitable firms are more likely to comply with biodiversity disclosures since it is a costly process. This is measured by using the return on assets (ROA). Slack is used as a control variable, which is measured by dividing cash and cash equivalents with total assets. Firms with more financial slack are better positioned to allocate resources to environmental management (de Villiers et al., 2011), which could enhance corporate biodiversity disclosure. Clarkson et al. (2008) showed a positive association between environmental disclosures and debt level, suggesting better environmental performance for firms with higher leverage. Leverage is measured by dividing total liabilities by total assets. Capital expenditure is also used as a control value as firms with new equipment are expected to use the latest and cleanest technologies, which can lead to more transparent environmental

disclosure (de Villiers et al., 2011). Capital expenditure is measured by dividing the total capital expenditure by total sales. Finally, firms with a higher market-to-book value might anticipate competitive advantages from enhanced environmental performance, potentially yielding higher future returns (Smith & Watts, 1991). This control variable 'growth' is measured by dividing the market value of equity by the book value of equity. These control variables are all extracted from the LSEG database. All the variables will be summarized in table 3.

Table 3 - Summary definition of variables

Dependent variable	**Definition**	**Abbreviation**
DBI-score	A DBI score is based on the sum of seven dummy variables representing a firm's disclosure of biodiversity initiatives as disclosed by the sampled firms and compiled by the LSEG database. These are biodiversity policies and processes on restoration or protection of biodiversity, reduction of impact, reduction of toxic chemicals, recycling of hazardous waste or wastewater, biodiversity impact on land use, and management monitoring of biodiversity initiatives.	DBI
Independent variables		
Board independence	Percentage of independent board members	BIND
CEO duality	Dummy variable: 1 if the CEO and the chairman of the board of directors are the same person, and otherwise 0.	CEOD
ESG-based compensation	Dummy variable: 1 if the firm have an executive sustainability-oriented compensation policy and otherwise 0.	ESG
Board size	Natural logarithm of the number of directors on the board.	BS
Board tenure	Natural logarithm of the average tenure of board directors.	TEN
Board corporate affiliations	Natural logarithm of the average corporate affiliations of board of directors.	AFF
Board gender diversity	Percentage of female board members.	GEN
Stakeholder engagement	Dummy variable: 1 if the firm report on their stakeholder engagement and otherwise 0.	SE
CSR committee	Dummy variable: 1 if the firm has a board CSR committee, and otherwise 0.	CSR
Control variables		
Firm size	Natural logarithm of total assets.	SIZE
Profitability	The ratio of net income to the average of last year's and current year's total assets * 100.	ROA
Slack	Cash and cash equivalents divided by total assets	SLACK
Leverage	Total debt to total assets.	LEV
Capital expenditure	Total capital expenditure divided by total sales.	CAPEX
Growth	Market value over book value of equity.	GRO
Employees	Natural logarithm of number of employees.	EMPL
Year	The years 2010-2022	year

3.3 Research design

To examine the impact of various corporate governance mechanisms on corporate biodiversity disclosure, this study employs a panel data regression model. This method is chosen for its effectiveness in analyzing data that spans both cross-sectional (different firms) and time-series (different time periods) dimensions, thereby capturing both inter-firm variations and intra-firm changes over time (Studenmund, 2014). This dual capability is essential for understanding the dynamics of corporate governance across different organizational contexts and over time. The primary empirical model to be used in testing the hypotheses is specified as follows:

$$DBI_{it} = B_0 + B_1 * BIND_{it} + B_2 * CEOD_{it} + B_3 * ESG_{it} + B_4 * BS_{it} + B_5 * TEN_{it} + B_6 * AFF_{it} + B_7 * GEN_{it} + B_8 * SE_{it} + B_9 * CSR_{it} + B_{10} * SIZE_{it} + B_{11} * ROA_{it} + B_{12} * SLACK_{it} + B_{13} * LEV_{it} + B_{14} * CAPEX_{it} + B_{15} * GRO_{it} + B_{16} * EMPL_{it} + B_{17} * YEAR_{it} + \varepsilon_{it}$$

In which B_0 is the intercept, *i* is the entity indicator, *t* is the period indicator and ε is the error term. Variables such as $BIND_{it}$ (Board Independence), $CEOD_{it}$ (CEO Duality), and others, are detailed in table 3. The choice between fixed effects or random effects models will be based on the Hausman test.

Chapter 4 – Results

4.1 Descriptive statistics

Table 4 present the summary statistics of the variables used in the analysis, providing insights into the central tendencies and variability within the dataset. It shows a mean value of 3.02 for the DBI-score with a standard deviation of 1.895 on a scale of 0-7. These statistics seem consistent with similar research (Haque & Jones, 2020), where the score was around 2.8 with a scale of 0-8, which means that the average score of firms has relatively increased. Still the score of 3.02 out of 7 seems quite low. But the standard deviation is relatively high which indicates that the DBI scores of firms are spread out well from the mean value.

Table 4 - Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
DBI (Score)	20202	3.018	1.895	0	7
BIND (%)	20202	56.031	27.096	0	100
CEOD	20202	.368	.482	0	1
ESG	20202	.357	.479	0	1
BS (ln)	20202	2.312	.319	0	3.555
TEN (ln)	20202	1.907	.474	-1.386	3.474
AFF (ln)	20202	.622	.332	0	2.757
GEN (%)	20202	17.096	13.804	0	75
SE	20202	.555	.497	0	1
CSR	20202	.719	.45	0	1
SIZE (ln)	20202	22.822	1.576	11.112	29.088
ROA (%)	20202	4.641	9.271	-410.282	118.876
SLACK	20202	.096	.096	0	.985
LEV	20202	25.768	18.576	0	281.45
CAPEX	20202	.232	5.782	0	624.143
GRO	20202	.998	.322	.016	8.196
EMPL (ln)	20202	9.17	1.795	.693	14.648

See table 3 for a tabulated overview of the definition and operationalization of the variables

The table further shows that the sampled firms have an average of around 10 board members (the natural logarithm of the mean board size is 2.31) and 56% of the directors on a sampled board are independent. The percentage of female directors in our sample is 17% with a standard deviation of 13.8% and a maximum of 75%, which is up from a similar study of (Haque & Jones, 2020) which indicates that on average more women are represented in the board of directors for this sample. The average tenure for a director over the whole sample is 6.73 years and the average corporate affiliation per director is 1.86. The table also shows that the CEO and chairman of the board of directors are the same person for 37% of the sampled boards, 72% of the boards have a board level committee that is responsible for decision-making on CSR strategy, 36% of the boards have an executive compensation policy depending on ESG-performance and 56% of the sampled boards explains how they actively engage with their stakeholders. The statistics for the control variables can also be found in table 4.

4.2 Assumption testing

This section outlines the various assumption tests conducted to ensure the robustness and reliability of the panel data regression model. The data was first checked for multicollinearity using a correlation matrix (table 5) and Variance Inflation Factor (VIF) scores (table 6). High multicollinearity can inflate the variance of coefficient estimates and make the model unstable. According to Hsiao (2014), correlation coefficients between -0.8 and 0.8 are considered acceptable. The correlation matrix revealed no problematic high correlation values, with all coefficients falling within this range. High correlations were observed between the DBI score, CSR committee, and stakeholder engagement, which can be explained by the fact that firms with a CSR committee are likely to disclose more biodiversity information due to their greater engagement with stakeholders. Similarly, the correlations between board size, firm size, and the number of employees can be attributed to larger firms typically having more board members and employees. The VIF scores were all below 2.5, indicating no significant multicollinearity issues. The mean VIF score was 1.31, further supporting this conclusion.

Table 5 - Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1 DBI	1.000																
2 BIND	-0.057	1.000															
3 CEOD	0.015	0.097	1.000														
4 ESG	0.174	0.361	-0.026	1.000													
5 BS	0.235	-0.131	0.077	-0.030	1.000												
6 TEN	-0.125	0.121	0.247	-0.022	0.009	1.000											
7 AFF	0.177	0.224	-0.003	0.144	0.052	0.027	1.000										
8 GEN	0.105	0.437	-0.002	0.374	0.049	0.009	0.185	1.000									
9 SE	0.538	0.072	-0.079	0.216	0.165	-0.117	0.226	0.246	1.000								
10 CSR	0.522	0.055	-0.031	0.214	0.170	-0.110	0.157	0.189	0.499	1.000							
11 SIZE	0.349	0.095	0.112	0.082	0.491	-0.054	0.222	0.122	0.297	0.261	1.000						
12 ROA	-0.001	0.040	0.028	-0.025	0.012	0.102	0.025	0.034	0.013	-0.004	-0.019	1.000					
13 SLACK	-0.055	-0.145	-0.003	-0.104	-0.116	0.003	-0.118	-0.106	-0.078	-0.088	-0.265	0.054	1.000				
14 LEV	0.070	0.062	0.034	0.056	0.085	-0.043	0.064	0.047	0.079	0.038	0.155	-0.185	-0.239	1.000			
15 CAPEX	-0.026	0.002	-0.014	-0.011	-0.045	-0.026	-0.004	0.003	-0.024	-0.032	-0.058	-0.034	0.010	-0.018	1.000		
16 GRO	0.003	-0.006	0.004	0.034	-0.048	-0.006	-0.028	-0.011	-0.012	0.019	-0.088	-0.104	-0.009	0.027	0.001	1.000	
17 EMPL	0.344	-0.053	0.116	-0.009	0.394	-0.010	0.194	0.066	0.244	0.243	0.579	0.042	-0.033	0.060	-0.090	-0.073	1.000

See table 3 for a tabulated overview of the definition and operationalization of the variables

Table 6 - VIF scores

Variable	VIF	1/VIF
SIZE	2.026	.494
EMPL	1.665	.601
SE	1.486	.673
BIND	1.483	.674
BS	1.425	.702
CSR	1.406	.711
GEN	1.399	.715
ESG	1.293	.773
SLACK	1.17	.855
AFF	1.156	.865
TEN	1.118	.895
LEV	1.113	.898
CEOD	1.112	.899
ROA	1.066	.938
GRO	1.025	.976
CAPEX	1.011	.989
Mean VIF	1.31	.

See table 3 for a tabulated overview of the definition and operationalization of the variables

The Hausman test was performed to determine whether a fixed effects or random effects model would be more appropriate for the data. The test indicated a significant p-value ($p < 0.05$), suggesting that the fixed effects model is the better fit for this analysis. The panel data regression was tested for heteroscedasticity using the Breusch-Pagan test. The results indicated the presence of heteroscedasticity. To address this issue, the regression was clustered at the firm level to provide robust standard errors, mitigating the effects of heteroscedasticity. The models include time fixed effects because adding time fixed effects in a fixed effects model helps to control for time-specific unobserved heterogeneity. To account for potential delayed effects of corporate governance mechanisms on corporate biodiversity disclosure, the model was re-tested with one-year lags for the corporate governance variables and their interaction effects. This approach acknowledges that the impact of governance changes may not be immediate.

4.3 Regression results

This section presents the results of the regression models used to test hypotheses H1-H15, focusing on the relationship between corporate governance mechanisms and corporate biodiversity disclosure (DBI score). Table 8 shows the results of the different models. Model 1 (random effects) and Model 2 (fixed effects) were used to do the Hausmann test to determine the appropriate model. The test was significant indicating that the fixed effects model is preferred. Therefore, subsequent analyses use the fixed effects model.

Model 2 shows the impact of individual corporate governance mechanisms on the DBI score without considering interaction terms. The results indicate that three out of nine corporate governance mechanisms have a significant influence on corporate biodiversity disclosure. Board tenure, shareholder engagement and CSR-committee have a significant positive effect on the DBI score. Therefore, this model provides support for hypotheses 7, 11 and 12. Among the control variables, firm size (SIZE) and the number of employees (EMPL) are significant, indicating that larger firms and those with more employees tend to have higher DBI scores.

Model 3 is the fixed effects model with the interaction terms of the corporate governance mechanisms to explore the combined effects of various corporate governance mechanisms. Only the interactions effects which were the most theoretically justified were incorporated in the model. The governance variables that are significant here are board gender diversity, stakeholder engagement and CSR-committee. The significant interaction effects are between stakeholder engagement and board gender diversity and between stakeholder engagement and

CSR-committee. The interpretation of these significant effects is different compared to the interpretation of Model 2 because of the interaction terms. The DBI score will increase with 0.006 for every percentage of female directors on a board if a firm does not report on their stakeholder engagement. The score would change with -0.008 (-0.014 + 0.006) for every percentage of female directors on a board if a firm does report on their stakeholder engagement, which would be subtracted of the significant positive effect of stakeholder engagement. If a board would report their stakeholder engagement and have a board-level CSR-committee, the DBI would increase with a total of two points. If stakeholder engagement is not reported, the presence of a CSR-committee would only increase the DBI with 0.326. The results show that this model only supports hypothesis 13. All the other corporate governance mechanisms and their interaction terms are not significant in this model. Thus, these results suggest that the presence of a CSR-committee enhances the positive effect active stakeholder engagement has on biodiversity disclosure and board gender diversity negatively impacts the effect active stakeholder engagement has on biodiversity disclosure. Board tenure loses its significant effect in this model, which suggests that the effect of board tenure on corporate biodiversity disclosure is not straightforward and likely depends on other factors. These factors were not found in Model 3. Employees and firm size are the only significant control variables.

Model 4 extends Model 3 by including one-year lags for the governance variables and their interactions. Significant coefficients from Model 3 remained significant in Model 4, indicating robustness. Additionally, growth (GRO) and capital expenditure (CAPEX) became significant with negative coefficients, suggesting that higher growth and capital expenditure may initially hinder biodiversity disclosure.

Combining the results from the main models, this thesis concludes that hypotheses 11, 12 and 13 are fully supported. Hypothesis 7 and 10 can only be partially supported by the models. The discussion chapter will elaborate on this. To conclude the regression results, table 7 shows an overview of the fifteen hypotheses:

Table 7 – Overview of hypotheses

#	Hypothesis	Supported?
1	The concentration of independent directors on a board has a positive relationship with corporate biodiversity disclosure.	No.
2	CEO duality has a negative relationship with corporate biodiversity disclosure.	No.

3	A higher concentration of independent directors can decrease the potential negative influence CEO-duality has on corporate biodiversity disclosure.	No.
4	The presence of an executive ESG compensation policy within a firm has a positive relationship with corporate biodiversity disclosure.	No.
5	The positive effect of board independence on corporate biodiversity disclosure is positively influenced by the presence of an executive ESG compensation policy.	No.
6	Board size has a positive relationship with corporate biodiversity disclosure.	No.
7	Board tenure has a positive relationship with corporate biodiversity disclosure.	Partially, only w/o interactions.
8	The number of corporate affiliations of a director on a board has a positive relationship with corporate biodiversity disclosure.	No.
9	The positive effect of board size on corporate biodiversity disclosure is positively influenced by board tenure and corporate affiliations.	No.
10	The concentration of female directors on a board has a positive relationship with corporate biodiversity disclosure.	Only in absence of active stakeholder engagement.
11	Active stakeholder engagement has a positive relationship with corporate biodiversity disclosure.	Yes.
12	The presence of board level CSR-committee has a positive relationship with the corporate biodiversity disclosure.	Yes.
13	The positive effect of active stakeholder engagement on corporate biodiversity disclosure will be positively influenced by the presence of a board-level CSR-committee.	Yes.
14	The positive effect of active stakeholder engagement on corporate biodiversity disclosure will be positively influenced if the concentration of female board members increases.	No, it is negatively influenced.
15	The positive effect of active stakeholder engagement on corporate biodiversity disclosure will be positively influenced if the concentration of independent board members increases.	No.

Table 8 - Regression DBI-score

VARIABLES	(1) Random Effects	(2) Fixed Effects	(3) Fixed Effects w/i	(4) Fixed Effects inc. lags
BIND	0.000	-0.000	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
CEOD	-0.015	-0.033	0.037	0.043
	(0.020)	(0.036)	(0.066)	(0.070)
ESG	0.029	-0.000	-0.028	-0.092
	(0.021)	(0.040)	(0.086)	(0.091)
BS	0.094**	0.096	0.014	-0.018
	(0.038)	(0.073)	(0.253)	(0.246)
TEN	0.118***	0.148***	-0.244	-0.323
	(0.024)	(0.049)	(0.299)	(0.305)
AFF	-0.050	-0.110	0.192	0.092
	(0.037)	(0.075)	(0.685)	(0.677)
GEN	-0.003***	-0.003*	0.006***	0.007***
	(0.001)	(0.002)	(0.002)	(0.002)
SE	0.686***	0.646***	1.261***	1.171***
	(0.020)	(0.042)	(0.102)	(0.099)
CSR	0.722***	0.689***	0.326***	0.185***
	(0.022)	(0.047)	(0.069)	(0.066)
1.CEOD*BIND			-0.001	-0.001
			(0.001)	(0.001)
1.ESG*BIND			0.001	0.001
			(0.001)	(0.001)
1.SE*GEN			-0.014***	-0.017***
			(0.002)	(0.002)
1.SE*BIND			-0.000	-0.000
			(0.001)	(0.001)
1.SE*CSR			0.467***	0.497***
			(0.079)	(0.075)
BS*.TEN			0.128	0.176
			(0.134)	(0.136)
BS*AFF			-0.285	-0.205
			(0.315)	(0.306)
TEN*AFF			0.153	0.191
			(0.397)	(0.408)
BS*TEN*AFF			0.017	-0.024
			(0.180)	(0.182)
SIZE	0.277***	0.251***	0.243***	0.256***
	(0.017)	(0.042)	(0.042)	(0.043)
ROA	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
SLACK	0.241**	0.209	0.228	0.180
	(0.103)	(0.155)	(0.155)	(0.160)
LEV	-0.001*	-0.001	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
CAPEX	-0.000	-0.000	-0.001	-0.001**
	(0.001)	(0.001)	(0.001)	(0.001)
GRO	-0.033	-0.034	-0.034	-0.058***
	(0.021)	(0.022)	(0.022)	(0.022)
EMPL	0.094***	0.089***	0.081**	0.076**
	(0.014)	(0.034)	(0.033)	(0.036)
Constant	-6.280***	-4.996***	-4.539***	-4.466***
	(1.039)	(0.914)	(1.019)	(1.065)
Year	YES	YES	YES	YES
Industry	YES	NO	NO	NO
Country	YES	NO	NO	NO
Observations	20,202	20,202	20,202	18,648
R-squared	0.5486	0.361	0.373	0.338
Number of firms	1,554	1,554	1,554	1,554

Heteroskedasticity-adjusted robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, ^one lag (t-1). See table 3 for a tabulated overview of the definition and operationalization of the variables.

4.4 Robustness tests

To ensure the robustness of the results and to check if the results are influenced by sample selection, a series of robustness tests were conducted using subsample analyses. These analyses help verify whether the relationships observed hold true across different contexts and conditions. The results of these tests are presented in tables 9-12. First, the whole sample was divided into countries with perceived stronger corporate governance and countries with perceived weaker corporate governance. This subsample was chosen to assess whether the strength of corporate governance environments influences the relationship between corporate governance mechanisms and biodiversity disclosure. Second, separate regressions were run for European countries and the USA. Europe was chosen due to the potential impact of new environmental guidelines, and the USA was selected for its significant position in the global economy and significant sample size. Third, the sample was divided into industries with higher biodiversity impact and industries with lower biodiversity impact. This categorization helps understand if the environmental performance of industries affects the governance-disclosure relationship. Finally, the sample was split into two time periods: 2010-2015 and 2016-2022. This division was made to capture potential changes over time, particularly considering the increased global awareness and regulatory changes regarding corporate governance and environmental issues, such as the Paris Agreement adopted in 2015.

Most of the robustness tests confirm the stability of our main findings across various subsamples, indicating that the observed relationships between corporate governance mechanisms and biodiversity disclosure are not driven by sample selection biases. Only for the US firms there is no significant coefficient for the interaction effects, while there is a positive significant effect for board gender diversity. This might be interesting for future research to explore. Some differences were noted in the control variables: Slack was positively significant in 2010-2015 and for low biodiversity impact industries over the whole period. CAPEX was negatively significant in 2016-2022 and positively significant for countries with low quality corporate governance. The significant differences provide additional insights into how financial factors may influence disclosure practices in different contexts.

Table 9 – Robustness checks: countries with strong corporate governance vs weak corporate governance

	(1)	(2)	(3)	(4)
VARIABLES	FE HQ-CG	FE HQ-CG w/i	FE LQ-CG	FE LQ-GG w/i
BIND	-0.001	-0.002	0.003	0.005
	(0.001)	(0.002)	(0.003)	(0.004)
CEOD	-0.036	0.042	-0.066	-0.180
	(0.040)	(0.071)	(0.087)	(0.185)
ESG	0.004	-0.087	0.047	0.011
	(0.043)	(0.094)	(0.101)	(0.220)
BS	0.130	0.338	0.033	-0.277
	(0.079)	(0.320)	(0.173)	(0.393)
TEN	0.151***	0.204	0.174	-0.819*
	(0.054)	(0.359)	(0.116)	(0.495)
AFF	-0.107	0.185	0.013	3.292*
	(0.082)	(0.840)	(0.185)	(1.783)
GEN	-0.002	0.008***	0.001	0.003
	(0.002)	(0.002)	(0.004)	(0.008)
SE	0.568***	1.122***	0.941***	1.406***
	(0.046)	(0.119)	(0.108)	(0.214)
CSR	0.615***	0.211***	0.746***	0.575***
	(0.052)	(0.080)	(0.115)	(0.127)
1.CEOD*BIND		-0.001		0.003
		(0.001)		(0.004)
1.ESG*BIND		0.002		0.001
		(0.001)		(0.005)
1.SE*GEN		-0.016***		-0.000
		(0.002)		(0.008)
1.SE*BIND		0.003*		-0.008**
		(0.002)		(0.004)
1.SE*CSR		0.502***		0.288
		(0.089)		(0.184)
BS*.TEN		-0.076		0.407*
		(0.161)		(0.235)
BS*AFF		-0.285		-1.563**
		(0.388)		(0.793)
TEN*AFF		0.039		-0.868
		(0.478)		(0.889)
BS*TEN*AFF		0.068		0.453
		(0.219)		(0.392)
SIZE	0.181***	0.173***	0.527***	0.498***
	(0.043)	(0.042)	(0.114)	(0.118)
ROA	-0.002	-0.001	0.006	0.005
	(0.001)	(0.001)	(0.005)	(0.005)
SLACK	0.018	0.063	0.474	0.489
	(0.173)	(0.172)	(0.358)	(0.367)
LEV	-0.002	-0.002	0.005*	0.006**
	(0.001)	(0.001)	(0.003)	(0.003)
CAPEX	-0.001	-0.001	0.011***	0.010***
	(0.001)	(0.001)	(0.001)	(0.001)
GRO	-0.022	-0.023	-0.064	-0.069
	(0.024)	(0.024)	(0.047)	(0.046)
EMPL	0.134***	0.127***	-0.126	-0.111
	(0.037)	(0.035)	(0.084)	(0.086)
Constant	-3.754***	-3.836***	-9.689***	-8.445***
	(0.933)	(1.111)	(2.518)	(2.677)
Year	YES	YES	YES	YES
Industry	NO	NO	NO	NO
Country	NO	NO	NO	NO
Observations	16,627	16,627	3,575	3,575
R-squared	0.324	0.338	0.507	0.517
Number of firms	1,279	1,279	275	275

Heteroskedasticity-adjusted robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 See table 3 for a tabulated overview of the definition and operationalization of the variables.

Table 10 – Robustness checks: Europe and USA

VARIABLES	(1) FE EU	(2) FE EU w/interactions	(3) FE USA	(4) FE USA w/interactions
BIND	-0.000	0.002	-0.004	-0.001
	(0.002)	(0.002)	(0.003)	(0.005)
CEOD	-0.085	0.093	-0.160**	-0.343
	(0.083)	(0.197)	(0.073)	(0.353)
ESG	-0.053	0.041	0.053	0.447
	(0.059)	(0.130)	(0.079)	(0.449)
BS	0.245**	0.185	0.200	-0.471
	(0.119)	(0.605)	(0.178)	(1.081)
TEN	0.164**	-0.102	0.228*	-0.837
	(0.078)	(0.734)	(0.125)	(1.059)
AFF	0.034	0.570	-0.044	0.214
	(0.115)	(1.375)	(0.169)	(2.440)
GEN	0.003	0.009***	0.009**	0.013***
	(0.002)	(0.003)	(0.004)	(0.004)
SE	0.371***	0.939***	0.635***	2.246***
	(0.063)	(0.195)	(0.098)	(0.758)
CSR	0.273***	0.029	0.649***	0.257
	(0.079)	(0.102)	(0.088)	(0.206)
1.CEOD*BIND		-0.003		0.002
		(0.003)		(0.004)
1.ESG*BIND		-0.002		-0.004
		(0.002)		(0.005)
1.SE*GEN		-0.009***		-0.011*
		(0.003)		(0.006)
1.SE*BIND		-0.001		-0.012
		(0.002)		(0.009)
1.SE*CSR		0.402***		0.425*
		(0.116)		(0.219)
BS*.TEN		0.125		0.384
		(0.314)		(0.491)
BS*AFF		-0.225		-0.394
		(0.612)		(1.215)
TEN*AFF		0.073		0.194
		(0.776)		(1.335)
BS*TEN*AFF		-0.042		0.046
		(0.340)		(0.646)
SIZE	-0.024	-0.019	0.119	0.131
	(0.069)	(0.068)	(0.084)	(0.082)
ROA	-0.002	-0.002	-0.007**	-0.007**
	(0.003)	(0.003)	(0.003)	(0.003)
SLACK	0.204	0.270	0.233	0.190
	(0.315)	(0.321)	(0.296)	(0.302)
LEV	-0.003	-0.002	-0.002	-0.003
	(0.002)	(0.002)	(0.002)	(0.002)
CAPEX	0.032	0.031	-0.234	-0.204
	(0.081)	(0.084)	(0.182)	(0.177)
GRO	-0.132***	-0.128***	0.034	0.024
	(0.042)	(0.042)	(0.043)	(0.043)
EMPL	0.183***	0.170***	0.156***	0.134**
	(0.060)	(0.059)	(0.052)	(0.052)
Constant	0.663	0.478	-3.172*	-1.610
	(1.504)	(2.094)	(1.841)	(2.588)
Year	YES	YES	YES	YES
Industry	NO	NO	NO	NO
Country	NO	NO	NO	NO
Observations	5,226	5,226	4,641	4,641
R-squared	0.199	0.212	0.398	0.410
Number of firms	402	402	357	357

Heteroskedasticity-adjusted robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. See table 3 for a tabulated overview of the definition and operationalization of the variables.

Table 11 – Robustness checks: Industries with high or low biodiversity impact

	(1)	(2)	(3)	(4)
VARIABLES	FE HBI Industries	FE HBI industries w/i	FE LBI Industries	FE LBI industries w/i
BIND	0.000	0.000	-0.002	-0.001
	(0.001)	(0.002)	(0.002)	(0.002)
CEOD	0.010	0.095	-0.118**	-0.080
	(0.047)	(0.077)	(0.054)	(0.120)
ESG	0.048	0.056	-0.081	-0.192
	(0.050)	(0.107)	(0.064)	(0.144)
BS	0.089	0.038	0.090	0.225
	(0.095)	(0.320)	(0.107)	(0.527)
TEN	0.159**	-0.123	0.124	-0.706
	(0.062)	(0.366)	(0.076)	(0.650)
AFF	-0.052	0.360	-0.195	-0.255
	(0.097)	(0.811)	(0.119)	(1.639)
GEN	-0.004**	0.008***	-0.000	0.002
	(0.002)	(0.003)	(0.002)	(0.003)
SE	0.639***	1.334***	0.649***	1.093***
	(0.053)	(0.130)	(0.069)	(0.159)
CSR	0.783***	0.385***	0.536***	0.247**
	(0.063)	(0.088)	(0.070)	(0.107)
1.CEOD*BIND		-0.002		-0.000
		(0.002)		(0.002)
1.ESG*BIND		0.000		0.002
		(0.002)		(0.002)
1.SE*GEN		-0.019***		-0.003
		(0.003)		(0.004)
1.SE*BIND		0.000		-0.002
		(0.002)		(0.002)
1.SE*CSR		0.518***		0.369***
		(0.101)		(0.121)
BS*.TEN		0.115		0.257
		(0.169)		(0.277)
BS*AFF		-0.245		-0.305
		(0.379)		(0.718)
TEN*AFF		0.099		0.375
		(0.470)		(0.885)
BS*TEN*AFF		-0.008		0.013
		(0.217)		(0.388)
SIZE	0.302***	0.290***	0.184***	0.183***
	(0.056)	(0.055)	(0.062)	(0.060)
ROA	-0.001	-0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
SLACK	-0.081	-0.025	0.590***	0.549***
	(0.219)	(0.218)	(0.209)	(0.211)
LEV	-0.001	-0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
CAPEX	0.000	-0.001	0.103	0.116*
	(0.001)	(0.001)	(0.066)	(0.066)
GRO	-0.014	-0.016	-0.084**	-0.076*
	(0.026)	(0.026)	(0.042)	(0.043)
EMPL	0.071*	0.063	0.099*	0.099*
	(0.042)	(0.040)	(0.053)	(0.052)
Constant	-5.858***	-5.575***	-3.754***	-2.649
	(1.191)	(1.335)	(1.398)	(1.760)
Year	YES	YES	YES	YES
Industry	NO	NO	NO	NO
Country	NO	NO	NO	NO
Observations	13,195	13,195	7,007	7,007
R-squared	0.352	0.369	0.388	0.396
Number of firms	1,015	1,015	539	539

Heteroskedasticity-adjusted robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. See table 3 for a tabulated overview of the definition and operationalization of the variables.

Table 12 – Robustness checks: Period 2010-2015 and 2016-2022

	(1)	(2)	(3)	(4)
VARIABLES	FE 2010-2015	FE 2010-2015 w/i	FE 2016-2022	FE 2016-2022 w/i
BIND	0.002	0.001	-0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.002)
CEOD	-0.009	0.052	0.023	0.094
	(0.036)	(0.058)	(0.049)	(0.107)
ESG	0.012	-0.161	0.080*	-0.047
	(0.054)	(0.114)	(0.041)	(0.100)
BS	0.098	0.059	0.069	0.183
	(0.071)	(0.327)	(0.082)	(0.294)
TEN	0.087	-0.051	0.058	0.072
	(0.054)	(0.380)	(0.053)	(0.343)
AFF	-0.169**	0.124	-0.026	-0.663
	(0.083)	(0.802)	(0.081)	(1.013)
GEN	-0.003	0.002	0.003*	0.009***
	(0.002)	(0.002)	(0.002)	(0.003)
SE	0.430***	0.816***	0.501***	0.963***
	(0.052)	(0.120)	(0.052)	(0.132)
CSR	0.442***	0.198**	0.546***	0.315***
	(0.055)	(0.083)	(0.057)	(0.074)
1.CEOD*BIND		-0.001		-0.001
		(0.001)		(0.002)
1.ESG*BIND		0.003*		0.002
		(0.002)		(0.001)
1.SE*GEN		-0.009***		-0.008***
		(0.003)		(0.003)
1.SE*BIND		-0.000		-0.000
		(0.002)		(0.002)
1.SE*CSR		0.312***		0.360***
		(0.090)		(0.092)
BS*.TEN		0.052		-0.057
		(0.165)		(0.158)
BS*AFF		-0.167		0.154
		(0.357)		(0.452)
TEN*AFF		-0.021		0.409
		(0.421)		(0.555)
BS*TEN*AFF		0.027		-0.110
		(0.192)		(0.250)
SIZE	0.147***	0.134***	0.112**	0.113**
	(0.042)	(0.041)	(0.053)	(0.053)
ROA	-0.001	-0.000	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
SLACK	0.454***	0.438**	-0.254	-0.215
	(0.173)	(0.172)	(0.189)	(0.191)
LEV	0.001	0.001	-0.002	-0.002
	(0.002)	(0.002)	(0.001)	(0.001)
CAPEX	-0.002	-0.001	-0.001***	-0.001***
	(0.003)	(0.003)	(0.000)	(0.000)
GRO	-0.020	-0.024	-0.005	-0.005
	(0.025)	(0.024)	(0.031)	(0.031)
EMPL	0.101***	0.105***	0.076*	0.073*
	(0.037)	(0.036)	(0.042)	(0.042)
Constant	-2.597***	-2.273*	-1.220	-1.392
	(0.960)	(1.201)	(1.249)	(1.380)
Year	YES	YES	YES	YES
Industry	NO	NO	NO	NO
Country	NO	NO	NO	NO
Observations	9,324	9,324	10,878	10,878
R-squared	0.103	0.110	0.313	0.320
Number of firms	1,554	1,554	1,554	1,554

Heteroskedasticity-adjusted robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. See table 3 for a tabulated overview of the definition and operationalization of the variables.

Chapter 5 – Discussion

This chapter discusses the findings of the thesis in relation to the three theoretical frameworks identified: agency theory, resource dependency theory, and stakeholder theory.

5.1 Agency theory

Agency theory addresses the relationship between shareholder and executives and argues that corporate governance mechanisms can align the interests of executives with that of shareholders by monitoring the management. The models in this thesis found no support for hypotheses 1-5 which were made in support of the agency theory. Specifically, no significant relationships were identified for board independence, CEO duality or ESG executive compensation policy, nor for their interactions. This lack of support suggests that these mechanisms might not be effective in influencing biodiversity disclosure. One possible explanation is that biodiversity disclosure is driven more by external pressures, such as regulatory requirements and stakeholder demands, rather than internal governance mechanisms, as this thesis discusses in the rest of this chapter.

5.2 Resource dependency theory

Resource dependency theory highlights the important role of the board of directors for biodiversity disclosure, as board members possess human and relational capital that are important to attract precious resources to the firm (Hillman et al., 2001; Hillman & Dalziel, 2003). Board tenure shows a positive significant effect on biodiversity disclosure in the model without interaction terms. This finding aligns with the idea that longer-tenured board members bring valuable organizational knowledge and networks, which could increase the possibility of biodiversity disclosure engagement. However, this effect is not significant in the model with interactions. This suggests that the effect of board tenure on corporate biodiversity disclosure is not straightforward and likely depends on other factors, which were not found in this thesis. Hypothesis 10 can only be partially supported by the results, as board gender diversity only shows a significant positive effect when a firm does not report on its' stakeholder engagement. No significant effects for board size, board corporate affiliations and the interaction effect between board size, board tenure and board corporate affiliations were found. Therefore, hypotheses 6, 8, and 9 are not supported, indicating that these aspects of board composition and dynamics might not significantly influence biodiversity disclosure.

5.3 Stakeholder theory

Stakeholder theory argues that companies should be accountable to a broad range of stakeholders, not just shareholders. Disparity between firm values and values of stakeholders can be a threat to organizational legitimacy. Stakeholder engagement therefore plays a vital role in understanding the stakeholders' expectations and maintaining organizational legitimacy. This study found strong support for hypotheses 11, 12, and 13, with stakeholder engagement and CSR-committee showing significant positive effects on biodiversity disclosure. The interaction between these two variables was also significant, indicating that stakeholder engagement's positive impact is positively affected by the presence of a CSR committee. A firm shows a pro-active attitude towards dealing with sustainability issues by appointing a CSR-committee. This committee implements and reviews sustainability initiatives and reporting processes of environmental information. It ensures the quality of sustainability reporting while also improving the range of disclosures available, which explains the positive effect on corporate biodiversity disclosure.

There was no support found for hypotheses 14 and 15. Board independence has no significant impact on the relationship between stakeholder engagement and corporate biodiversity reporting. The interaction term between stakeholder engagement and board gender diversity has a significant effect, but it is negative instead of positive. This indicated that the positive impact active stakeholder engagement has will decrease with every increase of female representation on a board. These results suggest that board gender diversity and stakeholder engagement might not complement each other in promoting biodiversity disclosure. The combined influence might lead to complexity and possible resource allocation conflicts, which diminishes their overall positive impact on corporate biodiversity disclosure. This effect is negative over the whole period, but for the period 2016-2022 (table 12) this effect is positive but very small (0.001). This could foresee a possible shift in this relationship.

The robustness tests, including models with lagged variables, confirmed the stability of the main findings. Firm size and the number of employees consistently showed significant positive effects on biodiversity disclosure, highlighting that larger firms face more external pressure and are more capable of addressing environmental issues (Hickman, 2020; Al-Tuwaijri et al., 2004; Clarkson et al., 2008; Mckendall et al., 1999). Growth had a significant negative impact in the lagged model, indicating that rapidly growing firms might prioritize immediate business concerns over biodiversity disclosure.

Chapter 6 – Conclusion

Recent research has highlighted the influence of corporate governance mechanisms on environmental performance and disclosure, but there has been limited investigation into their impact on corporate biodiversity disclosure. With new regulations for biodiversity disclosure being introduced in the EU, European firms of all sizes have to comply with these regulations by 2030. It is crucial for firms to adapt swiftly to avoid unexpected costs, therefore this thesis shows which corporate governance mechanisms can smooth this transition along. This thesis does this by researching how various corporate governance mechanisms affect biodiversity disclosure among 1,554 firms from 2010 to 2022 using a fixed effects model with heteroskedasticity-adjusted robust standard errors. Interaction terms were included to account for the combined influence of governance mechanisms.

This study contributes to the relative scarce research done on corporate biodiversity disclosure by exploring its relationship with corporate governance mechanisms. Prior research provided this thesis with three possible theories that could explain the influence of corporate governance mechanisms on corporate biodiversity disclosure. Results show that board tenure has a significant positive effect on corporate biodiversity disclosure, but only in the model without interactions. This indicates that there are other factors not found in the model that affect the relationship between board tenure and biodiversity disclosure. There is a significant positive effect of board gender diversity on corporate biodiversity disclosure, but this is only if firms have no active stakeholder engagement. This is the only support for the resource dependency theory in this research as board size and board corporate affiliations do not have a significant effect. Stakeholder engagement and the presence of a CSR committee, along with their interaction, have a positive effect on corporate biodiversity disclosure, strongly supporting stakeholder theory. Interestingly, board gender diversity negatively influences the positive impact of stakeholder engagement over the whole period, but positively affects these effects in the period 2016-2022. Still the effect remains small. No support was found for agency theory in this context.

The implications of the results could be of interest to shareholders and possible investors. With the new regulations for biodiversity disclosure every European firm has to disclose their biodiversity impact by 2030. Firms yet to intensively engage in biodiversity disclosure should focus on active stakeholder engagement and establishing CSR committees to improve their biodiversity disclosure practices. The results have implications for policymakers, suggesting

that active stakeholder engagement and CSR committees positively impact corporate biodiversity disclosure. Policymakers could mandate CSR committees and develop frameworks for stakeholder engagement, fostering transparency, accountability, and more sustainable business practices.

This study has several limitations. First, an international dataset is used in this research. While findings from an international dataset are more likely to be generalizable across different contexts, not all findings are applicable to all countries. For example, table 10 showed a positive individual effect of board gender diversity for American firms. Future research can expand on the general results from this thesis by focusing on more region-specific datasets for more localized insights, possibly starting with this deviant effect of board gender diversity in the US. Second, only one variable is used to measure biodiversity disclosure due to limited quantitative metrics available. Future research could explore alternative methods to measure biodiversity disclosure, as more methods may come available in the future due to the new European biodiversity disclosure regulations. Third, this thesis incorporates some of the total corporate governance mechanisms and interactions effects possible for this research. Future research examines different corporate governance mechanisms or other interactions effects between corporate governance mechanisms. Finally, stakeholder engagement is identified as an important variable in explaining the biodiversity disclosure of a firm according to the results, but this research uses a basic measurement of stakeholder engagement. Future research could investigate into different levels of stakeholder engagement affects corporate biodiversity disclosure in more depth.

References

Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics*, *94*(2), 291–309. https://doi.org/10.1016/j.jfineco.2008.10.007

Adler, R., Mansi, M., & Pandey, R. (2018). Biodiversity and threatened species reporting by the top Fortune Global companies. *Accounting, Auditing and Accountability Journal*, *31*(3), 787–825. https://doi.org/10.1108/AAAJ-03-2016-2490

Al-Tuwaijri, S. A., Christensen, T. E., & Hughes, K. E. (2004). The relations among environmental disclosure, environmental performance, and economic performance: A simultaneous equations approach. *Accounting, Organizations and Society*, *29*(5–6), 447–471. https://doi.org/10.1016/S0361-3682(03)00032-1

Amran, A., Lee, S. P., & Devi, S. S. (2014). The influence of governance structure and strategic corporate social responsibility toward sustainability reporting quality. *Business Strategy and the Environment*, *23*(4), 217–235. https://doi.org/10.1002/bse.1767

Atkins, J., & Maroun, W. (2018). Integrated extinction accounting and accountability: building an ark. *Accounting, Auditing and Accountability Journal*, *31*(3), 750–786. https://doi.org/10.1108/AAAJ-06-2017-2957

Barko, T., Cremers, M., & Renneboog, L. (2022). Shareholder Engagement on Environmental, Social, and Governance Performance. *Journal of Business Ethics*, *180*(2), 777–812. https://doi.org/10.1007/s10551-021-04850-z

Barnosky, A. D., Matzke, N., Tomiya, S., Wogan, G. O. U., Swartz, B., Quental, T. B., Marshall, C., McGuire, J. L., Lindsey, E. L., Maguire, K. C., Mersey, B., & Ferrer, E. A. (2011). Has the Earth's sixth mass extinction already arrived? In *Nature* (Vol. 471, Issue 7336, pp. 51–57). https://doi.org/10.1038/nature09678

Baysinger, B., & Hoskisson, R. E. (1990). The Composition of Boards of Directors and Strategic Control: Effects on Corporate Strategy. In *Source: The Academy of Management Review* (Vol. 15, Issue 1).

Bear, S., Rahman, N., & Post, C. (2010). The Impact of Board Diversity and Gender Composition on Corporate Social Responsibility and Firm Reputation. *Journal of Business Ethics*, *97*(2), 207–221. https://doi.org/10.1007/s10551-010-0505-2

Blanco-Zaitegi, G., Álvarez Etxeberria, I., & Moneva, J. M. (2022). Biodiversity accounting and reporting: A systematic literature review and bibliometric analysis. *Journal of Cleaner Production*, *371*. https://doi.org/10.1016/j.jclepro.2022.133677

Braam, G., & Peeters, R. (2018). Corporate Sustainability Performance and Assurance on Sustainability Reports: Diffusion of Accounting Practices in the Realm of Sustainable Development. *Corporate Social Responsibility and Environmental Management*, *25*(2), 164–181. https://doi.org/10.1002/csr.1447

Brammer, S. J., & Pavelin, S. (2006). Corporate reputation and social performance: The importance of fit. *Journal of Management Studies*, *43*(3), 435–455. https://doi.org/10.1111/j.1467-6486.2006.00597.x

Braun, P. (2010). Going green: women entrepreneurs and the environment. *International Journal of Gender and Entrepreneurship*, *2*(3), 245–259. https://doi.org/10.1108/17566261011079233

Carver, J. (1990). Boards that make a difference. San Francisco, CA: Jossey-Bass.

CBD. (2009). *Global Biodiversity Outlook 2 Convention on Biological Diversity*.

Ceballos, G., Ehrlich, P. R., & Dirzo, R. (2017). Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines. *Proceedings of the National Academy of Sciences of the United States of America*, *114*(30), E6089–E6096. https://doi.org/10.1073/pnas.1704949114

Clarkson, P. M., Li, Y., Richardson, G. D., & Vasvari, F. P. (2008). Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. *Accounting, Organizations and Society*, *33*(4–5), 303–327. https://doi.org/10.1016/j.aos.2007.05.003

Coffey, B. S., & Wang, J. (1998). Board Diversity and Managerial Control as Predictors of Corporate Social Performance. *Journal of Business Ethics*, *17*, 1595–1603.

Core, J. E., Holthausen, R. W., & Larcker, D. F. (1999). Corporate governance, chief executive officer compensation, and firm performance. In *Journal of Financial Economics* (Vol. 51).

CSCP (2024) The CSRD Opens a New Chapter on Biodiversity Reporting: What This Means for Companies https://www.cscp.org/csrd-biodiversity/#:~:text=The%20link%20between%20biodiversity%20and,from%20the%20financial%20year%202028

Dalton, D. R., Daily, C. M., Johnson, J. L., & Ellstrand, A. E. (1999). Number of Directors and Financial Performance: A Meta-Analysis. In *Source: The Academy of Management Journal* (Vol. 42, Issue 6). https://about.jstor.org/terms

de Villiers, C., Naiker, V., & van Staden, C. J. (2011). The effect of board characteristics on firm environmental performance. *Journal of Management*, *37*(6), 1636–1663. https://doi.org/10.1177/0149206311411506

Deegan, C. (2010). Organizational legitimacy as a motive for sustainability reporting. In Sustainability accounting and accountability (pp. 146-168). Routledge.

Dowling, J., & Pfeffer, J. (1975). Organizational legitimacy: Social Values and Organizational Behavior. *Pacific Sociological Review*, *18*(1), 122–136. www.jstor.org

EC. (2015). *EU assessment of progress in implementing the EU biodiversity strategy to 2020*.

Fischer, H. M., & Pollock, T. G. (2004). Effects of social capital and power on surviving transformational change: The case of initial public offerings. *Academy of Management Journal*, *47*(4), 463–481. https://doi.org/10.2307/20159597

Glass, C., Cook, A., & Ingersoll, A. R. (2016). Do Women Leaders Promote Sustainability? Analyzing the Effect of Corporate Governance Composition on Environmental Performance. *Business Strategy and the Environment*, *25*(7), 495–511. https://doi.org/10.1002/bse.1879

Haniffa, R. M., & Cooke, T. E. (2005). The impact of culture and governance on corporate social reporting. *Journal of Accounting and Public Policy*, *24*(5), 391–430. https://doi.org/10.1016/j.jaccpubpol.2005.06.001

Haque, F. (2017). The effects of board characteristics and sustainable compensation policy on carbon performance of UK firms. *British Accounting Review*, *49*(3), 347–364. https://doi.org/10.1016/j.bar.2017.01.001

Haque, F., & Jones, M. J. (2020). European firms' corporate biodiversity disclosures and board gender diversity from 2002 to 2016. *British Accounting Review*, *52*(2). https://doi.org/10.1016/j.bar.2020.100893

Hickman, L. E. (2020). Information asymmetry in CSR reporting: publicly-traded versus privately-held firms. *Sustainability Accounting, Management and Policy Journal*, *11*(1), 207–232. https://doi.org/10.1108/SAMPJ-12-2018-0333

Hillman, A. J., & Dalziel, T. (2003). Boards of Directors and Firm Performance: Integrating Agency and Resource Dependence Perspectives. In *Source: The Academy of Management Review* (Vol. 28, Issue 3). https://www.jstor.org/stable/30040728

Hillman, A. J., Keim, G. D., & Luce, R. A. (2001). *Board Composition and Stakeholder Performance: Do Stakeholder Directors Make a Difference?*

Hollindale, J., Kent, P., Routledge, J., & Chapple, L. (2019). Women on boards and greenhouse gas emission disclosures. *Accounting and Finance*, *59*(1), 277–308. https://doi.org/10.1111/acfi.12258

Hsiao, C. (2014). Analysis of panel data (No. 54). Cambridge university press.

Hussain, N., Rigoni, U., & Orij, R. P. (2018). Corporate Governance and Sustainability Performance: Analysis of Triple Bottom Line Performance. *Journal of Business Ethics*, *149*(2), 411–432. https://doi.org/10.1007/s10551-016-3099-5

Ibrahim, N. A., & Angetidis, John. P. (1995). *The Corporate Social Responsiveness Orientation of Board Members: Are there Differences between Inside and OutsideDirectors?*

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. In *Journal of Financial Economics* (Issue 4). Harvard University Press. http://ssrn.com/abstract=94043Electroniccopyavailableat:http://ssrn.com/abstract=94043 http://hupress.harvard.edu/catalog/JENTHF.html

Jensen, M. C., & Murphy, K. J. (1990). Performance Pay and Top-Management Incentives. In *Source: Journal of Political Economy* (Vol. 98, Issue 2). https://about.jstor.org/terms

Ji, Y.-Y. (2015). Top management team pay structure and corporate social performance. *Journal of General Management*, *40*(3), 3–20.

Jo, H., & Harjoto, M. A. (2011). Corporate Governance and Firm Value: The Impact of Corporate Social Responsibility. *Journal of Business Ethics*, *103*(3), 351–383. https://doi.org/10.1007/s10551-011-0869-y

Johnson, R. A., & Greening, D. W. (1999). The Effects of Corporate Governance and Institutional Ownership Types on Corporate Social Performance. In *Source: The Academy of Management Journal* (Vol. 42, Issue 5). https://www.jstor.org/stable/256977?seq=1&cid=pdf-

Kassinis, G., & Vafeas, N. (2002). Corporate boards and outside stakeholders as determinants of environmental litigation. *Strategic Management Journal*, *23*(5), 399–415. https://doi.org/10.1002/smj.230

Kelton, A., & Yang, Y.-W. (2004). *The Impact of Corporate Governance on Internet Financial Reporting*.

Kor, Y. Y., & Sundaramurthy, C. (2009). Experience-based human capital and social capital of outside directors. *Journal of Management*, *35*(4), 981–1006. https://doi.org/10.1177/0149206308321551

Liao, L., Luo, L., & Tang, Q. (2015). Gender diversity, board independence, environmental committee and greenhouse gas disclosure. *British Accounting Review*, *47*(4), 409–424. https://doi.org/10.1016/j.bar.2014.01.002

Mallin, C. A., & Michelon, G. (2011a). Board reputation attributes and corporate social performance: An empirical investigation of the US Best Corporate Citizens. *Accounting and Business Research*, *41*(2), 119–144. https://doi.org/10.1080/00014788.2011.550740

Mallin, C. A., & Michelon, G. (2011b). Board reputation attributes and corporate social performance: An empirical investigation of the US Best Corporate Citizens. *Accounting and Business Research*, *41*(2), 119–144. https://doi.org/10.1080/00014788.2011.550740

Manetti, G. (2011). The quality of stakeholder engagement in sustainability reporting: Empirical evidence and critical points. *Corporate Social Responsibility and Environmental Management*, *18*(2), 110–122. https://doi.org/10.1002/csr.255

Manning, B., Braam, G., & Reimsbach, D. (2019). Corporate governance and sustainable business conduct—Effects of board monitoring effectiveness and stakeholder engagement on corporate sustainability performance and disclosure choices. *Corporate*

Social Responsibility and Environmental Management, *26*(2), 351–366. https://doi.org/10.1002/csr.1687

Mckendall, M., Sánchez, C., & Sicilian, P. (1999). CORPORATE GOVERNANCE AND CORPORATE ILLEGALITY: THE EFFECTS OF BOARD STRUCTURE ON ENVIRONMENTAL VIOLATIONS. In *The International Journal of Organizational Analysis* (Vol. 7, Issue 3).

McNulty, T., & Pettigrew, A. (1999). Strategists on the Board. *Organization Studies*, *20*(1), 47–74.

Michelon, G., & Parbonetti, A. (2012). The effect of corporate governance on sustainability disclosure. *Journal of Management and Governance*, *16*(3), 477–509. https://doi.org/10.1007/s10997-010-9160-3

Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts. In *Source: The Academy of Management Review* (Vol. 22, Issue 4). https://www.jstor.org/stable/259247

Oh, W. Y., Chang, Y. K., & Kim, T. Y. (2018). Complementary or Substitutive Effects? Corporate Governance Mechanisms and Corporate Social Responsibility. *Journal of Management*, *44*(7), 2716–2739. https://doi.org/10.1177/0149206316653804

Pfeffer, J. and Salancik, G. (1978) The External Control of Organizations: A Resource Dependence Perspective. Harper & Row, New York.

Post, J. E., Preston, L. E., & Sachs, S. (2002). Redefining the corporation, stakeholder management and organizational wealth. Stanford, CT: Stanford University Press.

PWC. (2023). *Corporate Sustainability Reporting Directive (CSRD) 2023 - an analysis*. www.pwc.de

Rechner, P. L., & Dalton, D. R. (1991). CEO duality and organizational performance: A longitudinal analysis. *Strategic Management Journal*, *12*(2), 155–160. https://doi.org/10.1002/smj.4250120206

Samkin, G., Schneider, A., & Tappin, D. (2014). Developing a reporting and evaluation framework for biodiversity. *Accounting, Auditing and Accountability Journal*, *27*(3), 527–562. https://doi.org/10.1108/AAAJ-10-2013-1496

Shleifer, A., & Vishny, R. W. (1997). A Survey of Corporate Governance. *Journal of Finance*, *52*(2), 737–783. https://doi.org/10.1111/j.1540-6261.1997.tb04820.x

Smith, C. W., & Watts, R. L. (1991). The investment opportunity set and corporate financing, dividend, and compensation policies*. In *Journal of Financtal Economics* (Vol. 32).

Studenmund, A. H. (2014). Using econometrics. Pearson Education.

Tricker, R. I. (1984). Corporate governance practices, procedures and powers in British companies and their boards of directors. UK: Gower Publishing Company Ltd.

Ullmann, A. A. (1985). Data in Search of a Theory: A Critical Examination of the Relationships among Social Performance, Social Disclosure, and Economic Performance of U.S. Firms. The Academy of Management Review, 10(3), 540–557. https://www.jstor.org/stable/258135?seq=1&cid=pdf-

Un Global Compact e UNGC. (2012). A framework for corporate action on biodiversity and ecosystem services. Switzerland: UN Global Compact and IUCN.

GRI. (2007). Biodiversity - a GRI reporting resource. The Netherlands: Global Reporting Initiative.

Unerman, J., Bebbington, J., & O'Dwyer, B. (2010). Introduction to sustainability accounting and accountability. In Sustainability accounting and accountability (pp. 20-35). Routledge.

Woodward, D., Edwards, P., & Birkin, F. (2001). Some evidence on executives' views of corporate social responsibility. *British Accounting Review*, *33*(3), 357–397. https://doi.org/10.1006/bare.2001.0165

World Economic Form. (2020). *The Global Risks Report 2020 Insight Report 15th Edition*.

Zahra, S. A., & Stanton, W. W. (1988). The implications of board of directors' composition for corporate strategy and performance. International Journal of Management, 5, 229–236.

Zahra, S. A., & Pearce, J. A. (1989). Boards of Directors and Corporate Financial Performance: A Review and Integrative Model. *Journal of Management*, *15*(2), 291–334.