

OTDK-dolgozat

2025

BUDAPESTI CORVINUS EGYETEM



**HOGYAN BEFOLYÁSOLJA A KORRUPCIÓ ÉS A NEMZETI JÓLÉT A
VÁLLALATI ZÖLDREFESTÉST**

**HOW CORPORATE GREENWASHING IS AFFECTED BY
CORRUPTION AND NATIONAL WELL-BEING**

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Kézirat lezárásának dátuma: 2024. 11. 18.

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1. Introduction

Sustainability has become a priority for more and more companies, which are trying to make their activities, products, and services as sustainable as possible through the use of sustainable technologies. However, there are companies that engage in greenwashing as a deceptive practice. Greenwashing promotes false solutions to the climate crisis, which distract from and delay concrete, credible actions. Companies and other entities engage in greenwashing in order to appear to do more to protect the environment than they actually do. (UN, 2022)

It is an extremely sensitive subject when it comes to greenwashing. In order to define exactly what constitutes greenwashing, it is difficult to make a definitive statement. The meaning of greenwashing is very subjective, and what it means to one individual may not be the same for another. As Seele and Gatti (2017) emphasize, greenwashing has no universally accepted definition. In response to the emergence of greenwashing, regulatory problems and measurement issues have arisen. A company that greenwashes in their sustainable disclosure can also mislead investors by misleading them about their green credentials. Several different research methodologies have also been used to examine greenwashing as a phenomenon from a different perspective. Some are attempting to tackle this problem with the help of emerging artificial intelligence systems. Such as Boelders (2020) European energy firms, Kang and Kim (2022) 23 global leader companies and Lien (2023) Norwegian firms. Other studies develop other methodologies, such as Yu et al. (2020) greenwashing scoring system, Gil-Cordero et al. (2021) Likert scale questionnaire, and Ruiz-Blanco (2021) contention analysis. It has also been observed that studies are moving away from micro variables in order to include macro variables. Hoang (2022) examines the political corruptions and ESG disclosures of US based companies, and Yu et al. (2020) analysis the level of corruption in a countries and companies greenwashing behaviors.

Understanding the impacts of company actions on societal well-being is of paramount importance, and this study addresses this concern by assessing the associations between corporate greenwashing, corruption, and national well-being. How do different levels of corruption in a country affect firms' willingness to adopt ESG greenwashing behavior by influencing transparency, the regulatory environment, corporate governance structures. Also, how the socio-economic development indicators and social expectations of a country combine to influence the acceptance of ESG greenwashing practices by companies. It also delves into

investigating how does board size influence firm's ESG greenwashing behavior, and to extent does a larger board size mitigate such behavior through enhanced monitoring capabilities.

Using multiple linear regression on panel data from notable sources such as Bloomberg, Refinitiv Eikon, the United Nations, and the Transparency International for the period between 2018 and 2021, insight into global capital markets was gleaned. The universe of the study is the MSCI Worldwide Index, reflecting diverse economies. Furthermore, the greenwashing scoring system used provides wide acceptance as a measure of corporate greenwashing.

Conclusions absorbed from this research may notably impact investors, managers, and policymakers. The findings could potentially enforce better sustainability disclosures and reporting standards, enforce stricter corporate governance policies, and influence investment decisions, all with an aim to drive more sustainable and ethical corporate behavior.

2. Literature Review

2.1. The role of regulators and legislation

Regulators and legislators play a key role in the ongoing fight against greenwashing. In the age of rising global awareness of environmental issues, consumers, investors, and stakeholders are increasingly prioritizing sustainable practices. The lack of regulation and punishment of greenwashing practices, which involve the dissemination of misleading information about a company's environmental efforts, can result in loss of stakeholder trust and trust in green investments. (Delmas & Burbano, 2011). Increased demand for environmentally conscious products and investments raises concerns about the legitimacy of companies' sustainability claims. To address these concerns and defend the principles of transparency and accountability, regulators and legislators have taken several legislative and regulatory initiatives to combat greenwashing. There is a possibility for confusion and potential greenwashing traps led by regulators and regulations as companies have difficulty accurately measuring, assessing, and communicating their environmental impact.

This article examines the critical role of regulators and legislative action in holding companies accountable, promoting credible sustainability practices, and ensuring that companies meet strict standards in their environmental reporting.

2.1.1. European Union

The EU presented the Taxonomy Regulation in 2020 as part of the Green Deal, to reach the goal of becoming the first climate-neutral continent by 2050. The EU Taxonomy establishes a shared framework, enabling the consistent evaluation of companies' sustainability in their operations. This standardized approach empowers companies to present their sustainability metrics uniformly, creating a level playing field and promoting fairness among competitors. This increased transparency could put pressure on companies to keep more accurate records and improve their communication, which could ultimately alleviate the problem of greenwashing. It is important to note, however, that the EU taxonomy does not focus primarily on specific types of greenwashing. (Migne, 2023)

The Sustainable Finance Disclosure Regulation (SFDR) aims to ensure that financial market participants and financial advisors are sustainability risks in their processes. In addition, sustainability must be integrated into their processes sustainability impacts of sustainability in their processes, and to communicate the sustainability features of their financial products their transparency. (Dydon AI, 2022)

The European Union's Non-Financial Reporting Directive (NFRD) has been mandatory for 2018 to 2022 for public interest entities with more than 500 employees, to include non-financial statements in their separate accounts. Such as the environmental, social and governance information. The European Commission proposed a Corporate Sustainability Reporting Directive (CSRD) in 2021 to replace the existing NFRD. (Dydon AI, 2022)

Corporate Sustainability Reporting Directive (CSRD) entered into the legislation in 2023, which requires companies to produce sustainability reports from 2025 that are "comparable, reliable and easy for users to find and use using digital technologies". CSRD is an extended version of the NFRD. It obligates companies to self-report on double materiality as well. Which means that firms have to report on the company's impact on the environment and the sustainability risks the company faces. They should also address the formulation of long-term ESG objectives and policies. They should do due diligence in their operations and supply chain. They should also include information on intangible assets in their reports. (Sandin, 2022)

The European Sustainability Reporting Standards (ESRS) were adopted under the CSRD indeed brings several benefits beyond the scope of EU regulation. The ESRS provides more detailed structure and disclosure requirements that covered companies, banks and insurers are required to report. (Nordea, 2023) The ESRS consists of two broad standards covering general reporting principles and overarching disclosure requirements, along with ten specialized standards that focus on specific aspects of sustainability. These standards collectively mandate companies to disclose information about governance and strategic approaches for addressing significant sustainability issues. The effects, potential risks, and opportunities associated with these sustainability matters. Specific quantitative metrics and targets related to sustainability goals. (KPMG, 2023)

In addition to the CSRD and the Taxonomy Regulation, the European Parliament voted to adopt the Corporate Sustainability Due Diligence Directive (CSDD). The CSDD requires companies to identify and, if necessary, to prevent, eliminate or reduce the negative impacts of their activities on human rights, such as child labour and the exploitation of workers, and on the

environment, such as pollution and biodiversity loss. (European Commission, 2022) The CSDD has not yet entered into application, but some concerns have been raised about the legislation. Lukas Schaugg, international legal analyst at the International Institute for Sustainable Development (IISD), noted that the legislation could create legal uncertainty and increased compliance costs for countries and suppliers in the Global South, which could exclude small and medium-sized enterprises from international trade. Furthermore, analysts are concerned about the potential for increased corruption. Furthermore, compliance with the law could take financial resources away from important areas such as education and health. Maria Teresa Pisani of the United Nations Economic Commission for Europe (UNECE) suggested that the legislation should be accompanied by technical and capacity-building assistance programs. (Portfolio, 2023)

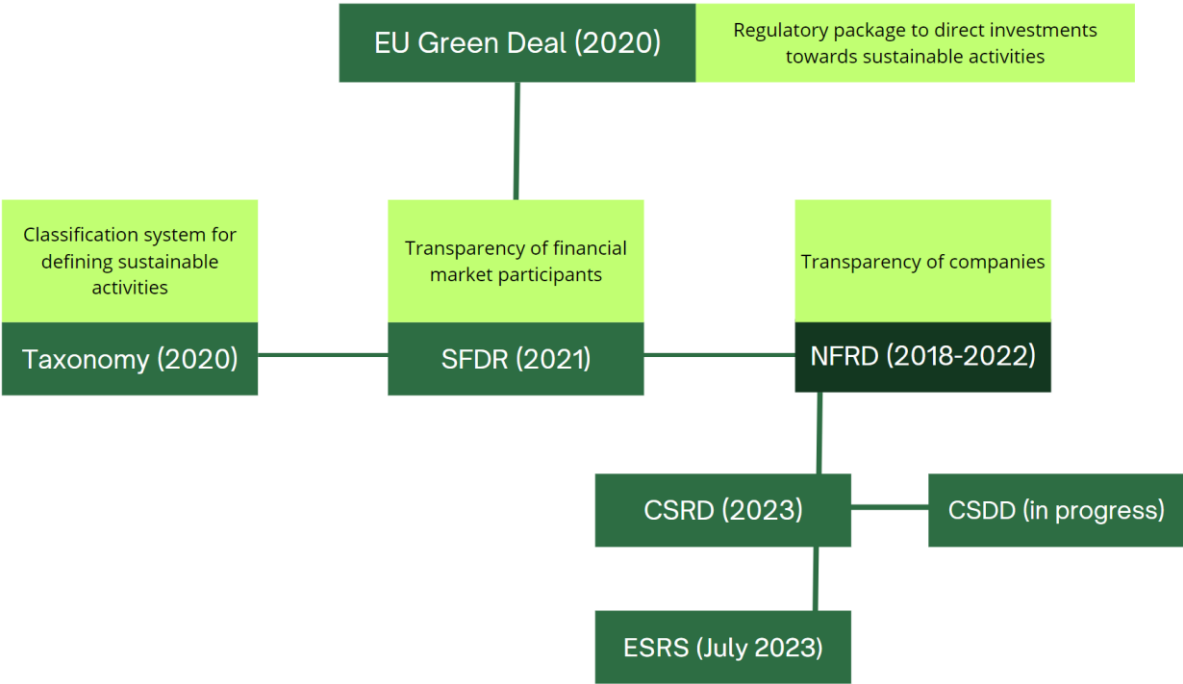


Table 1 - European Union regulations (compiled by author; based on Yamamoto (2023))

The CSRD and EU taxonomy are designed to increase transparency and accountability in assessing the sustainability of economic activities. However, understanding and complying with these frameworks can be challenging for organizations. To end this, Greenomy - the software company - is committed to simplifying the sustainable finance regulations to enable businesses to integrate sustainability into their core activities. Their mission is to accelerate and strengthen the transition to a sustainable economy by providing relevant and reliable information to all stakeholders. Through their digitized data capture and reporting process, Greenomy is creating

a comprehensive sustainability data and analytics ecosystem that facilitates the reallocation of funds to sustainable projects. By leveraging their technology, companies can easily reduce compliance costs and navigate the complexities of a rapidly changing regulatory environment. Their solution streamlines reporting, allowing organizations to devote more time and resources to actively improving their sustainability initiatives. (Haine, 2023)

In response to the growing issue of greenwashing and misleading environmental claims, the European Commission has proposed common criteria. The goal is to ensure that consumers have more confidence in purchasing environmentally friendly products, while recognizing and rewarding businesses who are truly committed to sustainability. In the EU, over half of the environmental claims evaluated were vague or misleading, resulting in an unequal market for genuinely sustainable companies. As a result of the proposal, consumers will be required to verify green claims independently and present scientific evidence before consumers can be informed of them. Environmental labels are also regulated to prevent consumer confusion and distrust. Legislation will be carried out in both the European Parliament and the Council. (European Commission, 2023)

2.1.2. Other countries

In the United States of America, Green Guides were introduced by the Federal Trade Commission (FTC) in 1992 and redesigned in 2023. Businesses can use these guidelines to make environmental claims in their marketing efforts. Green Guidelines are important because they prevent misleading environmental marketing claims and "greenwashing", which is when companies exaggerate their environmental impact to consumers. As well as building trust, they help businesses comply with evolving regulations and avoid penalties. Besides general principles for environmental marketing claims, the Green Guides also address specific environmental claims, such as carbon offsetting, composting, and biodegradability. To enhance credibility and reliability of their marketing activities, these guidelines help businesses make accurate and transparent environmental claims. (Sullivan, 2023)

The US Securities and Exchange Commission (SEC) is taking action to combat greenwashing in the financial sector as well. To this end, the agency has proposed stricter regulations on the names of financial products, particularly sustainable-themed mutual funds. While financial companies have expressed support for the SEC's efforts, they have also called for some changes

to the regulations. The proposed rules aim to ensure transparency and accuracy in the marketing of financial products that make environmental or sustainable claims to prevent deceptive practices. (Financial Times, 2023)

The Green Claims Code, which was introduced in the United Kingdom in 2021, was established to help businesses selling products and services to consumers to ensure that their environmental claims. It addresses issues such as inaccurate, exaggerated or incomparable claims. The Code on Green Claims set six key principles for businesses to follow, ensuring that claims are true, clear and unambiguous, contain all relevant information, are fair and meaningful, take into account the whole life cycle and are substantiated. Businesses in breach of the Code could face investigation by the Competition and Markets Authority's (CMA) and notices to voluntarily change their communications. Failure to comply can lead to litigation, fines, and reputational damage. The CMA does not encourage companies to avoid communicating their environmental efforts. The goal is to promote honest and meaningful communication about sustainability efforts. (George, 2023)

There are also efforts by countries on the Asian continent to regulate greenwashing. In Singapore, the Monetary Authority of Singapore (MAS) has gradually integrated environmental risks into its supervisory framework and processes. Recently, the regulator has provided tools, including artificial intelligence (AI) called NovA! to financial institutions to assess the sustainability performance of the Singapore property sector. This is also being used to detect greenwashing. (MAS, 2022) According to the Financial Services Agency (FSA) of Japan, the number of investment products incorporating ESG is growing in Japan and overseas, but they are raising concerns about "greenwashing". (Fuminaga, 2022) Bursa Malaysia (the Malaysian Stock Exchange) has been conducting an annual disclosure review (SDR) of sustainability statements or reports of publicly listed companies on a sample basis since 2017. (Bursa Malaysia, 2022) China has issued the "14th Five-Year Plan (2021-2025) for the Development of Financial Standardization", which focuses on the need to improve the green financial standard system and also addresses the issue of greenwashing. (Eco-Business, 2020)

The Australian Competition and Consumer Commission (ACCC) has published new guidance on tackling greenwashing, the misleading practice of making false or exaggerated environmental statements. The move is in response to an ACCC study which found that 57% of companies surveyed had made questionable environmental claims. The regulator aims to protect consumers and promote transparency on sustainability claims. The guidance sets out eight key principles for businesses, emphasizing accurate, evidence-based and transparent

claims. It rejects unclear or unqualified terms such as "environmentally friendly" and emphasizes clear communication. The ACCC's enforcement approach could include fines of up to \$50 million or three times the profit from false claims. (Segal, 2023)

2.1.3. Cooperation of other organizations

In Asia, scrutiny of greenwashing is increasing as several regulators recognize it as a major problem. ClientEarth, an environmental legal charity, and the Asia Investor Group on Climate Change (AIGCC) have collaborated to publish a guide which aims to address greenwashing in the region. The publication called "Greenwashing and how to avoid it: an introductory guide for Asia's finance industry" provides practical information on how to combat greenwashing. The guide provides an overview of new forms of greenwashing and the various regulations. 'The lack of global consensus on 'green' claims has led to the growth of greenwashing, which poses long-term risks and obstacles to progress in the fight against climate change,' said Herry Cho, Head of Sustainability and Sustainable Finance at SGX Group. The guide makes five key suggestions for tackling greenwashing, which include assessing the accuracy and credibility of green statements, transparency on how green objectives are integrated into financial products, aligning a company's green image with its actual operations, monitoring relevant regulations, and understanding legal and fiduciary obligations to investors and stakeholders. Regulators are increasingly identifying greenwashing as a serious problem, with figures such as Yi Gang, Governor of the People's Bank of China, describing it as a 'moral hazard'. The guide also highlights the need to introduce new global standards to combat greenwashing. (ESG Clarity, 2023)

Planet Tracker is a non-profit financial think-tank that produces analyses and reports aimed at bringing capital markets in line with the planet's boundaries. Their core mission is to drive significant and permanent change in global financial practice by 2030. Planet Tracker has published a report entitled 'The Greenwash Hydra', which highlights the different forms of greenwash practiced by companies. Greenwashing encompasses a wide range of activities, from incidental misinformation in marketing to deceptive practices that divert attention from harmful environmental policies. (The Greenwashing Hydra, 2023). The report identifies six types of greenwashing:

'Greencrowding': this occurs when companies hide environmentally damaging practices by blending in with other companies, creating the illusion of collective action.

‘Greenlighting’: companies divert attention from environmentally damaging activities by highlighting their environmentally damaging activities. For example, they can promote decarbonisation efforts while continuing to contribute to plastic pollution.

‘Greenshifting’: some companies shift responsibility up or down the value chain, often to consumers, to avoid responsibility for their environmental impacts.

‘Greenlabelling’: This deceptive practice involves misleading advertising claims about a product's environmental friendliness.

‘Greenrinsing’: companies often change climate and sustainability targets before they are met, giving the appearance of progress without meaningful action. Examples include Coca-Cola and PepsiCo.

‘Greenhushing’: companies underreport or hide their sustainability data and performance to avoid scrutiny by stakeholders.

2.2. Methodologies for Greenwashing

As the world becomes increasingly aware of the importance of sustainability, there is a rising concern about companies that engage in greenwashing. The question arises as to how best to identify and measure the extent of greenwashing by companies. Many different perspectives are starting to be explored. There are those who start from the ESG scores of companies and those who approach it from the perspective of computer science. According to Woloszyn et al. (2021) automatic detection of greenwashing is an unsolved problem from the perspective of computer science.

2.2.1. Greenwashing Scoring Systems

In the following section, I am going to review the various methods used in the literature in order to identify and analyze the different forms of greenwashing that exist. In this article, I will discuss how different literatures define greenwashing and how they develop their scoring systems to measure and evaluate this phenomenon based on their definitions.

According to Yu et al. (2020), the following method was developed in order to measure greenwashing. Firstly, they identified the greenwashers as following: ‘as firms which seem very transparent and reveal large quantities of ESG data but perform poorly in ESG aspects’. In order to mislead their stakeholders, companies that adopt greenwashing as part of their corporate strategy disclose large quantities of ESG data in order to obscure their less impressive ESG performance. As a result, it has been developed a method that combines the ESG disclosure score with the ESG score in order to develop a peer-relative greenwashing score. The MSCI All Country World Index was analyzed between 2012 and 2016.

In their research, they are seeking answers to the following questions: Corporate greenwashing activities are monitored by examining whether independent directors, institutional investors or board size play a direct role.

H1: (c) A greater board size reduces firms’ ESG greenwashing behavior, since a larger board size can increase a board’s capability for monitoring.

Their research aims to determine whether firms' greenwashing behavior can be affected by corruption and the absence of political rights. Specifically, they examine whether these two country-level factors can contribute to a company's exposure to scrutiny and, therefore, its engagement in greenwashing.

H2: (a) Firms will engage in less ESG greenwashing behavior in countries where corruption is low. (b) Firms will engage in more ESG greenwashing behavior in countries with an absence of political rights.

Researchers have found that firms' greenwashing behavior can be reduced by increasing institutional ownership and independent directors' share. Greenwashing behavior is not significantly impacted by an increased board size. The insignificant impact of board size on greenwashing behavior may be attributed to the increased costs that come with a larger board outweighing the benefits of having more directors. Research has shown that a larger board size can be effective in monitoring manager behavior, but a larger board may also suffer from free-riding, coordination problems among group decision makers, and slower decision making.

The results suggest that in a less corrupt country, citizens are more likely to scrutinize firms' greenwashing behavior and speak out against it. Research suggests that a less corrupt system can reduce the extent of greenwashing by providing more opportunities for stakeholders. A society that has stronger political rights gives its citizens more opportunities to voice their

concerns through the media, influential environmental groups, and nongovernmental organizations (NGOs).

Using a different methodology, Ruiz-Blanco et al. (2021) aimed to answer the question in their research: which characteristics make firms less or more likely to engage in greenwashing. In the paper, greenwashing is defined as a disconnect between what is reported by firms and their commitment to sustainability based on externally established sustainability performance ratios. A separate term has even been developed to describe the differences in communication and action on social issues, known as ‘bluewashing’.

100 S&P US-listed companies were studied between 2013 and 2016. The methodology was content analysis. Content analysis helps to reduce the amount of data collected, categorize it and make sense of the data so that conclusions can be made. (Bengsston, 2016) They collected the sustainability reports from the companies' official websites and analyzed the reports using RapidMiner, a data science platform that analyses the collective impact of organizations' data. Using the accuracy construct developed by Beretta and Bozzolan (2004), they assessed public discourse on CSR. Weighted disclosure scores are used to evaluate sentences. The weight for monetary values is 3, for numerical values 2 and for textual sentences weight of 1. In order to arrive at the most precise measure, monetarization, we have to go from the least precise (text) to the most precise (quantitative). The published CSR discourse is calculated as the proportion of weighted sentences to the total number of sentences in the report. The study examines the target variable greenwashing at three distinct levels: global, environmental, and social. ‘Global-Greenwashing’ is a metric that encompasses both environmental and social aspects. It is computed as the disparity between the average of environmental and social disclosures (the discourse component) and the average of standardized Bloomberg environmental and social scores. Similarly, ‘Green-Greenwashing’ and ‘Blue-Greenwashing’ are determined through a parallel process, utilizing environmental and social disclosures and the standardized Bloomberg environmental and social scores, respectively.

According to the results, companies in environmentally sensitive industries (ESI) are less environmentally friendly, socially responsible, and economically efficient than their counterparts following GRI guidelines. A company that does not participate in the ESI or follow the GRI guidelines is more than twice as likely to greenwash its greenwashing activities as a company that is in the ESI or follows the GRI guidelines. Reports that include assurances of sustainability are less likely to greenwash globally compared to those that do not. The research

mentioned that the sample includes data from the United States only and the results cannot be generalized to other countries.

Gil-Cordero et al. (2021) aimed to gain a better understanding of corporate green strategy by looking at the relationship between greenwashing (GW) and behavioural intention (BI), as well as how word of mouth (WOM) and corporate social responsibility (CRS) influence this relationship. Researchers designed a Likert scale questionnaire. Customers who use the apps and are 18 years or older were asked to complete the survey. The study also included 198 submitted and validated online questionnaires from Spanish users of the urban mobility apps Blablacar and Amovens. February to March 2020 was the period of the questionnaire's availability. A partial least squares regression technique was used to test the hypothesized relationships and proposed research model. Consumer behavior is influenced negatively by market knowledge of unethical activities. The environment may not be a priority for clients in this sector, so CSR does not directly influence BI. WOM is significantly influenced by CSR, showing that consumers value and share positive company images. A lack of understanding of GW concepts may explain this result. A substantial influence of WOM is found in BI, suggesting trustworthiness shapes consumer behaviors. Greenwashing alone does not significantly impact BI. Prices or distribution may be prioritized over ethical considerations, diminishing GW's importance. Although other factors may take precedence in making decisions, GW and BI indirectly remind customers of the importance of green policies.

2.2.2. Natural Language Process identifies Greenwashing

In the past few years, the widespread use of artificial intelligence (AI), machine learning (ML) and natural language processing (NLP) has increased significantly, driven by the rapid development of technology, access to data and the growing demand for intelligent systems in various industries. New technology is changing society as well. The progress in sustainability reporting is in line with the growing interest and acceptance of artificial intelligence in business, society and scientific literature. Moodaley and Telukdarie (2023) research results show that there has been an increase in greenwashing or sustainability reporting with the investigation using AI, ML or NLP.

Kang and Kim (2022) investigated sustainability reports using the NLP method. The companies examined were selected with the help of a questionnaire from GlobeScan and the SustainAbility Institute, which identified the top 23 global sustainability leaders. Of those, 6 companies were

included in the analysis as they produce a separate or integrated sustainability report. The following firms were analyzed: BASF, IKEA, Marks & Spencer, Nestle, Toyota and Walmart. The companies selected are from various countries and different sectors. They investigated sustainability reports from 2011 to 2020, downloaded from companies' own websites. On the base of the 17 SDGs, six categories were set up to evaluate the reports: Equity, Social Development, Life, Economic and Technology Development, Resources and Environments. With the NLP help, they gathered the positive and negative sentences from the sustainability reports based on the six categories. Sentiment analysis was then applied to generate the scores. Then the ratio of positive emotions to negative sentences was visualized. The research found that companies use sustainability reporting to boost their positive reputation when they experience a crisis. During their investigation, they identified so-called anomalous peaks, which imply greenwashing. These anomalous spikes, occur when the report contains too many positive statements because the company wants to hide things that would damage the company's reputation, because it faces a crisis situation. Researchers have confirmed that these companies have indeed faced scandals when their reports contain too many positive claims.

Boelders (2020) research aims to investigate the relationship between firm characteristics and the level of greenwashing by firms in the European energy sector. The study defines the concept of greenwashing as 'when firms engage in greenwashing their symbolic actions ("the green talk") do not align with their substantive actions on environmental issues ("the green walk").' Symbolic actions are actions or gestures that signal a firm's compliance with environmental expectations without actually modifying their daily operations or strategies. It is the goal of these actions to shape stakeholders' perceptions of environmental responsibility and create a sense of environmental responsibility among them. Although this strategy may raise suspicions, its costs are lower than the true cost of compliance, and its legitimacy may be enhanced. A substantive measure, on the other hand, represents a significant change in the company's day-to-day operations. As a result, environmental measures, such as pollution prevention and environmental innovation, are taken to minimize the environmental impact of the firm. It is more costly and risky to implement meaningful measures, but the rewards can be real improvements in environmental performance and legitimacy. When technological innovations contribute to (non-)sustainable innovations, particularly those resulting from R&D, they qualify as substantive actions.

The database includes 134 companies in the European energy sector in 2015-2017. Corporate sustainability reports are collected from company websites. The reports were analyzed using

NLP. The scoring method for detecting greenwashing based on technological innovations involves selecting relevant topic clusters and calculating a deviation score for each firm by comparing CSR phrases with patent phrases in these clusters. The greenwashing score for each cluster is weighted according to the importance of the clusters, which is determined by the normalised data points. The firm-specific greenwashing score is then the average of the weighted cluster scores. A confidence score based on data availability is calculated for each company and companies with low confidence scores are excluded. For easier interpretation, all scores are scaled between 0 and 1. The purpose of this method is to assess the consistency between the symbolic and substantive actions of a company with respect to technological innovation. The research limits are the following. A positive correlation is claimed between firm size and patent creation, so the algorithm should be adjusted accordingly. Patent creation tends to be higher in larger companies. A positive correlation is also found between the number of customer service messages and the size of the firm.

The research concludes that, based on the investigated firm characteristics, greenwashing does not appear to be a systematic phenomenon. The study focused on firm size, profitability, and organizational inertia but found no direct relationship between these factors and the extent of greenwashing in the dataset. The research found that European energy companies are mainly implementing technological innovations to respond to environmental pressures, mainly solar, wind, and to reduce emissions and toxic gases. Reducing emissions and toxic gases was the most significant area of innovation, suggesting a preference for incremental changes rather than major changes in business practice. Interestingly, the scoring method used in the survey showed that the majority of companies scored low on greenwashing, indicating that they are indeed adopting environmentally friendly practices ('walking the talk'). Greenwashing was the exception rather than the norm. The study also found that electricity companies are less likely to innovate in solar and wind energy than oil and gas companies. This challenges the expectation that oil and gas firms have traditionally been less focused on renewables, suggesting a diversification strategy by oil and gas firms and potential competition with electricity firms in the renewables sector.

Stjernelund Lien (2023) researched greenwashing identification techniques using a variety of communication channels as well as managing a large amount of data in order to identify greenwashing. A programmatically-extracted database consisting of sustainability reports, product descriptions, and press releases has been compiled based on information gathered from websites. Datasets from two sources were used to collect comprehensive information on

enterprises. Based on Cicero's dataset, 'greenness' is categorized. Throughout the experiments, less sustainable companies can be distinguished from most sustainable companies using large-scale language models. Due to its inability to find green claims, this does not directly aid in detecting greenwashing. It is not possible to automatically find these claims because information is stored in manual reports. Another set of data is the Fauna dataset. The company Fauna allows users to earn points when they purchase green products. Based on the category of the brand, a brand has to meet certain criteria to be considered green. Approximately 360 Norwegian brands are included in this database. The purpose of using this dataset was to develop a system that extracts information about a company's website to develop an automated rating system for that company. The process involves retrieving information from a variety of websites and then condensing the extracted information in a manageable size so that it can be used in the machine learning models. Greenwashing might be more easily detected with this method. Corporate products can be distinguished by a model trained to detect green labels. As a corporate website contains a lot of information, training on those labels can be very challenging when it is manually labeled. The information it contains can be useful. A better scraper should be available if this data set is also used to detect greenwashing. In addition, it is important to improve methods for extracting key information from web pages.

2.3. Double Materiality – Greenwashing risk

As a result of corporate governance and sustainability, the traditional boundaries of materiality have expanded and it has been introduced to the concept of "double materiality". An IFRS Foundation initiative, the International Sustainability Standards Board (ISSB) developed the concept of double materiality under the intersection of financial accounting and sustainability principles. Companies should consider both their internal financial considerations and their broader social and environmental effects when developing this innovative framework. Companies are struggling with the pressures of both addressing financial materiality as well as external social implications. (Brightest, 2022) In order to combat greenwashing, more regulations such as the CSRD and EU Taxonomy require companies to report double materiality in their sustainability reports. Enhancing transparency within companies. Greenwashing can be effectively addressed through transparency. Accountability, trust, and consistency between sustainable practices are all enhanced by transparent reporting. The lack of strong regulations

and industry standards can make it difficult to achieve transparency in reporting. There is a risk that companies may misrepresent their environmental impacts, or fall victim to greenwashing traps. This is by failing to accurately measure, assess, and communicate their environmental impacts. (Greenomy, 2022)

Materiality (including double materiality) is most commonly known as a conceptual tool to help a company determine which ESG issues to address in its disclosures or ESG risk management processes. The origins of the concept can be traced back to audit materiality. Double materiality includes the following two types of materiality, as also shown on the Table 2.: Financial materiality focuses on how sustainability and climate or other external factors impact the company. Includes factors like company’s growth, performance, and cost of capital in different terms. Environmental and social or impact materiality is about how the companies’ actions influence society and the planet in different terms. (Deloitte, 2022)

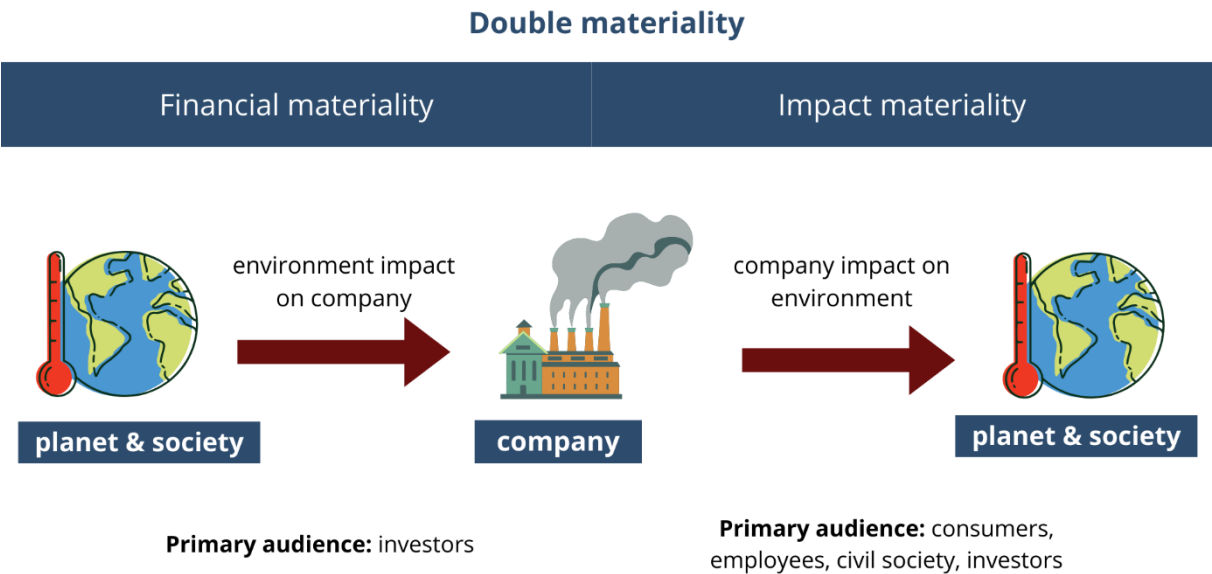


Table 2 - Double materiality (compiled by author, based on Ksapa (2022))

Materiality has proven invaluable for companies and financial institutions for several reasons based on Ksapa’s research in 2022. Firstly, it broadens the understanding of business performance by emphasizing the impact of an organization on sustainable development and stakeholders. This focus on sustainability encourages decision-makers to recognize the connection between addressing sustainability issues and overall business success. Secondly,

materiality fosters internal alignment by identifying issues that are financially material or crucial to enterprise value, promoting a comprehensive review of impacts on sustainable development. This alignment ensures that decision-makers prioritize sustainability as an integral part of their strategic plans. Additionally, materiality facilitates better stakeholder engagement by providing a clear rationale for prioritizing relevant issues. It helps companies understand why certain issues require resources and time, while stakeholders can use materiality assessments to pinpoint areas of shared interest for collaboration. Furthermore, materiality nurtures purpose and employee engagement by emphasizing value for the organization, society, and the environment beyond financial considerations. This approach aligns corporate mission statements with broader responsibilities, such as contributing to the United Nations' Sustainable Development Goals (SDGs). Moreover, materiality drives collective action towards the SDGs by influencing corporate reports to address sustainable development issues, leading to increased awareness and support for initiatives like climate regulations through coalition building. Additionally, materiality connects non-financial performance with financial valuation, as studies demonstrate a direct correlation between non-financial materiality, issue management, and improved financial valuation. Lastly, materiality streamlines resources by enhancing decision-making, particularly in resource allocation. Companies can prioritize existing resources towards addressing the most material issues, optimizing their impact while potentially reallocating resources from less impactful programs. (Ksapa, 2022)

2.4 Corruption

Corruption is a growing concern in the area of environmental sustainability and responsibility, one of the most insidious expressions of which is greenwashing. In addition to misleading consumers, the greenwashing practice undermines efforts to combat climate change and encourage responsible corporate behavior. It is crucial to understand the dynamics of corruption in order to ensure truly eco-friendly, transparent, and accountable business practices globally.

Khanh Hoang (2022) study investigates the influence of political corruption on the ESG disclosure of US-based companies and its connection to carbon risk. The research examines the effects of political corruption and carbon risk on ESG disclosure by studying a sample of US-

listed firms over the period from 2005 to 2018. ESG disclosure has increasingly become a standard practice in the reporting of publicly listed companies in the United States. This trend stems from growing public concerns about climate change and environmental incidents involving carbon-intensive and energy-consuming industries. The market demand for nonfinancial information reporting, especially related to companies' progress toward sustainable development goals, is significantly increasing. In the absence of a standardized framework or regulation for ESG disclosure in the United States, companies have the discretion to report ESG information when and where they seem it appropriate. Also, there is no legal requirement for ESG disclosure in the United States. The arguments in favor of mandatory ESG disclosure emphasize the need for greater transparency and investor protection, while opponents cite concerns about the regulatory burden it may impose on businesses.

Political corruption remains a major concern in governments worldwide. Previous studies in economic literature have demonstrated that political corruption leads to increased market inefficiencies and impacts the decision-making processes of companies. Firms must weigh the costs and benefits of ESG practices. Voluntary ESG practices can offer various advantages to companies, such as enhancing their reputation, improving profitability, reducing capital costs, creating corporate value, fostering customer loyalty, and increasing employee satisfaction. In areas characterized by high levels of corruption, businesses face elevated costs associated with operating under the uncertainty linked to corrupt practices.

The findings of the study reveal that political corruption has a harmful impact on corporate sustainability reporting activities. Further analysis reveals that this negative impact is more pronounced in companies with stronger ESG disclosure practices and disappears in companies with very low disclosure scores. Whether a company discloses information about sustainable development, voluntarily or otherwise, is influenced by the level of corruption within the local government. With the global shift towards a low-carbon economy, carbon control policies present both opportunities and risks for specific industries. The research paper provides evidence that the adverse impact of corruption on corporate ESG disclosure is more pronounced in companies facing higher carbon-related risks.

The paper provides the following recommendations to regulators. Enhancing the quality of institutions is crucial to encourage voluntary ESG disclosure at the firm level. Additionally, strengthening enforcement and penalties for corruption should be a top priority, as changes in the political landscape have limited impact on the relationship between corruption and voluntary ESG disclosure by US firms. The US is a significant contributor to global carbon

emissions, it's important to establish monitoring systems to detect and minimize the negative effects of corruption on ESG disclosure, especially among heavy-polluting firms. This will promote sustainability goals by preventing bribery and lobbying by such firms to corrupt officials. The widespread presence of political corruption worldwide may make it challenging to effectively eliminate it. Therefore, in addition to improving institutional quality, making ESG disclosure mandatory for US-listed firms is highly recommended. This measure can help mitigate the impact of corruption on corporate ESG disclosure and advance sustainable development goals.

3. Theoretical Background – Signaling Theory

Spence's views are widely accepted, with several papers in this field of research being based on Spence's theory as their basis, Boelders (2020), Seele and Gatti (2017), Walker and Wan (2012) and Connelly (2011). In recent years, companies are becoming increasingly aware of the importance of how they communicate with the external world about themselves.

A theory called signaling theory originated from an article written by Spence in 1973. This concept is informed by the concept of information asymmetry, which is a central concept in information economics. It is a theory that explains situations of strategic interdependence where an actor is trying to persuade another actor of a fact they do not know or are uncertain about in order to gain a competitive advantage.

As it applies to corporate green communication, signaling theory emphasizes the role of communication as a strategic tool for organizations in order to effectively communicate green ideas. Asymmetric information is the basis of the discussion, in which the organization (the signaler) and its stakeholders (the receivers) have different levels of knowledge in relation to the organization.

According to Seele and Gatti (2017), both high- and low-performing organizations can benefit from signaling their commitment to green issues. The expected legitimacy gain motivates organizations even with low performance levels to signal false messages. As a result, stakeholders recognize that it is difficult to differentiate between substantive (real) and symbolic (mere signaling) values when it comes to green communication.

False green communication, as a signaling strategy, is highly successful due to the information asymmetry that results from it. According to the study, the scientific knowledge underlying claims concerning the environment can often be complex and unpredictable and is subject to change on a regular basis. As a consequence of this complexity, it is sometimes challenging for the general public to fully comprehend the messages that organizations are conveying to them. (Connelly et al. (2011), Spence (1973))

Asymmetry between organizations and stakeholders can lead to the use of false green communication as a signal of positive environmental behavior due to the asymmetry of information available to each of them. As a result, stakeholders may have a hard time identifying the real motivations and values behind corporate messages that are expressed publicly.

The concept of symbolism and 'green talk' are introduced as effective methods for businesses to appear committed to environmental issues by engaging in symbolic action or 'green talk'. (Walker and Wan, 2012) This strategy can be described as one of the most effective ways to signal to corporate stakeholders the corporation's commitment to environmental and social sustainability. In accordance with the theory of signaling, even when the organization has no specific values, implementing green communication can be an effective way to show their commitment.

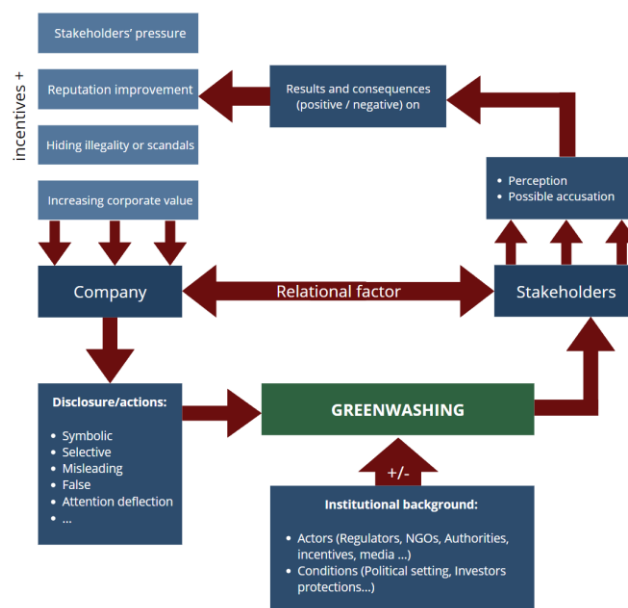


Table 3 - Greenwashing: a conceptual vision (compiled by author based on Bernini and La Rosa (2023))

4. Research Design

4.1. Review of Database

A variety of data providers are involved in the building up of the database. The MSCI World Index was chosen as the universe of this research, which was also chosen by Yu et al. (2020) for their study as the universe of their research. It is a broad universe index that provides a good representation of the capital market and has a broad universe of securities. Since the availability of companies included in the MSCI World Index is limited among data providers, the iShares MSCI ACWI ETF tracks the MSCI World Index created by Blackrock. There were 2352 companies in the MSCI ACWI ETF at the beginning of October 2023.

In order to carry out an empirical analysis of the database, data cleaning was carried out, after which the universe under study included 1949 companies. The period under study is from 2018 to 2021, during which companies will start to pay significant attention to sustainability reporting and corporate social responsibility.

As can be seen from the dataset, there is a diverse distribution of companies across a variety of sectors. According to the data, the Financials sector dominates the dataset, accounting for 17 percent of the total, followed by Industrials at 14 percent and Technology at 11 percent, respectively. Consumer-oriented sectors such as Consumer Discretionary and Consumer Staples also hold significant shares, each comprising 10 percent and 8 percent respectively. There is a noticeable presence of the Healthcare and Materials sectors at 8 percent and 10 percent, respectively. As opposed to this, the Communications and Utilities sectors each have a relatively smaller representation of 6percent. Compared to the other sectors, the Real Estate sector has the smallest share, accounting for just 5.4 percent of the total, while the Energy sector accounts for 4.7 percent. In general, the dataset represents a remarkably diverse landscape of industries and provides a good understanding of the distribution of companies across these various sectors.

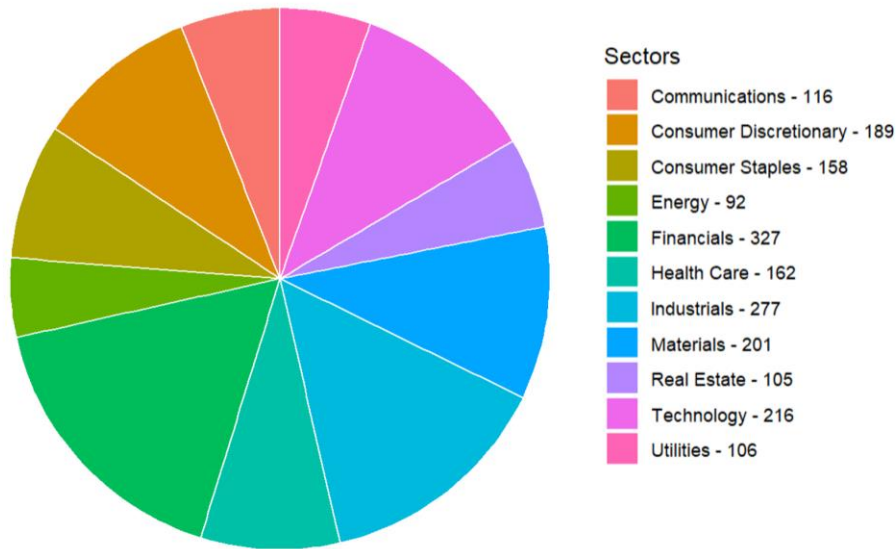


Table 4 – Distribution by Sector (compiled by the author)

As shown in the chart below, there is a noticeable difference in the distribution of companies across countries based on the data of the country-by-country distribution chart. Using this dataset, it has been found that there is a distribution of companies throughout the world, with notable concentrations centered around key economic hubs. There is no doubt that Japan stands out as a major contributor to the developed Asia Pacific region, while China dominates the emerging Asia Pacific region. A significant number of North American companies are based in the United States, which dominates the North American region. Germany is considered to be one of the most influential countries in Western Europe. In the region of Latin America and the Caribbean, Brazil is one of the largest players. There is a wide range of diversity in the Middle East and Africa, with South Africa, Saudi Arabia, and Israel taking the lead.

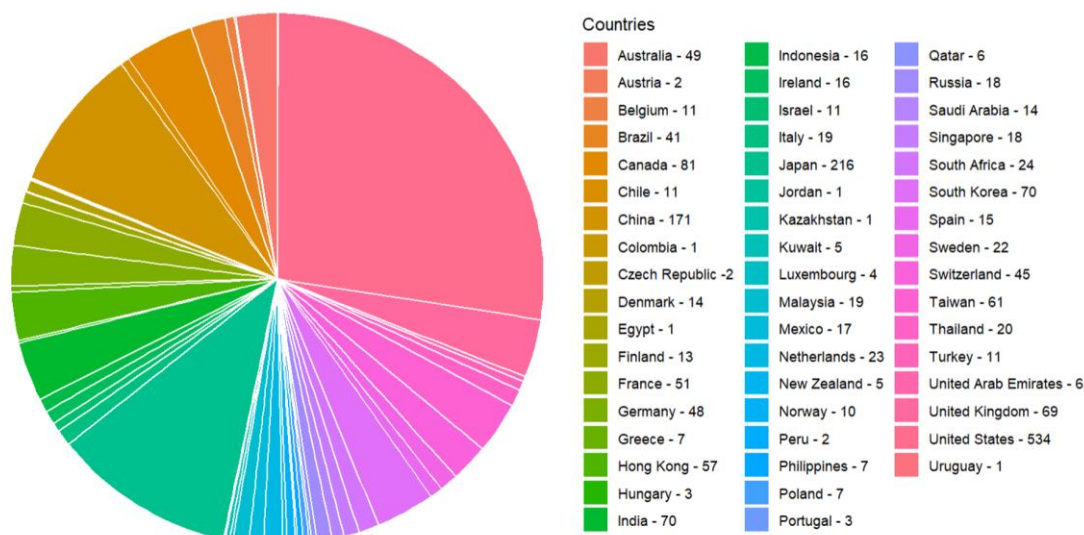


Table 5 - Distribution by Country (compiled by the author)

In this study, the following variables were considered to be included in the analysis. Variables were selected for analysis based on the literature review.

In this study, the dependent variable is the greenwashing score, which is calculated according to the method developed by Yu et al. (2020). Based on the ESG Disclosure score that is provided by Bloomberg and the Reuters ESG score, the method is implemented as follows. The study defines 'greenwashers' as companies that *'seek to create a very transparent public image by revealing large quantities of ESG data but perform poorly in ESG aspects.'*

The ESG disclosure score is a measure of the amount of environmental, social and governance reporting published by companies. The scores range on a scale from 0.1 to 100. Companies that do not share ESG-related reports receive a score of 0 in the ESG disclosure score. Companies for which Bloomberg does not have the relevant information are also assigned a score of 0.

As reported by Reuters, the ESG score represents the relative performance of a company based on its performance on the E, S and G criterion. The ESG score ranges from 0 to 100, with higher scores showing greater performance, while lower scores indicate lower performance.

In order to calculate the peer-relative greenwashing score, the ESG Disclosure Score and the ESG score have to be normalised before the greenwashing score is calculated:

$$\text{ESG Disc}_{\text{stand.}} = \frac{(D_{jkt} - \bar{D})}{\sigma_D} \quad (1)$$

The Equation (1) is the normalized measure of Bloomberg ESG disclosure score, where: D_{jkt} is the ESG Disclosure score company j of country k in year t , and the average ESG Disclosure score is $\bar{D}$ and σ_D is the standard deviation of ESG Disclosures score.

$$\text{ESG Perf}_{\text{stand.}} = \frac{(P_{jkt} - \bar{P})}{\sigma_P} \quad (2)$$

The Equation (2) is the Normalized measure of Reuters ESG performance score, where:

P_{jkt} is the ESG score company j of country k in year t , $\bar{P}$ is the average ESG score and σ_P is the standard deviation of ESG score. The Equation (3) is the greenwashing score, which shows the unadjusted value.

$$\text{GW score} = \text{ESG Disc}_{\text{stand.}} - \text{ESG Perf}_{\text{stand.}} \quad (3)$$

Peer-relative GW score $_{jkt}$ = A peer-relative greenwashing score for a company j of country k in year t , which measures the magnitude of firms' greenwashing behaviour in ESG dimensions (4)

Yu et al. (2020) concluded that the greenwashing scores of comparator companies are highly industry-dependent based on their peer-relative methodology. A company's greenwashing score is adjusted by subtracting the average greenwashing score of the sector in which the company operates. Accordingly, the results can be interpreted as follows: if a company has a positive score on the GW, then the score indicates that the company engages in greenwashing. There is a possibility that by disclosing huge amounts of data on ESG issues, the company is covering up its low performance on ESG issues. Companies with negative greenwash scores undervalue their environmental performance. According to research by Fisher-Vaned and Thorburn (2011),

environmental qualification and corporate social responsibility programs negatively impact stock prices.

This model includes the following explanatory variables. The operating firm performance represented by return on asset (ROA) indicates how profitable a company is in relation to its total assets, expressed as a percentage. Return on assets gives a picture of how efficiently management is using its assets to generate earnings. The firm size is the book value of the asset which is the total of all short and long-term assets as reported on the Balance Sheet. Leverage ratio in percentage that defines the total amount of debt relative to assets. The board size is the number of individuals who serve on the board that oversees the company's activities and management.

The Corruption Perceptions Index (CPI) is a tool developed by Transparency International to measure the perceived level of corruption in countries around the world. A variety of data sources are used to examine different aspects of public sector corruption. There are several sources that assess such phenomena as bribery, misappropriation of public funds, and the use of positions for personal gain by officials without consequences. CPI also evaluates the effectiveness of governments in combating corruption, bureaucratic obstacles that facilitate corrupt practices. (Transparency International, 2023) There is a scale from 0 to 100, where 0 represents highly corrupt countries, while 100 represents clean countries. New Zealand and Finland received 88 points because they are considered clean countries, while Mexico and Russia have 28 points due to their highly corrupt governments.

The other corruption measure is coming from the Freedom in the World. Freedom House uses a scoring system from 1 to 7 to assess the level of political rights and civil liberties in countries around the world. Countries with a score of 1 or 2 fall into the "free" category, indicating open political competition, respect for civil liberties and independent media. Countries with a score between 3 and 5 are classified as "partly free", which means limited political rights and civil liberties, often restricted by factors such as government repression or corruption. Finally, countries with a score between 5 and 7 are classified as "not free", characterized by severe restrictions on political rights and civil liberties, often associated with authoritarian regimes and censorship. These scores are based on an assessment of various indicators and are used to classify countries into one of three broad categories: Free, Partially Free, or Not Free. (Freedom House, 2024)

In the Human Development Index (HDI), three main dimensions are taken into consideration when measuring the development of a country. These three dimensions are health, education, and standard of living. Based on life expectancy, educational attainment, and level of income in a country, the index provides a snapshot of the average achievements in these areas. It is based on information provided by the United Nations.

The other national welfare indicator is GDP per capita, which provides very long-term information on economic growth and income levels. It was provided by the World Bank. In a country, the index provides a snapshot of the average achievements in these areas. It is based on information provided by the United Nations. The other national welfare indicator is GDP per capita, which provides very long-term information on economic growth and income levels. It was provided by the World Bank.

Variable	Proxy	Measurement	Source
Greenwashing Score	ESG Disclosure Score ESG Score	calculation based on Yu et al. (2020)	Bloomberg Reuters
Operating Firm Performance	Return on Asset	net income/ total assets	Bloomberg
Firm Size	Book Value of Asset	total short and long-term assets	Bloomberg
Leverage	Debt / Total Asset	total debt * 100 / total assets	Bloomberg
Country factor	Corruption Scale	0-100 scale	Transparency International
	Freedom Scale	1-7 scale	Freedom House
Total Board Size	Board Size	number of board members	Bloomberg
National Well-being	Human Development Index	0-1 scale	United Nation
	GDP per capita	US dollar per capita	World Bank

Table 6 - Description and measurement of variables (compiled by the author)

Sectors	St. Dev	Mean	Min.	Max.
Communications	0.73	(0.149)	(1.98)	2.06
Consumer Discretionary	0.84	(0.047)	(2.6)	3.07
Consumer Staples	1.02	(0.029)	(3.05)	3.77
Energy	0.62	0.416	(1.98)	1.69
Financials	0.76	(0.398)	(2.74)	2.91
Health Care	0.8	(0.163)	(2.16)	3.39
Industrials	0.88	0.101	(2.36)	3.74
Materials	0.85	0.397	(2.76)	2.81
Real Estate	0.84	(0.123)	(2.06)	3.98
Technology	0.85	(0.065)	(3.6)	2.58
Utilities	0.95	0.622	(2.57)	3.98

Table 7 – Descriptive statistics - greenwashing score by sector (compiled by the author)

Sectors with negative GW scores, such as Communications, Consumer Discretionary, Consumer Staples, Financials, Health Care, Real Estate, and Technology, suggest a lower likelihood of greenwashing practices. On the other hand, sectors with positive GW scores, including Energy, Industrials, Materials, and Utilities, may have a higher likelihood of engaging in greenwashing activities.

As a result of a combination of regulatory frameworks, consumer expectations, industry standards, and sector-specific challenges, greenwashing practices vary across sectors. Greenwashing is likely to be more scrutinized and penalized in sectors with strict regulations. Regulations in industry like Financial may become more and more strict and require transparency and accuracy in disclosures, reducing greenwashing. (KPMG, 2022) To greenwash products and services, consumer awareness and demand are important factors. There is likely to be a great deal of pressure on sectors that have highly informed consumers and who are environmentally conscious to make genuine sustainability efforts. Consumers in sectors such as Communications and Technology tend to be more technically savvy and socially aware. Environmental standards and certifications have been introduced in some sectors, helping to distinguish genuine sustainability efforts from greenwashing. The ISO 14001 environmental management system certification may apply to the energy sector, for instance. (QAS International, 2023) By providing transparent performance measures, greenwashing practices can be reduced. Each sector faces unique environmental challenges and opportunities. There may be an increasing focus on environmental impacts and carbon emissions in the energy sector, particularly fossil fuel-based industries.

The corruption map (Table 8) was prepared by looking at the average CPI score for each country. The minimum score of 28.75 for Russia and the maximum score of 87.75 for Denmark. Using the calculated range, the countries of the universe under study were divided into three groups in order to further categorize them. For example, Brazil received a score of 36.5, China received a score of 41.75, and Jordan earned a score of 48.75 in the category of countries with higher perceived corruption levels. On the middle scale of perceived corruption, the Czech Republic scores 55.75, Israel scores 60, and Taiwan scores 65.25. In the category of countries with lower perceived corruption levels, scores like 75.75 for Austria, 77.25 for Canada, and 87.75 for Denmark stand out.

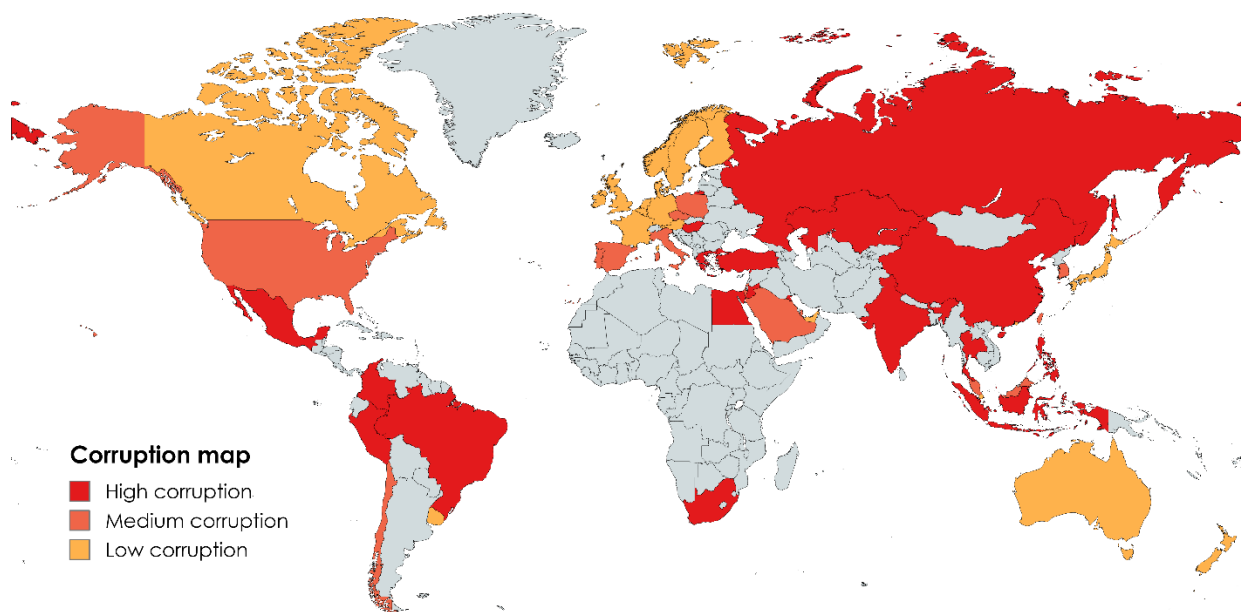


Table 8 – Corruption map (compiled by the author)

Human Development Index (HDI) maps (Table 9) are created by analyzing the average HDI scores of each country, with India's HDI score of 0.641 being the lowest, and Norway's HDI score of 0.96075 being the highest. The study universe was categorized into three parts based on the range of countries that were included in the study. According to the HDI score category, countries such as India, Egypt, and Indonesia are among the countries that have scores ranging from approximately 0.640 to 0.737. In the medium HDI score category, nations such as Brazil, Mexico, and Thailand have scores ranging from about 0.760 to 0.838. There are several countries within the high HDI score category including Norway, Australia, and Switzerland. The scores of these countries are above 0.900, which indicates that they have attained a high level of human development.

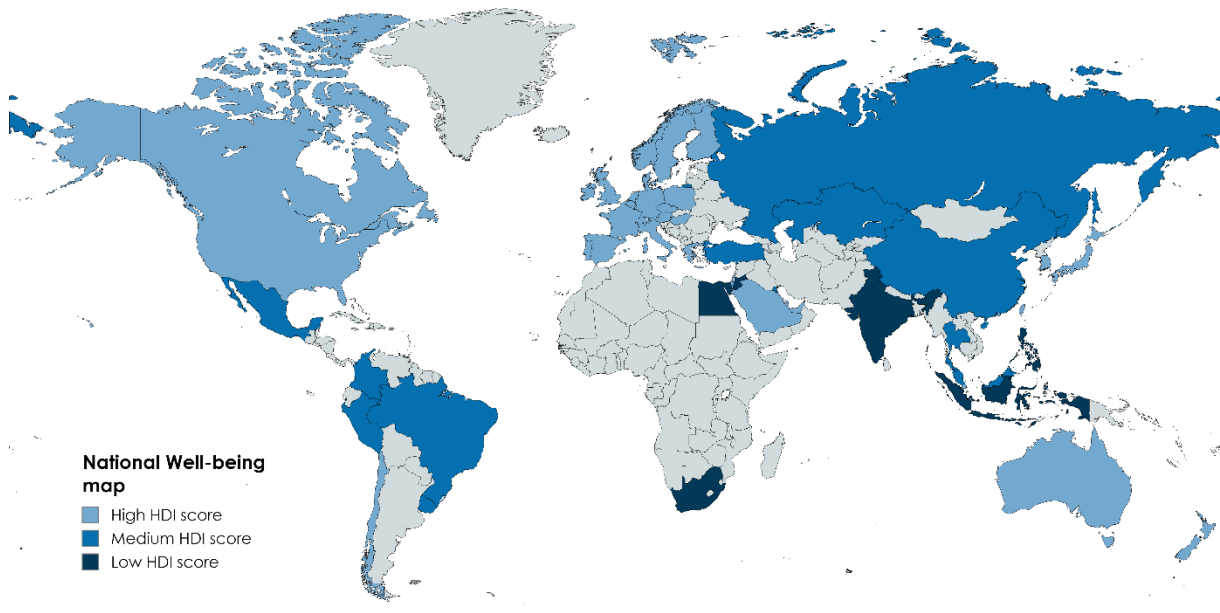


Table 9 - National well-being map (compiled by the author)

According to the below table (Table 10), the data are presented in terms of the number of mean, standard deviation, median, as well as the minimum value and maximum value.

Variables	Variables	Mean	St.Dev.	Median	Min.	Max.
Greenwashing Score	GW Score	0.00	0.84	(0.04)	(3.6)	3.98
Operating Firm Performance	Return on Asset	5.81	7.86	4.34	(113.05)	95.34
Firm Size	Book Value of Asset	7 076 105	63 912 634	56 283	241	1 725 611 128
Leverage	Debt / Total Asset	26.77	19.61	24.86	0,00	389.2
Country factor	Corruption Scale	23 559	45 518	69	28	88
	Freedom Scale	2.36	1.92	2.00	1.00	7.00
Total Board Size	Board Size	10.59	2.95	10,00	0,00	24,00
National Well-being	Human Development Index	0.89	0.08	0.92	0.63	0.96
	GDP per capita	42 976	23 165	43 671	1 913	133 712

Table 10 – Descriptive statistics (compiled by the author)

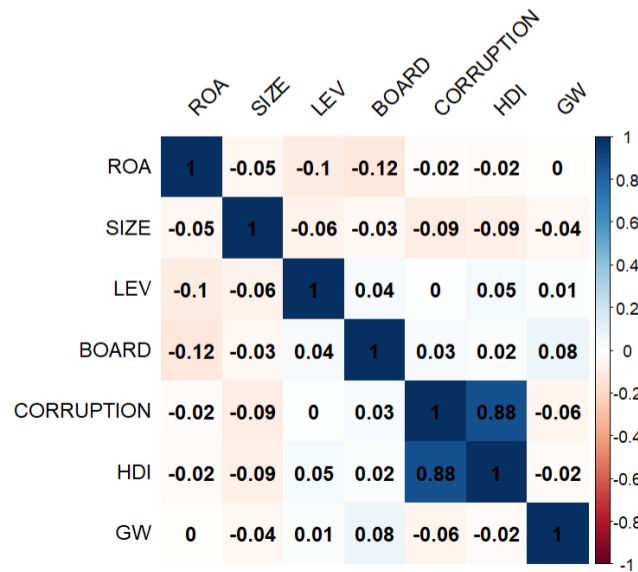


Figure 1 - Pearson correlation matrix (compiled by the author)

The Pearson correlation matrix in Figure 1. represents the strength and direction of the associations between different variables. The correlation coefficient between Corruption (CORRUP) and the Human Development Index (HDI) is approximately 0.88, suggesting a very strong positive association. The relationship between SIZE and both Corruption (CORRUP) and HDI is slightly negative (correlation coefficient -0.09), indicating an inverse relationship between firm size and levels corruption. Additionally, we note weak positive associations (correlation coefficients ranging from 0.08 to 0.01) between various factors such as Board Size (BOARD), Leverage (LEV), and Greenwashing score (GW), indicating relatively weak but still discernible positive relationships between these variables. Finally, the correlation coefficients for Return on Assets (ROA) with other variables range from weak to moderate, indicating varying degrees of association between ROA and the other factors under consideration.

4.2. Research Questions and Hypotheses

According to Seele and Gatti (2017), the term "greenwashing" lacks a universally agreed-upon definition, presenting a complex concept that can be interpreted differently depending on the involved actors. As a consequence, legislators and regulators have difficulties in governing and punishing companies in the greenwashing industry effectively and efficiently.

There are significant gaps in the literature regarding the sectoral and regional focus of the study of green misery. This gap highlights the importance of understanding how different industries and geographical regions approach and contribute to greenwashing practices. While micro-variables certainly play a role in influencing greenwashing behavior within firms, it is essential to acknowledge the influence of macro-variables as well. These macro variables include wider economic, political, and social factors that can shape sustainability reporting and greenwashing initiatives. Over the period analyzed, there has been a notable shift in companies' priorities toward increasing sustainability reporting efforts. This shift can be attributed to increasing pressure from stakeholders, including consumers, investors, and regulators, for greater transparency and accountability of environmental practices. Consequently, companies have been forced to place increased emphasis on sustainability reporting as a means of managing their reputation and maintaining stakeholder confidence.

In the next section, the research questions and hypotheses are presented. As a result of analyzing the literature, the research questions and hypotheses for the study were developed.

There is a research study that has been published by Yu et al. (2020) which examined the extent to which a country's political corruption contributes to the extent to which corporate greenwashing occurs in that country. Hoang (2022) studied the effects of political corruption on corporate sustainability reporting activities. As a part of my thesis research, I am interested in how political corruption affects the greenwashing of companies. The studies show that in countries that have high levels of corruption, companies are more likely to engage in greenwashing in order to gain a competitive advantage. The corresponding hypothesis is as follows:

H1: Firms will engage in less ESG greenwashing behavior in countries where corruption is low.

Study by Husted (2005) indicates that economic development contributes to environmental sustainability. In advanced economies, people are better informed and therefore demand companies to conduct themselves environmentally and socially responsibly. Studies have shown Chapple and Moon (2005) and Cheng et al. (2012) that the differences in the social performance of firms in different countries are not entirely due to the level of economic development. A research question and hypothesis have been developed based on the literature reviewed above. How corporate greenwashing is affected by national well-being.

H2: Firms will adopt more ESG greenwashing behavior where countries are not that developed.

Based on Yu et al. (2020) research, increased institutional ownership and independent directors can reduce companies' greenwashing behavior. Increased board size does not affect greenwashing behavior. Greenwashing behavior is not affected by board size due to the increased costs associated with a larger board. Larger boards have been found to monitor manager behavior more effectively, however, this can lead to coordination issues between group decision-maker. The research question is the following: Can a larger board reduce ESG greenwashing by companies, and Yu et al. (2020) hypothesis was used in this research.

H3: A greater board size reduces firms' ESG greenwashing behavior, since a larger board size can increase a board's capability for monitoring.

4.3. Methodology and model assumptions

The methodology for this paper was chosen based on studies that were similar to the research questions. The research methodology used in this study was based on studies conducted by Yu et al. (2020), and Hoang (2022). In multiple linear regression, multiple explanatory variables are combined to predict the outcome of a response variable.

The panel regression model is expressed as the following equation:

$$\begin{aligned} \mathbf{GW\ score}_{jkt} = & \beta_0 + \beta_1(\text{operating firm performance})_{jt} + \beta_2(\text{firm size})_{jt} + \\ & \beta_3(\text{leverage})_{jt} + \beta_4(\text{country factor})_{jt} + \beta_5(\text{total board size})_{jt} + \\ & \beta_6(\text{overall national wellbeing})_{jt} + \varepsilon_{jt} \end{aligned} \quad (5)$$

where: β_0 = constant term ; ε_{jkt} = error term; j = company ; k = country ; t = year

As shown in the below figure (Figure 2.), the greenwashing score by sector is plotted. There are several features that can be seen in the next figure as well such as the central tendency, the standard deviation, and potential outliers that can easily be identified. The points above and below the boxplots show the outliers values. As can be observed from the Figure 2., there is no outlier in the Communication sector. Other sectors have a high proportion of outliers, and this needs to be taken into account. The winsorization method was used to handle extreme values.

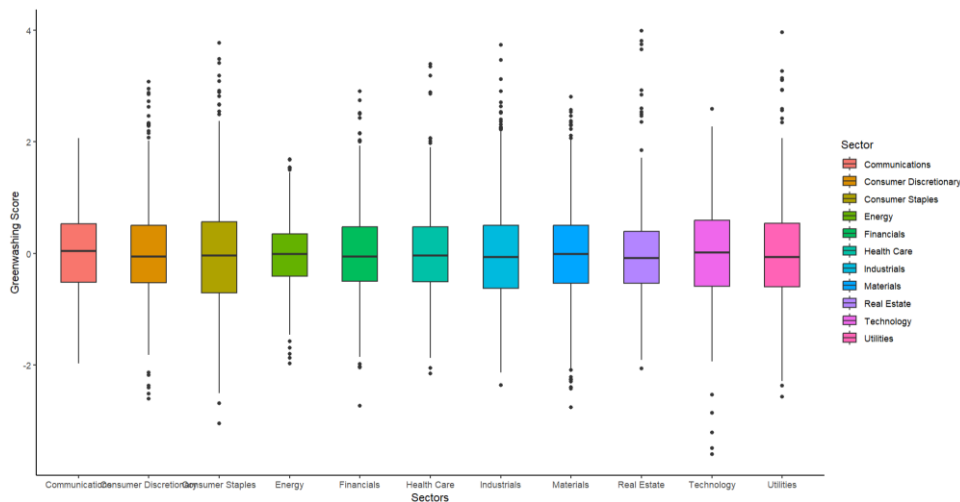


Figure 2 – Sector-specific greenwashing score (compiled by the author)

By winsorizing data, we are limiting the effect of outliers on the calculations and results derived from that data by replacing extreme values. (Bekes & Kezdi, 2021) The winsorized greenwashing scores can be seen on the (Figure 3.) chart.

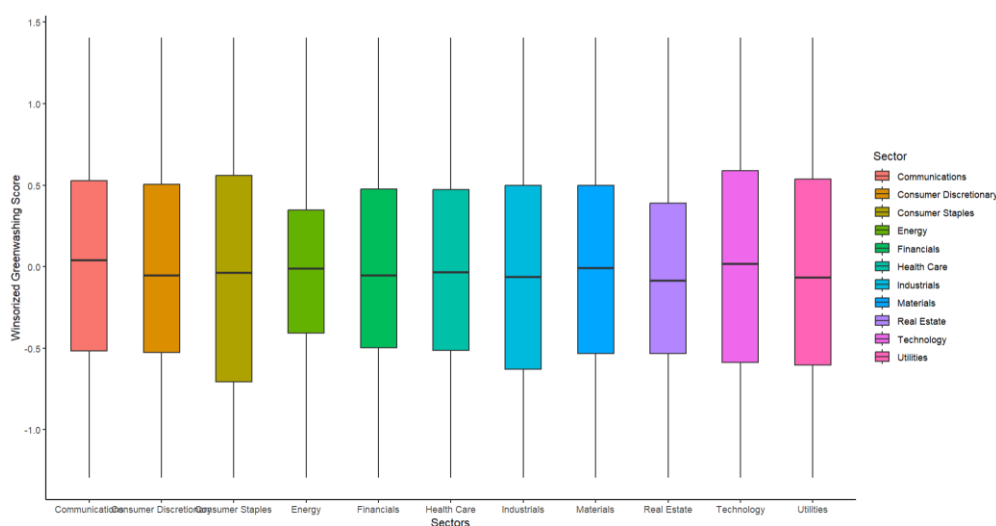


Figure 3 – Winsorized Greenwashing score by sectors (compiled by the author)

There is a nonlinear relationship between the outcome variable and the explanatory variables in the model. Due to this, in order to retain the linear nature of the data model, natural logarithms for the variables firm size, corruption, board size, HDI were used. (Benoit, 2011)

The model has been tested, starting with the homoscedasticity test. For this purpose, the Breusch-Pagan test was applied, a statistical tool used to assess the stability of residual variances in regression models. After performing the test, the obtained p-value of 0.929 at the 0.05 significance level suggests that there is no significant evidence to reject the null hypothesis. This means that the variance of the residuals remains constant, supporting the assumption of homoskedasticity in the regression model.

Data provided were tested for serial correlation in the panel models using the Breusch-Godfrey test. It was very small (p-value 1.187e-06) for the test. As a result of these results, the null hypothesis that there is no serial correlation in idiosyncratic errors is rejected. We conclude, instead, that the residuals of the panel model show strong evidence of serial correlation.

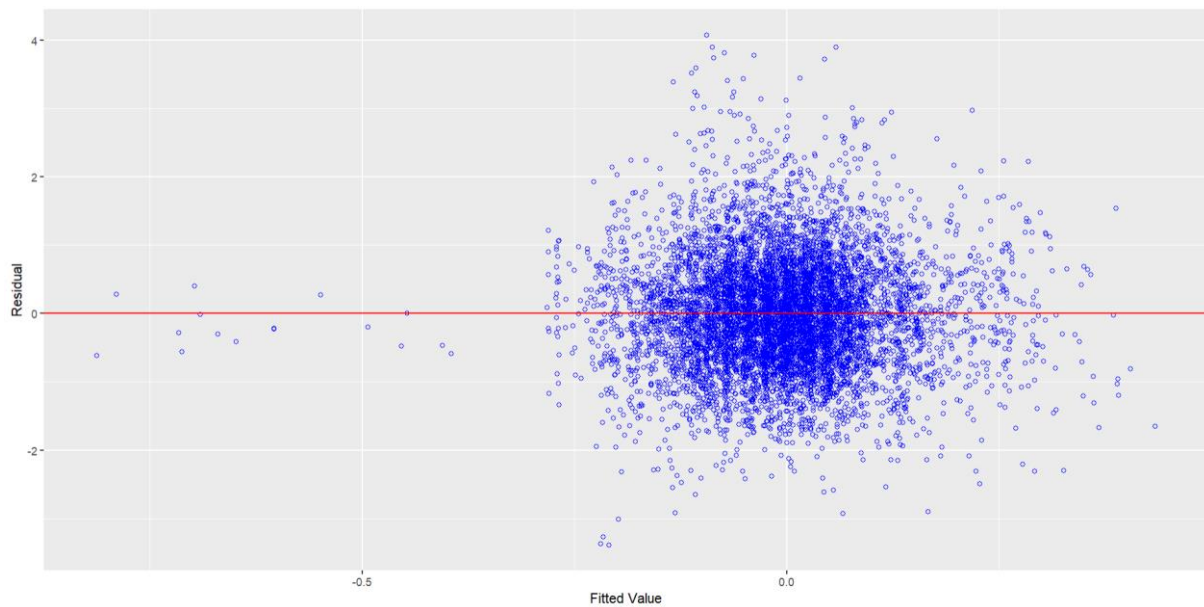


Figure 4 – Residuals vs Fitted Values (compiled by the author)

The next model assumption examined was normality. The skewness value of the residuals (0.372) indicates a slight departure from perfect symmetry, but it remains close to 0, suggesting that the distribution of residuals is approximately symmetric. However, the kurtosis value (4.190) is notably higher than the expected value of 3 for a normal distribution, indicating heavier tails. This suggests that extreme values occur more frequently than in a normal distribution. Visual inspection of the distribution can be found in Figure 5, where the histogram illustrates the shape of the residuals' distribution.

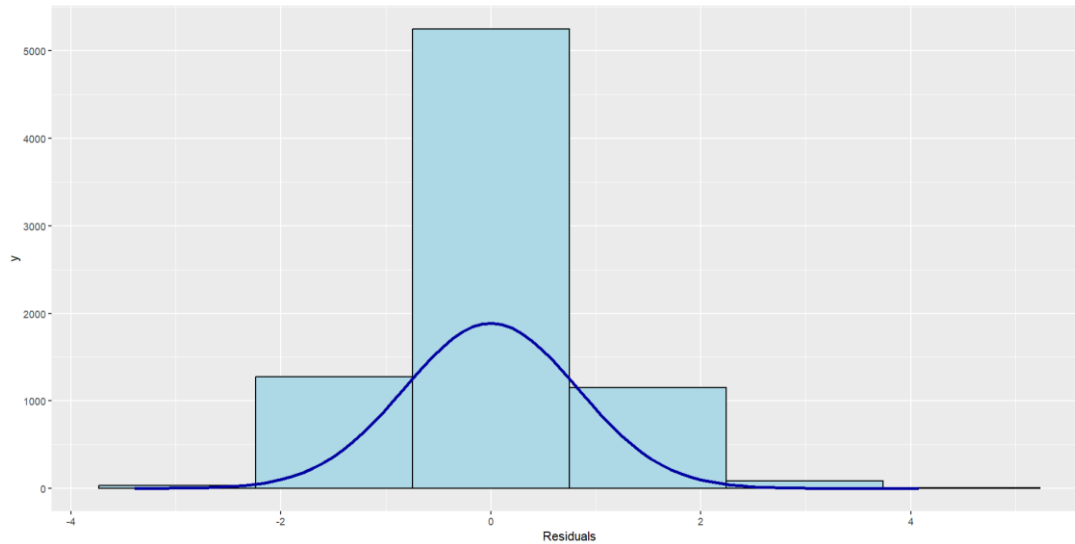


Figure 5 – Histogram of the residuals (compiled by author)

Multicollinearity diagnostics were analyzed for the predictor variables. The tolerance values indicate a high degree of independence between the predictor variables, with all variables close to 1, indicating minimal multicollinearity. In particular, the variables ROA, SIZE, LEV and BOARD show high tolerance values (> 0.97), indicating low intercorrelation. However, the CORRUPTION and HDI variables show much lower tolerance values (0.231), which may indicate some degree of multicollinearity between these predictors. This is also confirmed by the variance inflation factor (VIF) value, which is approximately 4.33 for CORRUPTION and HDI, indicating that multicollinearity may affect their predictive contribution. The other corruption variable and the national welfare variable were also examined and the VIF indicator showed similar results.

Variables	Tolerance	VIF
ROA	0.97	1.03
SIZE	0.98	1.02
LEV	0.98	1.02
BOARD	0.98	1.02
CPI	0.23	4.33
HDI	0.23	4.33

Table 11 – Multicollinearity (compiled by the author)

5. Research Outcomes and Interpretations

This section provides an overview of the findings from the models used in the study. It discusses the interpretation of the results and considers their possible applications in real life. It also provides insights into the changing landscape of greenwashing and sustainability practices, taking into account recent updates and developments in these areas.

5.1. Model results

The following section of the paper presents the model's results. There are 1949 companies in the universe that were considered between 2018 and 2021. Based on the Pearson correlation table as well as the VIF indicator, corruption and national wealth variables were analyzed separately.

NATIONAL WELL-BEING					
Dependent variables	Estimate	Std. Error	t value	Pr(> t)	
Intercept	-0.455	0.076	-6.009	0.000 ***	
ROA	0.001	0.001	1.175	0.24	
SIZE	0.002	0.003	0.638	0.524	
LEV	0.003	0.007	0.476	0.634	
BOARD	0.162	0.027	5.923	0.000 ***	
HDI	-0.206	0.086	-2.387	0.017 *	
Observations	7796				
R ²	0.006				
Adjusted R ²	0.005				
F Statistic	8.605*** (df = 5; 7786)				
Significance levels: 0 '****' 0.001 '***' 0.01 '**' 0.05 '.' 0.1 ' ' 1					

Figure 6 - Results of the national well-being model (compiled by the author)

In this model, the R-squared is also 0.006 as above, suggesting that the independent variables and fixed effects together explain only a small proportion of the change in the greenwashing score.

The intercept term represents the estimated value of greenwashing score when all independent variables are equal to zero. In this case, the intercept is -0.160, and it is statistically significant

at conventional levels (p-value = 0.000). This means that when all independent variables are zero, the greenwashing score is significantly different from zero.

$$GW\ score_{jkt} = \beta_0 + \beta_1 ROA_{jt} + \beta_2 SIZE_{jt} + \beta_3 LEV_{jt} + \beta_4 BOARD_{jt} + \beta_5 HDI_{jt} + \varepsilon_{jt} \quad (6)$$

where: β_0 = constant term; ε_{jkt} = error term; j = company ; k = country ; t = year

β_1 : The coefficient for ROA is 0.001, indicating that a 1 percent point increase in ROA is associated with an increase of 0.001 percent in greenwashing score if all other explanatory variables remain constant.

β_2 : The coefficient for firm size is 0.002, indicating that a 1 percent increase in the firm's book value of asset is associated with an increase of 0.001 percent in greenwashing score, if all other explanatory variables remain constant.

β_3 : The coefficient for leverage is 0.003, indicating that a 1 percent point increase in the firm's debt per total asset indicator is associated with an increase of 0.003 percent in greenwashing score, if all other explanatory variables remain constant.

β_4 : The coefficient for board is 0.162, indicating that 1 percent increase in the board member is associated with 0.162 percent increase in the greenwashing score if all other explanatory variables remain constant.

β_5 : The coefficient of the HDI is 0.206, indicating that 1 percent increase in the HDI is associated with a 0.206 percent decrease in the greenwashing score if all other explanatory variables remain constant.

Based on the results, both the HDI (p value = 0.017) and board (p value = 0.000) variables are statistically significant. Greenwashing is more likely to occur in companies with a large number of board members. The likelihood of a company engaging in greenwashing practices is reduced if it operates in a country with a higher national welfare level.

CORRUPTION					
Dependent variables					
	Estimate	Std. Error	t value	Pr(> t)	
Intercept	0.27	0.158	1.71	0.087	.
ROA	0.001	0.001	0.93	0.353	
SIZE	0.000	0.003	-0.082	0.934	
LEV	0.002	0.007	0.303	0.762	
BOARD	0.166	0.027	6.081	0.000	***
CPI	-0.164	0.032	-5.165	0.000	***
Observations	7796				
R ²	0.008				
Adjusted R ²	0.008				
F Statistic	12.796*** (df = 5; 7786)				

Significance levels: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Figure 7 - Results of the corruption model (compiled by the author)

In this model, the R-squared is 0.008, which suggests that the independent variables and fixed effects together explained only a small proportion of the variation in the greenwash score.

The intercept term represents the estimated value of greenwashing score when all independent variables are equal to zero. In this case, the intercept is 0.270., and it is not statistically significant at conventional levels (p-value = 0.087). This means that when all independent variables are zero, the greenwashing score is not significantly different from zero.

$$GW\ score_{jkt} = \beta_0 + \beta_1 ROA_{jt} + \beta_2 SIZE_{jt} + \beta_3 LEV_{jt} + \beta_4 BOARD_{jt} + \beta_5 CPI_{jt} + \varepsilon_{jt} \quad (7)$$

where: β_0 = constant term; ε_{jkt} = error term; j = company ; k = country ; t = year

β_1 : The coefficient for ROA is 0.001, indicating that a 1 percent point increase in ROA is associated with an increase of 0.001 percent in greenwashing score if all other explanatory variables remain constant.

β_2 : The coefficient for firm size is 0, indicating that a 1 percent increase in the firm's book value of asset is associated with an increase of 0 percent in greenwashing score, if all other explanatory variables remain constant.

β_3 : The coefficient for leverage is 0.002, indicating that a 1 percent point increase in the firm's debt per total asset indicator is associated with an increase of 0.002 percent in greenwashing score, if all other explanatory variables remain constant.

β_4 : The coefficient for board is 0.166, indicating that 1 percent increase in the board member is associated with 0.166 percent increase in the greenwashing score if all other explanatory variables remain constant.

β_5 : The coefficient of the corruption scale is -0.164, indicating that 1 percent increase in the corruption score is associated with a 0.164 percent decrease in the greenwashing score if all other explanatory variables remain constant.

The results indicate that both the board (p value = 0.000) and corruption (p value = 0.000) variables are statistically significant. It is more likely for greenwashing to occur in companies with a large number of board members. Greenwashing is less likely to occur in countries with lower levels of corruption.

5.2 Robustness Tests

The analysis is further strengthened by performing additional analysis in order to ensure the results are robust. There was an analysis of corruption as well as an analysis of the national welfare. In analyzing the national welfare of a country, the HDI variable has been replaced with the GDP variable. This corruption analysis uses the variable FREEDOM instead of the variable CPI as a measure of corruption.

NATIONAL WELL-BEING					
Dependent variables					
	Estimate	Std. Error	t value	Pr(> t)	
Intercept	-0.16	0.134	-1.195	0.232	
ROA	0.001	0.001	1.150	0.25	
SIZE	0.001	0.003	0.263	0.793	
LEV	0.004	0.007	0.52	0.603	
BOARD	0.164	0.027	5.998	0.000 ***	
GDP	-0.025	0.01	-2.598	0.009 **	
Observations	7796				
R^2	0.006				
Adjusted R^2	0.005				
F Statistic	8.816*** (df = 5; 7786)				
Significance levels: 0 '****' 0.001 '***' 0.01 '**' 0.05 '.' 0.1 ' ' 1					

Figure 8 – Results of the national well-being model – robustness check (compiled by the author)

The measure of how well the independent variables explain changes in the dependent variable is the R-square. In the analysis, it measures the proportion of the change in the dependent variable that is explained by the independent variables and the fixed effects in the model. In this case, the R-squared is 0.006, suggesting that the independent variables and fixed effects together explain only a small proportion of the change in the greenwashing score.

The intercept term represents the estimated value of greenwashing score when all independent variables are equal to zero. In this case, the intercept is -0.160, but it is not statistically significant at conventional levels (p-value = 0.232). This means that when all independent variables are zero, the greenwashing score is not significantly different from zero.

$$GW\ score_{jkt} = \beta_0 + \beta_1 ROA_{jt} + \beta_2 SIZE_{jt} + \beta_3 LEV_{jt} + \beta_4 BOARD_{jt} + \beta_5 GDP_{jt} + \varepsilon_{jt} \quad (8)$$

where: β_0 = constant term; ε_{jkt} = error term; j = company ; k = country ; t = year

β_1 : The coefficient for ROA is 0.001, indicating that a 1 percent point increase in ROA is associated with an increase of 0.001 percent in greenwashing score if all other explanatory variables remain constant.

β_2 : The coefficient for firm size is 0.001, indicating that a 1 percent increase in the firm's book value of asset is associated with an increase of 0.001 percent in greenwashing score, if all other explanatory variables remain constant.

β_3 : The coefficient for leverage is 0.004, indicating that a 1 percent point increase in the firm's debt per total asset indicator is associated with an increase of 0.004 percent in greenwashing score, if all other explanatory variables remain constant.

β_4 : The coefficient for board is 0.164, indicating that 1 percent increase in the board member is associated with 0.164 percent increase in the greenwashing score if all other explanatory variables remain constant.

β_5 : The coefficient of the GDP is 0.025, indicating that 1 percent increase in the GDP is associated with a 0.025 percent decrease in the greenwashing score if all other explanatory variables remain constant.

Overall, as can see from the results, the board (p value = 0.000) and GDP (p value = 0.009) variables are statistically significant in the model. It can be assumed that if a company has a large number of board members, it is more likely to engage in greenwashing behavior. In general, if a company operates in a country with a better level of national welfare, this will reduce the likelihood of the company engaging in greenwashing practices.

CORRUPTION					
Dependent variables					
	Estimate	Std. Error	t value	Pr(> t)	
Intercept	-0.519	0.075	-6.892	0.000	***
ROA	0.001	0.001	1.040	0.298	
SIZE	0.002	0.003	0.476	0.634	
LEV	0.000	0.007	0.041	0.967	
BOARD	0.168	0.027	6.214	0.000	***
FREEDOM	0.148	0.016	11.799	0.000	***
Observations	7796				
R^2	0.022				
Adjusted R^2	0.022				
F Statistic	35.311*** (df = 5; 7786)				
Significance levels: 0 '***' 0.001 '***' 0.01 '**' 0.05 '.' 0.1 ' ' 1					

Figure 9 - Results of the corruption model – robustness check (compiled by the author)

In this model, the R-squared is 0.022, which suggests that the independent variables and fixed effects together explained only a small proportion of the variation in the greenwash score.

The intercept term represents the estimated value of greenwashing score when all independent variables are equal to zero. In this case, the intercept is -0.519, and it is statistically significant at conventional levels (p-value = 0.000). This means that when all independent variables are zero, the greenwashing score is significantly different from zero.

$$GW\ score_{jkt} = \beta_0 + \beta_1 ROA_{jt} + \beta_2 SIZE_{jt} + \beta_3 LEV_{jt} + \beta_4 BOARD_{jt} + \beta_5 FREEDOM_{jt} + \varepsilon_{jt} \quad (9)$$

where: β_0 = constant term; ε_{jkt} = error term; j = company ; k = country ; t = year

β_1 : The coefficient for ROA is 0.001, indicating that a 1 percent point increase in ROA is associated with an increase of 0.001 percent in greenwashing score if all other explanatory variables remain constant.

β_2 : The coefficient for firm size is 0.002, indicating that a 1 percent increase in the firm's book value of asset is associated with an increase of 0.001 percent in greenwashing score, if all other explanatory variables remain constant.

β_3 : The coefficient for leverage is 0, indicating that a 1 percent point increase in the firm's debt per total asset indicator is associated with an increase of 0 percent in greenwashing score, if all other explanatory variables remain constant.

β_4 : The coefficient for board is 0.168, indicating that 1 percent increase in the board member is associated with 0.168 percent increase in the greenwashing score if all other explanatory variables remain constant.

β_5 : The coefficient of the corruption scale is 0.148, indicating that 1 percent increase in the corruption scale is associated with a 0.148 percent increase in the greenwashing score if all other explanatory variables remain constant.

The results indicate that both the freedom (p value = 0.000) and board (p value = 0.000) variables are statistically significant. It is more likely for greenwashing to occur in companies with a large number of board members. In countries with high levels of corruption, companies are more likely to engage in greenwashing practices.

	CORRUPTION		NATIONAL WELL-BEING		
	CPI	FREEDOM	HDI	GDP	BOARD
Communications					
Consumer Discretionary	✓	✓	✓	✓	✓
Consumer Staples	✓	✓			
Energy	✓	✓	✓	✓	
Financials	✓	✓			✓
Health Care	✓	✓			✓
Industrials	✓	✓	✓	✓	
Materials					✓
Real Estate			✓		
Technology	✓	✓			
Utilities		✓			

Table 12 - Significant variables by sector (compiled by the author)

In addition to examining the broad universe, the sectors were examined separately as well. The sector for which the variable is significant is indicated in the table by a tick. However, the study also showed that both the corruption variables and the national welfare variables in the Real Estate sector behaved in opposite directions. Thus, the higher the corruption in a country, the more greenwashing behavior companies exhibit. Furthermore, the more developed the countries and the more educated the people, the more likely firms in the Real Estate sector are to greenwash. In the Utilities sector, only the corruption variables, so the higher the corruption in the country, the more greenwashing behavior of the companies. While in the Energy sector, the national wealth variables and the CPI behave in opposite directions. As a result, firms in this sector in developed countries tend to engage in more greenwashing. Greenwashing may also be employed in countries with higher levels of corruption.

5.3. Results interpretations

Considering the results, in less corrupt countries, it is less likely that companies engage in greenwashing practices, so it would appear that the first hypothesis could be true. The results of previous studies confirm this. (Yu et al., 2020, Hoang, 2022). In communities where political rights are well established, individuals and companies have plenty of opportunity to argue in favor of environmental concerns when they reside in such communities. The use of media platforms is one way that people can accomplish this, as well as working with influential environmental organizations and non-governmental organizations. In addition to that, large companies can also take advantage of their political rights in order to strategically publicize their environmental efforts. A number of things may be done in this regard, including lobbying government agencies, emphasizing green branding to gain legitimacy, or engaging in voluntary self-regulation to prevent the imposition of mandatory laws. (Delmas and Montes-Sancho, 2010, Yu et al. 2020)

The second hypothesis is also confirmed, as the results suggest that firms in more economically developed countries are less likely to exhibit greenwashing practices. People in these countries have access to higher levels of education and better access to information. Environmental practices are often regulated and enforced more strictly in developed countries. Environmental issues are more likely to be raised by consumers in economically developed countries and they are more likely to investigate companies' claims about sustainability and environmental responsibility. Economically developed countries tend to have more reliable investigative journalism and are more likely to expose cases of unfriendly littering. As a result of intense competition between companies in economically developed countries, companies tend to differentiate themselves on the basis of their environmental commitment rather than by deceptive greenwashing.

In addition, the third hypothesis, which is that the size of the board has an effect on reducing the company's greenwashing behavior, was not confirmed by the results. Considering that the results of the study are significant, it is assumed that the larger the size of the board of the company, the greater the likelihood of greenwashing taking place. Studies have also shown that large boards can cause groupthink, lack of monitoring, and a greater degree of conflict of interest. (Harjoto and Wang, 2020). Also, Lipton and Lorch (1992) and Jensen (1993) results indicate that boards with fewer members might be more efficient compared to boards with larger

memberships. It is also possible that a larger board may encounter challenges such as free-ride issues, coordination problems between decision-makers, and the need to make decisions more slowly.

The results can also have important implications for investors, informing their investment strategies and decision-making processes. Understanding how companies in different sectors react to different macroeconomic influences is essential to assess investment risks and opportunities. Investors can use this information to identify companies that demonstrate a genuine commitment to environmental responsibility across different levels of corruption and economic development. Furthermore, recognizing the impact of these factors on corporate behavior will allow investors to tailor their risk assessment framework and allocation strategies accordingly.

In the area of greenwashing and sustainability, regulators play a key role in ensuring transparency, accountability, and credibility within corporate environmental practices. By analyzing the results of regulatory efforts, regulators can gain insight into the effectiveness of existing policies and identify areas for improvement. The study also explores how different sectors and companies respond to different macroeconomic impacts within regulatory frameworks. This analysis will highlight the interaction between regulatory actions and corporate behavior and inform regulators' strategies to enhance compliance and enforcement mechanisms. By using this knowledge, regulators can adapt their regulatory approaches to address the specific challenges posed by different socio-economic environments and strengthen their efforts to effectively combat greenwashing.

The anti-ESG movement in investment in the US has risen, driven by concerns that the inclusion of environmental, social and governance (ESG) factors in investment decisions could hold back corporate growth, limit freedom and threaten industries such as oil and gas. This movement has led to a political divide: some states are calling for more detailed sustainability reporting by companies, while others are pushing for legislation restricting the use of ESG criteria in investments. Despite the media attention, the actual impact of anti-ESG measures has been limited and mainly affects some impact funds operating in states with anti-ESG legislation. European investors in US funds have experienced minimal disruption as fund managers have adapted their communications to emphasize the financial benefits of ESG without explicitly

using the term. In the future, the financial sustainability of ESG integration and the need for transparent communication is expected to balance the anti-ESG sentiment. ESG proponents need to simplify their communication and improve sustainability reporting to alleviate sceptics' concerns and facilitate decision-making. Despite the challenges, sustainability remains a growing priority globally, especially in Europe, where it is expected to gain further momentum. (Honkanen, 2024, Winston, 2023)

By introducing the Green Claims Directive (GCD), the European Union strengthens its fight against greenwashing. The deceptive practice of greenwashing occurs when companies exaggerate or misrepresent their environmental efforts to appear more environmentally friendly than they actually are. The demand for sustainable products and services has increased as consumers become more environmentally aware. In order to resolve this issue, the GCD regulates misleading environmental claims made by companies in their marketing and product labels. By creating transparency, it aims to ensure that consumers receive clear information about the environmental impacts and aspects of products, services, and companies. This empowers consumers to make informed purchasing decisions and promotes trust in green products. By 2050, the European Green Deal aims to make the economy sustainable and achieve climate neutrality by implementing the directive. As a result, it contributes to promoting sustainability, facilitating a circular economy, and combating climate change. By addressing greenwashing and promoting genuine sustainability, the GCD aims to create a level playing field for companies and support the transition to a more sustainable and circular economy within the EU. (Bartel, 2023)

6. Conclusion

This research seeks to answer the question of how corporate greenwashing affected by corruption and national wellbeing globally. Also, is there a relationship between the number of corporate board members and corporate greenwashing behavior.

As global awareness of sustainability increases, so does concern about companies involved in greenwashing. The question therefore raises: what are the most effective methods to detect and measure the extent of greenwashing within companies. The paper first explores what legislation and regulators have been established in recent years to monitor and regulate companies' sustainability activities and reporting. In different countries, what regulations have been enacted, and how companies are trying to combat greenwashing activities. In addition, a new phenomenon known as double materiality is introduced, which may carry the risk of greenwashing.

The greenwashing problem is approached from two perspectives. One is that as technology is evolving very rapidly, so is the emergence of the natural language process, which is used to check companies' sustainability reports. The disadvantage of the method is that it cannot check large amounts of content, and researchers check a small number of elements. Like Boelders (2020) looks at companies in the European energy sector, Kang and Kim (2022) examines 23 global leaders, while Lien (2023) studies Norwegian firms.

The other approach is greenwashing scoring methods. Ruiz-Blanco (2021) analyzed US-listed companies using content analysis, while Gil-Cordero et al. (2021) developed a Likert scale questionnaire to investigate Spanish companies. Yu et al. (2020) developed a so-called greenwashing scoring system. This is used in the analysis of this research. There is a growing trend in the literatures that is moving away from micro variables and looking at the macro effects on the greenwashing practices of companies. Yu et al. (2020) and Hoang (2022) focus on corruption and find that the level of corruption in a country also influences the firms.

The research covers a broad universe (MSCI All Country World Index) between 2018 and 2021, when companies are increasingly focusing on the importance of sustainability and its reporting. A panel regression analysis was used in order to examine how the level of corruption in a country affects the greenwashing behavior of companies within that country. Moreover, it appears that the level of development of a country may also play a significant role in the

greenwashing behavior of companies, as suggested by the literature. As part of this study, this issue is also investigated in detail. It is also important to mention that the analysis also focuses on a micro variable, that is, the number of board members of companies that are able to influence their attitude towards greenwashing.

According to the results of the study, companies are more likely to engage in greenwashing if corruption levels are high in a country. It has also been found that in countries with a developed economy and where the people are more educated and have greater access to information, companies are less likely to greenwash in their sustainability reports. The results of the study also indicate that the more members of a company's board there are, the more likely it is that these companies are going to practice greenwashing.

As more and more financial reporting regulations and regulators are put in place to ensure that sustainability reports are controlled, companies are trying to pay more attention to their non-financial reporting requirements. There has also been a movement called anti-ESG which argues that more attention should be given to financial matters than to environmental sustainability issues, as a consequence of this. Aside from this, the European Union has begun to implement the Green Claims scheme in order to combat greenwashing.

There are some limitations associated with this research in terms of data access. It would be interesting to do a future research which would cover a wider universe of companies in the same number of countries. The analysis of the sectors could be explored in more detail. As more and more regulations are coming into force to counteract greenwashing, the time horizon could be even wider.

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