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## **ESG and firms' market value: the moderating role of information asymmetry**

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Master's in Accounting

Supervisor:

PhD Jonas da Silva Oliveira, Assistant Professor  
Accounting Department  
Iscte Business School, Lisbon

July 2023



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## **ACKNOWLEDGEMENTS**

With the completion of this project, I mark the end of my academic journey. It has been the most joyful and challenging years so far, especially the last one, which has been the most demanding and exigent of all, and without some people would have been even harder.

First of all, I would like to thank Professor Jonas Oliveira for accepting me on this journey, and for all the help, advice, guidance and availability to answer all my questions.

To my parents, sister and brother, thank you for all the support during my studies and for always being there to help and challenge me to go further.

To all my friends, who directly or indirectly contributed to the completion of this project. Most importantly, I have to thank my great friend Estrela for all the company, belief, resilience and support during the last year, without her this project would not be possible.

My appreciation for all who supported me,  
Madalena

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## **ABSTRACT**

Over the years, the increased concerns by stakeholders with sustainability matters have led the companies to take action on those matters and disclose their activities in their reports, as a way of improving the perception of stakeholders on them. This research intends to study if ESG reports are value-enhancing the firms' market value, and not just a mechanism of persuasion of the stakeholders. Furthermore, based on agency theory, it will study the moderating effect of information asymmetry on the previous relationship.

For that, information on 353 non-financial companies from the Stoxx 600 Index for the period of 2014 to 2018 was extracted from the Eikon database and resourced to linear regression models to answer the questions in the study. The Firms' Market Value was measured by the natural logarithm of Tobin's Q ratio, the ESG measures through ESG Scores and the Information Asymmetry through the bid-ask spread.

The results show that the disclosure of ESG information has a positive and significant impact on firms' market value. Moreover, when analysing the three dimensions separately, all of them positively affect the Firms' Market Value, but only the social measures do it significantly.

Both ESG measures combined and separated verified that the relationship with the Firms' Market Value is intensified when companies present lower levels of information asymmetry.

**Keywords:** ESG • Firms' market value • Information asymmetry • Agency theory

**JEL Classification:**

M14 Corporate Culture • Diversity • Social Responsibility,

M41 Accounting

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## RESUMO

Ao longo dos anos, a crescente preocupação dos *stakeholders* com matérias de sustentabilidade levou as empresas a tomarem ações nessas matérias e divulgá-las nos seus relatórios, de forma a melhorar a percepção dos *stakeholders* sobre elas. Este estudo pretende perceber se o relato ESG provoca uma melhoria no valor de mercado das empresas, e não é apenas um mecanismo de persuasão dos *stakeholders*. Mais além, baseado na teoria da agência, pretende perceber o papel moderador da assimetria de informação na relação anterior.

Deste modo, informação referente a 353 empresas não-financeiras cotadas no Índice *Stoxx 600*, para o período entre 2014 e 2018, foi extraída da base de dados *Eikon*, e para responder às questões em estudo foram utilizadas regressões lineares. O Valor de Mercado das Empresas foi medido através do logaritmo natural do rácio *Tobin's Q*, as medidas ESG foram representadas pelos *ESG Scores* e a Assimetria de Informação pelo *bid-ask spread*.

Os resultados mostram que a divulgação de informação ESG tem um impacto positivo e significativo no valor de mercado das empresas. Aquando analisadas as três dimensões por separado, concluiu-se que todas impactam positivamente no valor de mercado das empresas, mas apenas a dimensão social o faz de forma significativa.

Tanto as medidas ESG combinadas como separadas verifica-se que a relação com o valor de mercado das empresas é intensificada quando as empresas apresentam menores níveis de assimetria de informação.

Palavras-chave: ESG • Valor de mercado das empresas • Assimetria de informação • Teoria da agência

Classificação JEL:

M14 Cultura Corporativa • Diversidade • Responsabilidade Social

M41 Contabilidade

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## **ACRONYM GLOSSARY**

**⟨IR⟩** – Integrated Reporting

**IRQ** – Integrated Reporting Quality

**CSR** – Corporate Social Responsibility

**ESG** – Environment, Social and Governance

**SR** – Sustainability Reporting

**SASB** – Sustainability Accounting Standards Board

**IIRC** – International Integrated Reporting Council

**CDSB** – Carbon Disclosure Standards Board

**CDP** – Carbon Disclosure Project

**ISSB** – International Sustainability Standards Board

**GRI** – Global Reporting Initiative

**EFRAG** – European Financial Reporting Advisory Group

**CSRD** – Corporate Sustainability Reporting Directive

**IA** – Information Asymmetry

**FP** – Financial Performance

**GDP** – Gross Domestic Product

**UN** – United Nations

**EU** – European Union

**UK** – United Kingdom

**BRICS** – Brazil, Russia, India, China and South Africa

**JSE** – Johannesburg Stock Exchange

**SME** – Small Medium Enterprises

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## 1 INTRODUCTION

Over the years, and with the growing worry of societies on companies' sustainable activities, companies could use Environmental, Social and Governance (ESG) disclosure as a mere façade for their activities, distorting their true performances, and creating a *greenwashed* version of the reality (Fatemi et al., 2018), weakening the relationship between ESG disclosure and performance and the relevance of the information disclosed to investors (Tsang et al., 2023). Furthermore, the lack of standardization of the non-financial disclosures can lead to managers' manipulation of the information disclosed, depending on the interests of the company for that period (Fatemi et al., 2018, Sreepriya et al., 2023), increasing this way information asymmetry between managers and shareholders.

One of the concerns managers have regarding the implementation of ESG measures is if its benefits overcome its costs, which leads to the first question of this study: does the ESG disclosure have a positive effect on the market valuation of a company? The second question aims to the main problem that ESG disclosure still faces nowadays, the heterogeneous extent and quality of the disclosure (Ioannou & Serafeim, 2016, cited by Fatemi et al., 2018) that create different levels of information asymmetry. So, how does this influence the previous relationship?

The main objective of the study is to understand the impact of the disclosure of ESG information on the firm's valuation and understand if the companies with lower levels of information asymmetry benefit more in the previous relationship. The study will follow the analyses of the information asymmetry on the scope of the agency theory, which focuses on the gap of information between managers and shareholders, which would be more appropriate insofar as the impact is measured in the firms' market value.

Managers must weigh if the disclosure of ESG measures has significant impacts on the companies' financial performance, or if it is only a mechanism of persuasion of stakeholders, more specifically, shareholders and external sources of capital. With this study, it will be possible to find evidence to help in this decision-making process.

The present study is organised as follows: *Context and Background* of the non-financial reporting, *Literature review* of studies on non-financial reporting and firms' valuation, the *Methodology* for the present study, and the *Results and Discussion* of the study.

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## 2 CONTEXT AND BACKGROUND

Since the 80's decade, organisations have felt the need to disclose non-financial information in order to complement the financial information disclosed in their annual reports and to help shareholders and external sources of financing in the decision-making process. But one of the problems found with this information was the lack of consistency and guidelines for companies to follow, in order to make the information comparable among organisations. By the 1990s, companies started to adopt the guidelines provided by the Global Reporting Initiative (GRI), an independent organisation (Brooks & Oikonomou, 2018), and until nowadays these guidelines are the most followed (Global Reporting Initiative, 2022) by around 67% of the companies around the world, regarding sustainability reporting (Darnall et al., 2022).

Over the years, several other independent organisations came up with different guidelines for sustainability reporting, the first ones focussing more on environmental matters, such as the Carbon Disclosure Project (currently CDP) and Climate Disclosure Standards Board (CDSB), which extended their focus on carbon emissions to all environmental matters. Other standards setters focus on sustainability, not only of environmental matters but also social and corporate governance, such as the Sustainability Accounting Standards Boards (SASB) and more recently on the full integration of sustainability matters with financial information in a unique document, consistent with a long-term value creation vision, as is the case of the International Integrated Reporting Council (IIRC).

In 2020, the CDP, the CDSB, the SASB and the IIRC joined forces with the International Financial Reporting Standards Foundation (IFRS Foundation) and created the first official sustainability guidelines and standards, the International Sustainability Standards Board (ISSB), which was announced during COP 26, in 2021 (Darnall et al., 2022).

The attention to sustainability matters was brought to the daylight by the United Nations (UN), which had worried about sustainable development in our world, for decades. In 1992, the first summit was held towards the establishment of sustainable action plans, for the 21<sup>st</sup> century, Agenda 21 (United Nations, 1992), that over the years have been developing and adapting on the environmental, social and economic fronts, to what are today the 17 Sustainable Development Goals (United Nations, 2015a) of the 2030 Agenda for Sustainable Development (United Nations, 2015b), adopted by all the UN members, in 2015.

Currently, only Brazil, China, Denmark, Hong Kong, India, Malaysia, South Africa and Europe have laws on mandatory non-financial information disclosure, that varies in their form in each country (Brooks & Oikonomou, 2018).

More specifically, in Europe, the main controller of sustainability matters is the European Union (EU), which establishes objectives that the 27 members must follow, such as the most recent one, the European Green Deal (European Union, 2020). In 2014, the first directive regarding non-financial information was published (Directive 2014/95/EU, 2014), and stated that large enterprises and mother-companies of large groups must disclose non-financial information on policies, risks, environmental and social performance, and measures against corruption and bribe, and respect for the human rights. One of the main critiques of this directive is the lack of a framework to follow, as it was suggested to follow either the IR Framework (IIRC, 2013), the GRI guidelines, the most adopted one, or the Guidelines on Non-Financial Reporting (2017/C 215/01) (2017) and the Guidelines on Non-Financial Reporting: Supplement on Reporting Climate-Related Information (2019/C 209/01) (2019). Another problem that this directive faced was the absence of external confirmation of the information that was presented by the firms.

As a solution for these problems, a new directive was published (Directive (EU) 2022/2464, 2022), also known as the *Corporate Sustainability Reporting Directive* (CSRD), with the main objective of creating a coherent framework of information disclosure in sustainability matters throughout the financial value chain in the EU. In this directive, it was established that all large firms and firms listed in any of the EU-regulated markets, with the exception of micro-enterprises, must disclose sustainability reports in their Management Report, and the information must be audited by external sources, assuring this way the trustworthiness and reputability of the information (Darnall et al., 2022). These sustainability reports shall follow the new guidelines from the European Sustainability Reporting Standards (ESRS) (EFRAG, 2022), published by the EFRAG (European Financial Reporting Advisory Group) (EFRAG, 2001) through the EFRAG Sustainability Reporting Board (EFRAG Sustainability Reporting Board, n.d.), that currently are composed by 12 norms: 2 general norms, that define the general requirements (ESRS 1) and general disclosure (ESRS 2); 5 environmental norms on the climate change (ESRS E1), pollution (ESRS E2), water and ocean resources (ESRS E3), biodiversity and ecosystems (ESRS E4), and resource usage and circular economy (ESRS E5); 4 social norms on the companies' workers (ESRS S1), chain value workers (ESRS S2), community (ESRS S3) and final consumers and utilizers (ESRS S4); and 1 governance norm on business conduct (ESRS G1).

Furthermore, the EFRAG intends to create sector-specific norms for big enterprises, among 41 sectors, a simplified version of the norms for the SME that is in line with the Regulation (EU) 2019/2088 (2019) and an adapted version for the European countries outside the EU.

CSRD will be implemented over the next years, with a defined plan until 2029, divided into 4 phases of implementation: the first phase, regards the reports for the 2024 economic period, for all companies which were already comprehended in (Directive 2014/95/EU, 2014); the second phase, implemented in the following year, will widen for companies that verified two of the criteria, more than 250 workers, the business volume of €40M or the Active of €20M; the third phase will be implemented in 2027 for all listed; and the last phase, for the year of 2029, the directive will be implemented for all European companies that do not belong to the EU, but have net sales in the EU over €150M and at least one branch in the EU that classifies as a big enterprise or listed or with net revenue over €40M. With this implementation, EFRAG expects the number of companies reporting ESG information to quadruplicate, from 11700 to 49000 companies.

The CSRD will combat one of the major problems of non-financial disclosure, the *greenwashing* (Fatemi et al., 2018, Brooks & Oikonomou, 2018, Darnall et al., 2022, Sreepriya et al., 2023) of the information for European countries, as there will be a clear guideline of what information must be disclosed and how, and the information will be comparable, harmonized and more credible between European companies, and also with most of the rest of the world, as the GRI guidelines are the most used ones and the CSRD is similar with them.

## 2.1 Sustainability Report

The growing concern, not only with environmental matters but also with social and economic sustainability made the progression from Environmental Reporting to Sustainability Reporting (SR), which brought the *triple bottom line* term (Brooks & Oikonomou, 2018). The purpose of Sustainability Reporting is to “assist organizations in setting goals and managing change towards a sustainable global economy” (Permatasari & Narsa, 2022, p. 669).

Firms disclose Sustainability Reports for various reasons: a) the increased interest of stakeholders in this information; b) the increased number of laws and regulations of companies’ activities; and c) the importance to show how sustainable activities influence the financial performance, which has made the number of SR increase over the years (Sreepriya et al., 2023).

Recently, the IFRS Foundation published the first set of sustainability-related standards (IFRS Foundation, 2023c), developed under the ISSB, for global homogeneous reporting on sustainability matters. The first standard, IFRS S1, refers to the *General requirements for disclosure of sustainability-related financial information* and has its effective implementation for the economic period starting on the 1<sup>st</sup> of January of 2024 onwards (IFRS Foundation,

2023a). The second standard, IFRS S2, refers to *Climate-related Disclosures*, focusing this way on the disclosure of physical and transitional risks entities are exposed to and available opportunities related to the climate (IFRS Foundation, 2023b).

## **2.2 CSR Report**

Corporate Social Responsibility (CSR) is defined by the World Business Council for Sustainable Development (2002, p.1) as the “commitment of businesses to contribute to sustainable economic development by working with employees, their families, the local community and society at large to improve their lives”.

The increasing interest of stakeholders and shareholders in companies' CSR initiatives in their business practices results in six major determinants of CSR disclosure by companies: “signalling future performance, reputation insurance, reduction in information asymmetry, managerial attributes, demands by stakeholders and disclosure cost” (Tsang et al., 2023, p.8).

The voluntary characteristic of CSR and lack of external verification in most countries makes the disclosure less credible, especially between developed countries, where the private sector highly invests in the disclosure, and emerging countries, where the intervention of governments is needed and corporate policy and social welfare are major problems in these economies (Yoon et al., 2018). This way, the external auditing of these disclosures will increase the credibility of the information and help investors make wiser decisions (Tsang et al., 2023).

## **2.3 ESG Report**

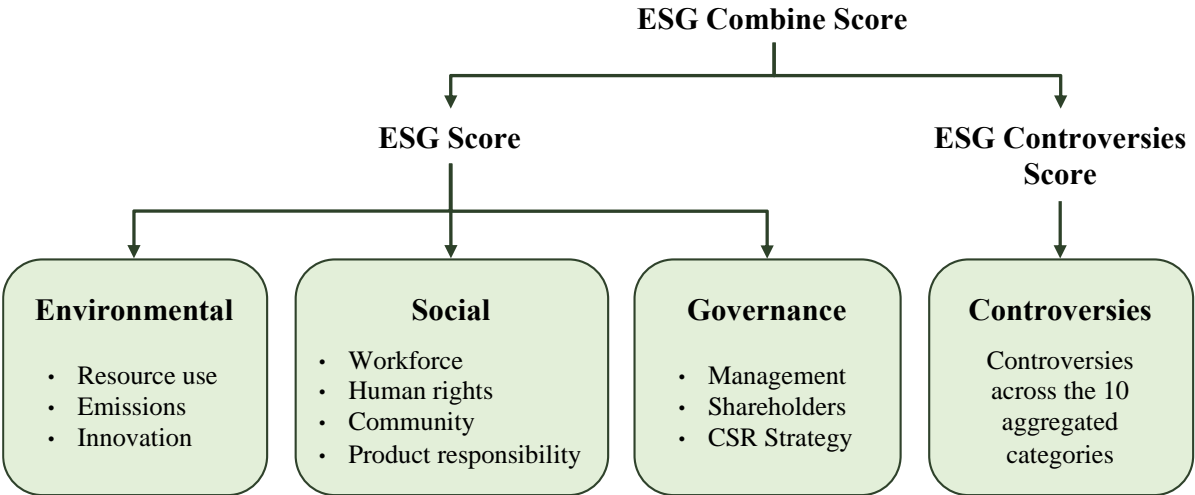
“ESG reporting is the formal disclosure and communication of a firm’s sustainability goals, recognized more specifically as their environmental, social, and governance goals, as well as its progress toward achieving those goals” (Darnall et al., 2022, p.1216).

The environmental dimension of ESG can be defined as the commitment of the company to the optimal consumption of natural resources, the reduction to a minimum of the level of harmful pollutant gas emissions throughout its process chain (Kumar & Shetty, 2018), energy consumption and efficiency, management of waste and pollution and environmental opportunities, such as activities and actions performed by the companies in helping the environment on their societies. The social dimension of ESG focuses on the policies and social welfare within their workforce and the society and where the companies are inserted, the respect for human rights and diversity. Finally, the governance dimension focuses on the board's

independence and diversity, the shareholders’ rights, management compensation and corporate ethics. The ESG materiality categories can be found in Appendix A.

Figure 2.1 shows how the ESG scores are constituted and the categories in each ESG dimension.

**Figure 2.1 - ESG scores constitution**



**Source:** Own elaboration, data from Refinitiv (2020)

Japan is the country that most use ESG reporting, with 31% of the companies disclosing ESG reports being Japanese, as it was the first country to create its own guidelines on ESG reporting, and later started to follow the GRI guidelines in order to be more harmonise with the rest of the world, followed by North America, representing 19% of the companies report ESG information, and Europe with 11% of the companies globally (Darnall et al., 2022).

ESG reporting suffers the same problem as other forms of non-financial reports. As there are no standards, with the exception of the EU, disclosures can vary in content, quality and accuracy (Li et al., 2018, Darnall et al., 2022).

**2.4 Integrated Report**

Integrated Reporting <IR> is the most complete form of reporting, as the financial and sustainability information are comprised in a single report, in an articulated way, with the objective of value creation in the short, medium and long term. With this type of report, the International Integrated Reporting Council (IIRC) intends to improve the quality, relevance and

accountability of the information provided to external sources of financial capital and internal decision-makers.

The IIRC Framework (IIRC, 2013) includes seven guiding principles (strategic focus and future orientation, connectivity of the information, stakeholder relationships, conciseness, reliability and completeness, consistency and comparability and materiality), and eight elements that constitute the <IR> disclosure (organizational overview and external environment, governance, business model, risks and opportunities, strategy and resource allocation, performance, outlook and basis of presentation).

Currently, this type of report is voluntary, except for the listed companies in the Johannesburg Stock Exchange (JSE) in South Africa, since 2010, through the King III requirements, all listed companies in the JSE were mandated to disclose an annual Integrated Report, in an “apply or explain basis”.

Mandatory <IR> and voluntary <IR> have different sources of motivation, and therefore, it can create different results. Since mandatory <IR> is compliance-based managers are forced to provide the information, but voluntary <IR> is motivated by reputational concerns (Obeng et al., 2021), which can result in more comprehensive disclosures as a way of *greenwashing* of negative reputation.

Although similar in the non-financial information provided, SR and <IR> distinguish from each other physically. <IR> is a unique report with financial and non-financial information integrated, structured by its objectives, and focus on the value creation of the integrated information. SR focus on the “long-term benefits with social responsibility and environmental care” (Permatasari & Narsa, 2022, p. 669).

### **3 LITERATURE REVIEW**

#### **3.1 CSR *versus* Firms' Market Value**

Several studies have been held all over the world to investigate the effects of the adoption of CSR measures on firms' valuation and its economic and financial effects depending on the countries and industry in which they operate.

Since 2014, the Indian government legislated mandatory CSR disclosure for all companies that met a set of established criteria, and that they should apply 2% of their profits to environmental and social causes. Furthermore, it was incentivised to “adopt CSR supporting governance structures and external reporting activities” (Panwar et al., 2023, p. 403). Although most of the companies do not comply with the legislation, as there is no penalty for that, they are obliged to publicly explain why. Panwar et al., (2023) saw the opportunity to study how this mandatory regime has been affecting the Indian firms' valuation and concluded that although the regime is not strictly followed, the firms that are comprised in the third criterion, the one that covers more firms and was chosen as a sample, saw a significant higher abnormal return compared to the companies that are not bounded by the regime. On the other hand, it was verified that the value-enhancement was higher for the foreign companies operating in India, rather than the domestic firms. Lastly, they concluded that the mandatory regime benefits more the firms that operate in sensitive industries compared to others, as the value-enhancement in these is stronger, which goes accordingly with the results found by de Klerk et al. (2015) that studied the association of share prices and CSR disclosure in the UK firms operating in sensitive industries compared to other industries.

Another lens that is studied is the effect of the national-level institutions, such as the level of democracy, freedom, commitment to the environment, government administration, investors' protection and regulatory agencies. Cahan et al. (2016) and de Villiers and Marques (2016) concluded that the countries with better national-level institutions disclose higher levels of CSR information. Although de Villiers and Marques (2016) found that when it comes to countries committed to environmental agendas, companies tend to disclose lower levels of CSR information, as it is possible that “management could fear the likelihood of increased environment-related litigation and liability” (de Villiers & Marques, 2016, p. 180). Furthermore, Cahan et al. (2016) concluded that as the national-level institutions increase, the previous relationship becomes weaker, and the same happens for firms with unexpected CSR disclosures, that tend to have higher firm values. De Villiers and Marques (2016) took another approach, studying the effect between the level of compliance with the GRI Guidelines and

European non-financial firms' share prices, and concluded that firms that are more compliant with the guidelines have higher share prices. Firms less compliant with the guidelines, when compared with firms that do not disclose, have lower share prices.

Researchers usually use different metrics to assess CSR disclosure. Some of them opt to use CSR dimensions (Tsai & Wu, 2022; Bouslah et al., 2023) the most common being: community, corporate governance, diversity, employee relations, environment, human rights, and product characteristics. Others opt to use the ESG Scoring metrics, which will be analysed later.

One of the environmental topics that companies more frequently focus on is carbon neutrality, as 137 countries committed to achieving carbon neutrality by 2050, representing around 68% of the world's economy (Xie et al., 2022; United Nations, 2020), but this commitment is negatively perceived by the market, decreasing firms' market value in the short run (Xie et al., 2022), but when analysing the carbon disclosure levels, through CDP Scoring, the market positively reacts to firms with higher levels of disclosure, improving their abnormal returns.

When disclosing structured CSR information, companies can opt to specialize the information or diversify it. Bouslah et al. (2023) studied the impact of different CSR structures on firms' market value, measured by Tobin's Q ratio, and concluded that a structured CSR disclosure positively affects the firms' valuation both before and during the 2007 financial crisis. Moreover, firms with specialized structures insignificantly impact the firms' market value in both periods. But firms with a diversified CSR structure saw a significant impact in the period before the financial crisis and a negative impact during it, which goes accordingly with the results found by Tsai and Wu (2022) that justify the reduction of CSR disclosure, and consequently reduced the impact on financial performance, on the less committed to CSR during a regression, especially with employees. Generally, they found that regardless market conditions, investment in CSR disclosure is value-enhancing, but each CSR dimension reacts differently to market conditions, being the most predominantly during a financial crisis: product, environment and human rights.

### **3.1.1 CSR disclosure through ESG Scoring**

As mentioned before, CSR disclosure can also be measured using the ESG Scorings provided by several databases and measured with several criteria in each of its dimensions.

Xie et al. (2022) concluded that better levels of CSR disclosure led to a better market perception of carbon neutrality, but they found that when measuring the CSR disclosure through



ESG Combined Score the positive association was even more significant, as this proxy is more complex, as it considers the impacts on the environment, social and governance of carbon neutrality, and the CDP Score is a rating that focuses mainly on the environment aspect.

Similarly with the specialized and diversified structures, CSR disclosure can be divided into strategic, when it focuses predominantly on the companies' core business, or secondary, when it expands to other matters not related to the core business. Havlinova and Kukacka (2023) also used the ESG Combined Score to study the effect of CSR disclosure in 486 US companies' financial performance, during the period of 2007 to 2020, and the different impacts depending on the type of CSR disclosure. Overall, the results go accordingly with previous studies, concluding that CSR disclosure has a positive and significant impact on the companies' financial performance after the financial crisis. Regarding the impact depending on the type of CSR disclosure, Havlinova and Kukacka (2023) found that the share prices increase up to 103% more when companies disclose strategic CSR, compared to secondary CSR, and that strategic CSR activities have a statistically higher impact on the share prices of United States' (US) companies than the secondary CSR activities.

### **3.2 <IR> versus Firms' Market Value**

Similar to CSR, studies have been held to investigate the effects of the adoption of <IR>. Many of these studies are conducted in the South African setting, which facilitates the access to larger sample sizes and decreases the managers' self-interest in the <IR>, due to the mandatory regime of <IR>.

As mentioned before, one of the objectives of the <IR> disclosure, but also the non-financial disclosure in general, is the capital allocation efficiency by stakeholders. This occurs due to a more detailed disclosure, which increases the access to information that is publicly available and a better forecast of the companies' performance, as uncertainty about the information is reduced (Li and Kleinman, 2021). With the implementation of the <IR> mandatory regime in South Africa, insurged the possibility to study the relationship between <IR> disclosure and analyst forecasts, both before (Zhou et al., 2017) and after (Bernardi & Stark, 2018) the adoption of <IR>. Zhou et al. (2017) studied the conformity of the level of analyst forecast error and the alignment with the IIRC framework, for the period of 2009 to 2012, for the listed companies in JSE. They found evidence that the alignment with the framework was negatively associated with the analyst forecast error, meaning that the more the companies were aligned

with the framework, the smaller the forecast error was, i.e., more accurate was the forecast. The same conclusion was reached by Bernardi and Stark (2018), from 2008 to 2012, that found evidence that the increased level of ESG disclosure, prior to the implementation of the ⟨IR⟩ regime, also lead to better analyst forecast accuracy. Furthermore, they also studied this relationship post-implementation and concluded that the same relationship was more intense, in particular with the environmental variable, for the non-financial services firms, which are the ones that benefit from the ⟨IR⟩ for a more accurate analyst forecast.

Another effect that researchers studied was the impact of the adoption of ⟨IR⟩ on firms' market value. Once more, the first studies were held with samples from the JSE, where mandatory adoption is applied. Lee and Yeo (2016) were one of the first to study this relationship after the establishment of the mandatory regime in South Africa, and found a positive relationship between the two variables, meaning that higher levels of ⟨IR⟩ disclosure led to better firms' market value, and the benefit exceeded the costs associated with the adoption. Further, they found that the previous relationship was more evident in firms with more organisational complexity and a high need for external financing, especially within the firms with higher levels of ⟨IR⟩ disclosure, as the Information Asymmetry between managers and stakeholders is reduced. Rather than study the simple relationship between the firms' valuation and the level of ⟨IR⟩ disclosure, Barth et al. (2017) extended the prior study to the Integrated Reporting Quality (IRQ), which they defined through the EY Excellence in Integrated Reporting Awards scores and reflect "the relevance, understandability, accessibility and connectedness" (Barth et al., 2017, p.49) of the information disclosed, and the economic consequences, which they divided into capital market and real effects (internal decision-making). Their findings were consistent with Lee and Yeo (2016), as they found a positive association between the firms' market value and the IRQ and concluded that higher levels of IRQ lead to a better knowledge of the firms by the market participants, and so, more accurate forecast of future cash-flows, and more efficient decision-making by the internal participants of the firm. Both studies found evidence that supports the IIRC framework on ⟨IR⟩ disclosure, and encouragement for the voluntary adoption of this type of reporting around the world.

Even though ⟨IR⟩ adoption is currently voluntary, many companies around the world have been progressively starting to adopt this form of disclosure. Obeng et al. (2021, p.2) mention that this "practice is incentivized by the reputational concerns and the economic benefits" of the disclosure of additional information disclosed that reduces the gap between the companies and the stakeholders, also known as the information asymmetry. Obeng et al. (2021) researched

the results in agency cost, with the adoption of ⟨IR⟩, and concluded that firms with higher levels of ⟨IR⟩ presented lower levels of agency costs when compared with firms with lower levels of ⟨IR⟩. They also found that this relationship was more intensified when the companies are inserted in a stakeholder-oriented community when compared with a shareholder-oriented one. The main objective of ⟨IR⟩ is to provide relevant integrated financial and non-financial information to the stakeholders, creating value for the companies, and not necessarily high levels of ⟨IR⟩ resulting in relevant information. In this scope, Cortesi and Vena (2019) studied the value relevance of ⟨IR⟩ disclosure, in 636 companies that voluntarily adopt ⟨IR⟩, in the period from 2003 to 2017, and found that the ⟨IR⟩ disclosure is value relevant for companies, having a positive relationship with its firms' market value, and with the ability to reduce the information asymmetry between managers and stakeholders. Furthermore, this adoption has also a positive effect, on average, on the value relevance of EPS and BVPS of the companies, as the market has more reliable and relevant information on the companies' activities and future prospects. It was able to reduce information asymmetry and increment transparency, especially in companies where, before the adoption of the ⟨IR⟩ disclosure, higher levels of opacity were registered, as are examples the companies originated from the BRICS countries, that show more benefits from the voluntary adoption.

### **3.3 ESG *versus* Firms' Market Value**

Although ESG disclosers are part of ⟨IR⟩, SR and CSR disclosures, it is possible to study the impact of the adoption of ESG measures through the analyses of the ESG Scores. This study aims to investigate the specific association between ESG measures adopted and the firms' market value.

Similar studies have been performed all over the world, with enfaces in Korea (Yoon et al., 2018; Cho, 2022), China (Yu & Xiao, 2022) and Japan (Darnall et al., 2022), as these, are countries with high levels of pollution due to their industrial-focused economy and lack of social and governance policies, and United States (Albitar et al., 2020) and Europe (Li et al., 2018; Velte, 2017) as these look for the legitimisation of their activities. Different conclusions have been found in these studies regarding the effect of the adoption of ESG disclosure, although the most recent ones show a clear trend for the positive effect of ESG disclosure on the firms' market value.

As previously seen, Japan was the first country to create its own guidelines on ESG reporting, between 2001 and 2005, later aligning them with the GRI Guidelines. Instead of studying the effect on firm valuation, Darnall et al. (2022) focus their study on the positive impact of following ESG guidelines and the importance of external verification procedures in the information disclosed credibility. Predictably, firms that followed ESG reporting guidelines tended to disclose 39% more information compared to those who do not follow any type of guidelines, and look for a content-focus verification, rather than process-focus, which was justified by Darnall et al. (2022) for the need to receive feedback from experts on sustainability matters, as opposed to the robust verification from expertise companies. These results show the importance of the creation of ESG guidelines, and sustainability guidelines in general, as companies tend to disclose more information, both in quantity and quality.

Yoon et al. (2018) defend that the study of non-financial disclosure is more value relevant in emerging economies as they face more corporate policy and social welfare implications, which is mitigated in the developed countries by the private sector that promotes the implementation of CSR concerns in its activities. Their study, likewise the study from Cho (2022), focused on the implementation of CSR disclosure, and more specifically ESG measures, in South Korea. Whilst Yoon et al. (2018) studied the market valuation through Ohlson's model, Cho (2022) studied the firms' value through two spectres: accounting-based, using ROA and ROE as dependent variables, and market-based, using Tobin's  $Q^1$  as the dependent variable. Both studies concluded that the combined score of the ESG measures adopted has positive and significant effects on the firm valuation, but in the case of Cho (2022) only for the accounting-based variable, not for the market-based variable. So, it can be concluded that investors positively value the adoption of ESG strategies by companies (Yoon et al., 2018). While Yoon et al. (2018) study the difference between environmentally sensitive industries and other industries, Cho (2022) separated them by sectors, service and non-service. But in both studies, it was concluded that in the different industries/sectors, the ESG measures have different impacts on firms' valuation. Similarly to Cho (2022), in China Yu and Xiao (2022) created a four-tier system to score ESG measures in order to study the effect of ESG disclosure on firms' market value using the two proxies (Tobin's  $Q$  and ROA), and concluded that both variables were positively associated with firms' market value. When studying the effect of each dimension, the market-based proxy showed positive and significant effects between each of the

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<sup>1</sup>  $\frac{\text{Book Value of Assets} - \text{Book Value of Equity} - \text{Deferred taxes} + \text{Market Value of Equity}}{\text{Book Value of Assets}}$

dimensions and firms' market value. The accounting-based proxy showed positive but insignificant effects between the environmental and the social measures and the companies' ROA.

In the United States, Fatemi et al. (2018) studied the impacts of ESG Strengths and Concerns on the firms' value<sup>2</sup> and found similar results to previous studies. Regarding the Strengths, it significantly increases the value of Tobin's Q, and the Concerns have an opposite effect. Overall Fatemi et al. (2018) concluded that ESG disclosure significantly decreased the value of US publicly traded firms, during the period of 2006 to 2011. Firms that disclose more information, tend to mitigate the negative effects of ESG weaknesses and help the ones in need of external financing to show investors a more credible commitment to ESG policies.

Studies in the United Kingdom (UK) and Germany show that the effect of ESG disclosure has had a positive effect on the firms' market value. In the UK case, it was studied the moderating effects of the governance mechanisms (Albitar et al., 2020) and the Chief Executive Officer (CEO) power (Li et al., 2018) in the relationship between ESG disclosure and firms' valuation. Both studies found that the firms' Financial Performance<sup>3</sup> has a positive relationship with the ESG disclosure and that in the companies with higher ESG disclosure levels, the relationship with the financial performance was stronger, as transparency between the firms and stakeholders is improved and firms take more accountability on their activities, enhancing the stakeholders trust on them (Li et al., 2018). The previous results were enhanced after the implementation of the (IR) regime in 2013 (Albitar et al., 2020). Regarding the governance mechanism, Albitar et al. (2020) divided it into three components, ownership concentration, board gender diversity and board size, and concluded that all factors moderate the relationship between ESG disclosure and Financial Performance. Furthermore, Li et al. (2018) concluded that the higher the power of the CEO, the greater the positive relationship between ESG disclosure and firms' market value, reasoning that shareholders find a greater commitment to ESG practices in those firms. The German-listed companies followed a similar trend to the British ones, according to the study performed by Velte, (2017). The three dimensions of ESG disclosure are positively, but not significantly, associated with Tobin's Q ratio<sup>4</sup>, and positively

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<sup>2</sup>  $\frac{\text{Book Value of Assets} - \text{Book Value of Equity} - \text{Deferred taxes} + \text{Market Value of Equity}}{\text{Book Value of Assets}}$

<sup>3</sup> Measured by the Tobin's Q ratio (not specified calculation for Albitar et al. (2020); ratio of the market value of a firm to the replacement cost of its total assets for Li et al. (2018))

<sup>4</sup>  $\text{Tobin's Q} = \frac{\text{Market value of the firm's equity and liabilities}}{\text{Book value of the firm's equity and liabilities}}$

and significantly associated with the ROA, with enfaces for the Corporate Governance score that shows a stronger association with ROA.

As it is possible to see, the literature has concluded different outcomes when analysing the effect of the adoption of ESG measures on the firms' market value, although the most recent studies show a positive association between the two. This way, the first hypothesis of this study is to investigate if the European non-financial companies followed the same trend as other companies regarding the direct relationship between the adoption of ESG measures and the firms' market value. Therefore, the first hypothesis is stated as follow:

*H1. ESG measures are positively associated with the firms' market value.*

### **3.4 Information Asymmetry theories**

Literature enhances three main theories on which researchers can base the study of information asymmetry: legitimacy theory, agency theory and stakeholders' theory. Depending on the variables in the study and the purpose of the information gap that is intended to analyse, the most appropriate theory must be chosen as each one has a different way of measuring it.

The **legitimacy theory**, also a social-political theory, has its concept founded on a social informal contract made between companies and the community in which they are inserted into, meeting its social expectations, and not only the expectations of investors and shareholders (De Villiers & Marques, 2016). The information asymmetry happens in the scope of this theory when the perception that organizations have towards the community expectations is different from the current expectations, and the values of the society are not respected by the organizations (Rouf & Siddique, 2023). Non-financial disclosure reports are used as a way of communicating compliance with the norms of society, especially CSR reports (De Villiers & Marques, 2016).

Rouf and Siddique (2023) characterize the **agency theory** as an economics-based theory that is founded on the different levels of information between management and shareholders. The information asymmetry is caused by management filtering information to shareholders in order to maximize their self-interests (De Villiers & Marques, 2016), creating a misalignment between the interests of managers and shareholders (Obeng et al., 2021). Managers tend to disclose more non-financial information when the prospects of the company appear positive and so the reduction of the information asymmetry will enable the interest in investment from

the investors and prefer not to disclose negative impacts or embezzle them with positive information (De Villiers & Marques, 2016).

The **stakeholders’ theory** is a social-political theory, based on accountability, and based on the pure satisfaction of stakeholders’ interests, in opposite to the investors’ interests as suggested by agency theory. The difference from the legitimacy theory lies in the fact that there is not an informal contract or implied norms from society to follow, but rather the desire from the companies to focus on the creation of value that the stakeholders will live by (Rouf & Siddique, 2023).

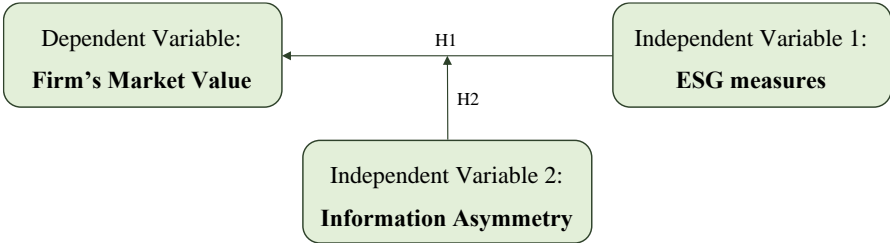
As seen before, Obeng et al. (2021) found that with the adoption of voluntary <IR> in stakeholder-oriented countries there was a reduction of information asymmetry between managers and outside investors, as the mechanism is more effective. Furthermore, Lee & Yeo (2016) found evidence that firms with higher needs of external financing tend to mitigate the agency cost to potential financing sources through higher levels of <IR>, which also results in increasing their firms’ valuation.

With this study it is intended to investigate the moderating role of information asymmetry, through the agency theory, in the relationship between ESG measures and the firms’ market value, hence the following hypothesis:

*H2. The positive relationship between ESG measures and company market value is more intense as information asymmetry levels become lower.*

Figure 3.1 shows, in a graphical perspective, the hypotheses under research, and the relationship between them.

**Figure 3.1 - Relationship between the dependent and independent variables**



**Source:** Own elaboration

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## 4 METHODOLOGY

### 4.1 Database and Sample

This research adopted a quantitative method, as it used quantified data from the financial and non-financial disclosure of the companies in the study and searches the relationship between the Firms' Market Value and the ESG measures (quantified through its scores) and the role of Information Asymmetry in this relationship.

The study is based on the listed companies of the Stoxx 600 Index, and the variables in the study were taken from the *Thomson Reuters Eikon* platform.

The period studied was from 2014 to 2018, a total of five years. This was the period of implementation of (Directive 2014/95/EU, 2014), and to prevent the recent impacts on the economy of Covid-19, and more recently the Ukraine War, in European companies. The sample started with 598 companies, for the five-year period, resulting in a total of 2990 observations (Table 4.1).

Likewise de Villiers and Marques (2016), this study focuses on the non-financial companies listed in the Stoxx 600 Index, as the inclusion of the financial companies, such as banks and financial services institutions, would generate different conclusions due to different characteristics that these companies present. And so, the first step was to deduct all financial and insurance companies in each year, utilizing the filter on the SIC Code 60-69. After this process, the sample ended up with 466 companies and 2330 observations.

The second step was to ensure that the 466 companies left reported non-financial information concerning ESG measures, and so the database reflected that information in ESG Scores (individually or the three dimensions combined). In this stage, 107 companies were eliminated from the sample. Although the majority of these companies by the year of 2017 already reported ESG information, to ensure that the sample is consistent throughout the years, 107 companies were eliminated in the five years.

Thirdly, it was checked that all companies presented values for the second independent variable, the Information asymmetry, measured through the Bid-Ask Spread. It was verified that two companies did not present a value for their information asymmetry.

The last step was to ensure that the remaining 357 companies reported information that enable the calculation of the firms' market value through Tobin's Q methods, having eliminated 4 companies that did not present enough information to calculate their market value.

A winsorization method was applied to the dependent variable (Firms' market value) and the independent variables (ESG Score, ENV Score, SOC Score, CG Score and Information

Asymmetry) at a 90% level, meaning that all observations up to percentile 5 and from percentile 95 were substituted by the value of percentile 5 and 95, respectively. This method was applied to reduce the effects of extreme values and outliers in the sample.

Summarising, the sample for this study is constituted of 353 non-financial companies indexed in the Stoxx 600 Index, as represented in Panel A of Table 4.1, from 2014 to 2018, resulting in 1,765 observations.

**Table 4.1 – Sample composition**

<b>Panel A: Number of companies in the sample</b>			<b>N</b>	<b># of obs.</b>
European Companies in the Stoxx 600 Index			598	2990
Financial companies			-132	-660
Companies do not disclose ESG information			-107	-535
Companies do not disclose IA information			-2	-10
Companies without information to calculate its FMV			-4	-20
<b>Final Sample</b>			<b>353</b>	<b>1765</b>

<b>Panel B: Geographical distribution of the companies</b>					
<b>Country</b>	<b>N</b>	<b>%</b>	<b>Country</b>	<b>N</b>	<b>%</b>
Austria	6	2%	Netherlands	15	4%
Belgium	8	2%	Norway	7	2%
Denmark	14	4%	Poland	3	1%
Finland	12	3%	Portugal	3	1%
France	52	15%	Spain	15	4%
Germany	43	12%	Sweden	29	8%
Ireland	9	3%	Switzerland	32	9%
Italy	11	3%	United Kingdom	89	25%
Luxembourg	5	1%			
<b>Total</b>				<b>353</b>	<b>100%</b>

<b>Panel C: Distribution of the companies per Sector</b>			<b>N</b>	<b>%</b>
10 – 17: Mining and Construction			26	7%
20 – 39: Manufacturing			188	53%
40 – 49: Transportation and Public Utilities			62	18%
50 – 59: Wholesale and Retail Trade			37	10%
70 – 89: Services			40	11%
<b>Total</b>			<b>353</b>	<b>100%</b>

**Source:** Own elaboration, data from Eikon database

The companies are distributed throughout 17 countries, being the United Kingdom the most represented, with 89 companies, followed by France, with 52, and Germany, with 43, the least

represented countries in the sample are Poland and Portugal, with only 3 companies, and Luxembourg, with 5 companies, as it is shown in Panel B of Table 4.1.

In terms of their distribution regarding their industry, the majority of the companies (53%) are designated as *Manufacturing* companies, followed by the *Transportation and Public Utilities* (18%) and *Services* (11%), as represented in Panel C of Table 4.1.

## 4.2 Econometric Model

In order to test the hypotheses formulated before, and based on literature research, two econometric models were designed to study the relationships proposed in the European companies. These econometric models are linear regression models.

To answer the first hypothesis, and test the relationship between the implementation of ESG measures and the Firms' Market Value, the following model was designed:

$$\begin{aligned}
 FMV_{it} = & \beta_0 + \beta_1 ESGS_{it} + \beta_2 IA_{it} + \beta_3 Size_{it} + \beta_4 Profitability_{it} \\
 & + \beta_5 Leverage_{it} + \beta_6 Loss_{it} + \beta_7 Complexity_{it} + \beta_8 GDP_{it} \\
 & + \beta_9 Year\ effects_{it} + \beta_{10} Industry\ effects_{it} + \varepsilon_{it}
 \end{aligned} \tag{1}$$

To support the first hypothesis,  $\beta_1$  must be positive and statistically significant. This model will answer to the significance level of this relationship through the coefficient  $\beta_1$ , which will assume a positive and significant value, and the hypothesis will be proven.

Then, to answer the second hypothesis a new variable was created,  $(IA \times ESG)_{it}$ , and integrated into the previous model to test the relationship between the Firms' Market Value and ESG measures, and the influence of Information Asymmetry in this relationship. This model will, once more, answer to the association between the three variables, and it will sustain if the hypothesis is true if the coefficient  $\beta_1$  is positive and significant, and  $\beta_3$  is negative and significant.

$$\begin{aligned}
 FMV_{it} = & \beta_0 + \beta_1 ESGS_{it} + \beta_2 IA_{it} + \beta_3 (IA \times ESG)_{it} + \beta_4 Size_{it} \\
 & + \beta_5 Profitability_{it} + \beta_6 Leverage_{it} + \beta_7 Loss_{it} \\
 & + \beta_8 Complexity_{it} + \beta_9 GDP_{it} + \beta_{10} Year\ effects_{it} \\
 & + \beta_{11} Industry\ effects_{it} + \varepsilon_{it}
 \end{aligned} \tag{2}$$

### 4.3 Variable definition

The dependent variable, the Firms' Market Value, is measured through the natural logarithm of Tobin's Q ratio<sup>5</sup> (Aouadi & Marsat, 2018). Most studies opt to use this proxy as a representation of the Firms' Market Value, for example, Li et al. (2018) and Fatemi et al. (2018). Other studies, like Cho (2022) use the three proxies that are most used to represent the Firms' Market Value (Tobin's Q, Return on Assets (ROA) and the Return on Equity (ROE)), as dependent variables or as a way of confirmation in their main results (Li et al., 2018).

Regarding the independent variables of the study, the *ESG measures* are quantified using the ESG scores, that evaluate the performance of each of the dimensions, environmental (ENV Score), social (SOC Score) and corporate governance (CG Score), in a scale from 0 to 100, and combines the three dimensions into one score: ESG Score, that is the most simplified proxy, or ESG Combined Score, that adds to the ESG Score the ESG Controversies ("environmental, social and governance controversies and negative events reflected in global media" (Xie et al., 2022, p.56)) and enables the comparison between groups of companies (Havlinova & Kukacka, 2023). Studies in ESG can be measured by ESG performance (Fatemi et al., 2018, Velte, 2017), or through the ESG scores (Albitar et al., 2020, Li et al., 2018), which are a more standardized measure. Concerning *Information Asymmetry*, this will be measured through the Bid-Ask spread, between managers and shareholders. According to the agency theory, it is calculated as the "natural logarithm of the median of daily<sup>6</sup> measured from the day after the release of the prior's year report to the release date of the current year's report" (Barth et al., 2017, p.60).

For the control variables, one of the factors that influence the disclosure is the *Size* of the companies, as concluded by Yoon et al. (2018). The Size variable will be measured through the natural logarithm of the Total Assets.

*Profitability* was measured by the Return on Assets ratio (ROA), calculated as Net Income over the book value of Total Assets. Although some studies use this ratio as a representation of firms' performance (Cho, 2022, Velte, 2017), Li et al. (2018) use it to confirm the results obtained using Tobin's Q ratio, as a representation of the Firms' Market Value. On the other hand, Fatemi et al. (2018) uses the ROA ratio as a control variable and find that ROA is strongly and significantly correlated with Firms' Market Value (measured by Tobin's Q ratio) and that

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<sup>5</sup>  $Ln\left(\frac{BV\ of\ Assets - BV\ of\ Equity - Deferred\ taxes + MV\ of\ Equity}{BV\ of\ Assets}\right)$ ; BV – Book Value; MV – Market Value

<sup>6</sup>  $\frac{Ask - Bid}{Ask + Bid}$ ; Ask and Bid are the daily closing ask and bid prices.

is one of the three variables that increase the Firms' Market Value ( $\beta = 11,2647$ ; significant at 1% level).

*Leverage* was measured by the Debt-to-Equity (D/E) ratio (D/E), calculated as Total Debt over Total Equity, and reflects the amount of debt to finance the companies' assets. High levels of the D/E ratio can negatively impact the firms' value, as Cho (2022) found in his study, where D/E is negatively correlated with ROA.

*Loss* was represented by a dummy variable that assumed the value "1" if the value of Net Income was negative, and the value "0" otherwise. Net Income values lower than 0 (Loss = 1) tend to decrease the firms' value.

*Complexity* was represented by the number of segments each company operates on. Lee and Yeo (2016) found that companies with higher organizational complexity had a stronger positive relationship between their firm valuation and <IR> disclosure.

Country effects were reflected by growth in *Gross Domestic Product* (GDP) and extracted from the World Development Indicators database with information provided by the World Bank. This indicator is used in literature as a control variable by Aras and Hacıoglu Kazak, 2022), or with variants of GDP indicators such as GDP per capita (Wen et al., 2022; Aras & Hacıoglu Kazak, 2022; Cortesi & Vena, 2019).

*Fixed Industry and Year effects* (Wen et al., 2022; Fatemi et al., 2018; Li et al., 2018) were also considered to capture the effects of different types of industry and time over the period. Each of these variables will assume the value 1 if the observation refers to the industry/year, and the value 0 for the remaining observations.

**Table 4.2 – Definition of variables**

<b>Dependent Variable</b>	<b>Measurement</b>	<b>References</b>
Firms' Market Value ( <i>FMV<sub>it</sub></i> )	Measures the value of the firm through the natural logarithm of Tobin's Q ratio.	Aouadi & Marsat (2018); Li et al. (2018); Fatemi et al. (2018); Cho (2022); Bouslah et al. (2023)
<b>Independent Variables</b>	<b>Measurement</b>	<b>References</b>
ESG measures ( <i>ESGS<sub>it</sub></i> )	Measured through ESG Scores, on a scale from 0 to 100.	Velte, 2017; Albitar et al., 2020; Li et al., 2018; Yoon et al. (2018)
Information Asymmetry ( <i>IA<sub>it</sub></i> )	Measured through the Bid-Ask Spread ratio.	Barth et al., (2017)
<b>Control variables</b>	<b>Measurement</b>	<b>References</b>
Size	Measured by the natural logarithm of Total Assets.	Yoon et al. (2018); Wen et al. (2022); Cahan et al. (2016); Bouslah et al. (2023)
Profitability	Measures the effect of companies' profitability through their Return on Assets (ROA).	Fatemi et al. (2018); Cahan et al. (2016); Bouslah et al. (2023)
Leverage	Measured through the Debt-to-Equity ratio.	Cho (2022); Wen et al. (2022); Cahan et al. (2016); Bouslah et al. (2023)
Loss	Dummy variable that assumes 1 if the company presented negative results, and 0 otherwise.	Barth et al., (2017)
Complexity	Measured by the number of segments the company operates on.	Lee and Yeo (2016)
GDP	Measured by the growth in GDP.	Aras & Hacıoglu Kazak, (2022)

**Source:** Own elaboration

## 5 RESULTS AND DISCUSSION

### 5.1 Descriptive analysis

Table 5.1 shows the descriptive statistics for the variables in the study, for the period between 2014 to 2018. It was concluded, that for this period, the European non-financial companies, on average had a market value, measured by the natural logarithm of Tobin's Q ratio, of 6.90, having the lowest value of 5.24 and the highest being 8.59, which is an approximate value of the one obtained by Aouadi and Marsat (2018) (9.850) in their 4,312 international firm sample.

In terms of ESG measures, which are weighted on a scale of 0 to 100 points, the lowest value on the ESG Score was 3.25 points and the highest was 89.95 points, lower than the 96.8 points observed by Velte (2017), and on average, the European companies had an ESG Score of 64.69 points, much as the same was the ESG Combined Score, with an average of 61.09 points, being the minimum score the same as the ESG Score (3.25 points) and the maximum score 88.08 points. The Environmental score varied between 0 and 95.54 points, the average score in this ESG dimension was 63.85 points. The Social score showed better results, being the minimum score of 19.23 points, much higher than the score on Velte's (2017) sample (3.2), and the maximum score of 96.06 points. The Corporate Governance score had a minimum value of 4.5 points and the lowest maximum value of 92.08 points, on average scoring 58.73 points. All values, with the exception of the ones highlighted before, are similar to the scores found in Velte (2017) study on German companies.

On average, European companies presented a bid-ask spread between managers and shareholders of 0.0007. The minimum value is 0 and the maximum value is 0.0026.

On average the size of the European companies was 16.08, ranging from a minimum size of 10.81 to a maximum size of 19.92, this difference is justified as small, medium and large enterprises are included in the sample, and it is possible to state that German companies follow the same characteristics as the European ones, as Velte (2017) found similar results regarding the size of German firms. The European companies had profit values ranging from -1.65 to 24.59, and on average their profits are very close to 0 (0.17). The companies' capacity to finance their operations with debt instead of their own capital is 0.50 on average. In terms of their complexity, the companies operate on average on 5 segments, the minimum of segments the companies operate on is 0 and the maximum is 10. In terms of GDP growth, on average the countries presented a growth of GDP of 2.30% and a maximum growth of 24.37%. In some countries, the GDP decreased at most 0.36%.

Lastly, over the 1,765 company-year observations, only 113 (6.4%) presented negative results during the 2014 to 2018 period, which follows the result obtained by Barth et al. (2017), as the majority of the companies present positive results.

**Table 5.1 – Descriptive analysis**

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Firms' Market Value	1765	5.2400	8.5900	6.9033	0.7987
ESG Score	1765	3.2500	89.9500	64.6968	17.0564
ESG Combined Score	1765	3.2500	88.0800	61.0999	16.3736
ENV Score	1765	0.0000	95.5400	63.8536	22.7668
SOC Score	1765	19.2300	96.0600	68.8387	20.3757
CG Score	1765	4.5000	92.0800	58.7316	21.3917
Information Asymmetry	1765	0.0000	0.0026	0.0007	0.0006
Size	1765	10.8158	19.9204	16.0816	1.4174
Profitability	1765	-1.6565	24.5964	0.1781	0.7403
Leverage	1765	0.0000	10.1987	0.5010	0.8433
Complexity	1765	0.0000	10.0000	5.0600	2.2690
GDP	1765	-0.3649	24.3704	2.3025	1.9584
			<b>N</b>	<b>%</b>	
Loss	dummy	= 1	113	6.40%	
		= 0	1652	93.60%	
		<b>Total</b>	<b>1765</b>	<b>100%</b>	

The Firms' Market Value, ESG Score, ESG Combined Score, ENV Score, SOC Score, CG Score and Information Asymmetry were winsorised at the 5 and 95 percentiles.

Definition of variables: Firms' Market Value = natural logarithm of Tobin's Q (book value of assets minus book value of equity minus deferred taxes plus market value of equity over book value of assets); ESG Score = measured in a scale from 0 to 100; Information Asymmetry (measured by the Bid-Ask Spread) = natural logarithm of the median daily bid and ask prices; Size = natural logarithm of total of assets; Profitability = Return on assets ratio; Leverage = Debt to Equity ratio; Loss = dummy variable that assumes 1 if the value of Net Income is negative, and 0 otherwise; Complexity = number of segments the company operates on; GDP (Gross Domestic Product) = growth on GDP.

**Source:** Own elaboration, data from Eikon database



## 5.2 Bivariate Analysis

Table 5.2 contains the correlations between the variables in the study. By analysing it, we can conclude that all variables are weakly correlated except for the *Size* variable, which is strongly and significantly at a 0.1% level correlated with the *Firms' Market Value*, but in opposite directions ( $r = -0.634$ ), and strongly and significantly at a 0.1% level correlated with the *ESG Score* ( $r = 0.529$ ). Regarding the *Firms' Market Value*, it is negatively correlated with the independent variables, *ESG Score* and *Information Asymmetry*, significantly at 0.1% level and insignificantly, respectively.

**Table 5.2 – Correlations**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>Panel A: Pearson Correlation for continuous variables</i>									
(1) Firms' Market Value	1.000								
(2) ESG Score	-0.236 ***	1.000							
(3) IA	-0.003	-0.230 ***	1.000						
(4) Size	-0.634 ***	0.529 ***	-0.256 ***	1.000					
(5) Profitability	0.203 ***	0.013	-0.052 *	-0.148 ***	1.000				
(6) Leverage	0.019	0.048 *	-0.028	-0.066 **	0.211 ***	1.000			
(7) Complexity	-0.273 ***	0.215 ***	-0.067 **	0.295 ***	-0.008	0.132 ***	1.000		
(8) GDP	0.127 ***	-0.123 ***	0.034	-0.119 ***	0.021	0.043	-0.071 **	1.000	
<i>Panel B: Spearman Correlation for categorical variables</i>									
(9) Loss	-0.231 ***	0.005	-0.022	0.094 ***	-0.424 ***	0.036	0.059 *	-0.011	1.000

The Correlation is significant at the \*\*\*0.001, \*\*0.01 and \*0.05 levels (2-tailed).

The Firms' Market Value, ESG Score, ENV Score, SOC Score, CG Score and Information Asymmetry were winsorised at the 5 and 95 percentiles.

Definition of variables: Firms' Market Value = natural logarithm of Tobin's Q (book value of assets minus book value of equity minus deferred taxes plus market value of equity over book value of assets); ESG Score = measured in a scale from 0 to 100; Information Asymmetry (measured by the Bid-Ask Spread) = natural logarithm of the median daily bid and ask prices; Size = natural logarithm of total of assets; Profitability = Return on assets ratio; Leverage = Debt to Equity ratio; Loss = dummy variable that assumes 1 if the value of Net Income is negative, and 0 otherwise; Complexity = number of segments the company operates on; GDP (Gross Domestic Product) = growth on GDP.

**Source:** Own elaboration, data from Eikon database

Having this in mind, we can assume that there are minimal multicollinearity problems, which can also be seen through the analysis of the Variance Inflated Factors ( $VIF < 10$ ), which are all moderately correlated (between 1 and 5), between all the variables, with the exception for the industry control variables.

### 5.3 Regression model

Table 5.3 presents the coefficients and model summaries for the two designed model equations (Model 1: equation (1); Model 2: equation (2)) to answer the hypotheses in the study. The models included control variables for each respective year and industry, and the normality assumptions were verified ( $n > 30$ ).

Regarding the first model, which answers the first hypothesis “ESG measures are positively associated with the firms’ market value”, we can conclude that the model is significant as a whole ( $F = 117.166$ ;  $p - value < 0.001$ ) to explain the relationship between the Firms’ Market Value and the independent and control variables.

The model explains 54.2% of the Firms’ Market Value ( $Adjusted R^2 = 54.2\%$ ), which means that the independent and control variables can strongly explain the Firms’ Market Value.

It is shown that the ESG measures, through the ESG Score, are positively associated with the Firms’ Market Value, confirming this way H1, the first hypothesis ( $\beta_1 = 0.004$ ;  $p - value < 0.001$ ). Companies with better performances regarding ESG measures, resulting in higher ESG Scores, present higher market values.

Bénabou and Tirole (2010) defended that “economic and social value creation are closely related” (Havlinova & Kukacka, 2023, p.238), which it was possible to conclude with this study, as an investment in ESG measures increases by one percentile point will mean an increase of 0.4% in the firms’ market value. Meaning that ESG activities must be seen as an investment opportunity and value creation for the firms, and not as a cost for the pleasure of stakeholders.

These results go in line with the predicted and corroborate the recent findings on the effect of ESG measures on firms’ market value in literature around the world. Similar to the European companies, the UK companies (Li et al., 2018), the Chinese companies (Yu & Xiao, 2022) and the North American companies (Fatemi et al., 2018) also present a value enhancement in Tobin’s Q proxy from the disclosure of ESG measures.

In the German case (Velte, 2017) the relationship between ESG measures and the market-based proxy, Tobin’s Q, although positive was not proven significant, but the accounting-based proxies, ROA and ROE, were both proven positive and significant.

**Table 5.3 – Regression Models for ESG Score**

	Firms' Market Value				
	Predicted sign	Model 1		Model 2	
		Coefficients		Coefficients	
Intercept		12.72	***	12.844	***
		(0.188)		(0.187)	
ESG Score	+	0.004	***	0.005	***
		(0.001)		(0.001)	
Information Asymmetry	-	-244.22	***	-111.538	***
		(25.310)		(31.888)	
IA x ESG Score	-	-		-0.004	***
				(0.001)	
Size	?	-0.354	***	-0.369	***
		(0.012)		(0.012)	
Profitability	?	0.072	***	0.067	***
		(0.018)		(0.018)	
Leverage	?	-0.024		-0.013	
		(0.016)		(0.016)	
Loss	?	-0.411	***	-0.403	***
		(0.054)		(0.053)	
Complexity	?	-0.029	***	-0.026	***
		(0.006)		(0.006)	
GDP	?	0.019	**	0.018	**
		(0.007)		(0.007)	
Industry effects	?	included		included	
Year effects	?	included		included	
<b>Model Fit:</b>					
R Squared		0.547		0.558	
Adjusted R Squared		0.542		0.554	
F Statistic		117.166	***	116.155	***
VIF		< 6.736		< 6.740	

Statistically significant at the levels of \*\*\*0.001, \*\*0.01 and \*0.05 (2-tailed). The t-values are given in parenthesis. Standard errors are heteroskedasticity-adjusted and clustered at the firm level. The Firms' Market Value, ESG Score and Information Asymmetry were winsorised at the 5 and 95 percentiles.

Definition of variables: Firms' Market Value = natural logarithm of Tobin's Q (book value of assets minus book value of equity minus deferred taxes plus market value of equity over book value of assets); ESG Score = measured in a scale from 0 to 100; Information Asymmetry (measured by the Bid-Ask Spread) = natural logarithm of the median daily bid and ask prices; Size = natural logarithm of total of assets; Profitability = Return on assets ratio; Leverage = Debt to Equity ratio; Loss = dummy variable that assumes 1 if the value of Net Income is negative, and 0 otherwise; Complexity = number of segments the company operates on; GDP (Gross Domestic Product) = growth on GDP.

**Source:** Own elaboration, data from Eikon database

Regarding the second model, which answers the second hypothesis “In companies with lower levels of Information Asymmetry, the positive association between ESG measures and a firm’s market value is more intense”, we can conclude that the model is significant as a whole ( $F = 116.155$ ;  $p - value < 0.001$ ).

The model strongly explains the Firms' Market Value ( $Adjusted R^2 = 55.8\%$ ), which means that variation in the independent and control variables explains 55.8% of the total variation in the Firms' Market Value.

First of all, the ESG Score is positively associated with the Firms' Market Value, confirming H1 and findings from model 1 ( $\beta_1 = 0.005$ ;  $p - value < 0.001$ ). Next, as shown in Table 5.1, Information Asymmetry assumes only positive values (minimum value = 0). Findings presented in Table 5.3 show that Information Asymmetry is negatively associated with Firm's Market Value ( $\beta_1 = -111.538$ ;  $p - value < 0.001$ ). This means that companies with higher levels of information asymmetry face lower market valuation, which is aligned with agency theory arguments (Jensen & Meckling, 1976).

Findings also show that Information Asymmetry has a negative effect on the relationship between ESG measures and Firms' Market Value ( $\beta_3 = -0.004$ ;  $p - value < 0.001$ ). This supports H2, the second hypothesis. The positive relationship between ESG measures and company market value is more intense as information asymmetry levels become lower. It seems that information asymmetry moderates the relationship between ESG measures and firms' market value.

The agency theory aims to analyse the information asymmetry between managers and ownership. A less transparent relationship between the two leads to higher levels of information asymmetry, and the more transparent the relationship the lower the levels of information asymmetry. So less transparent companies tend to have lower market values as the information for the decision-making process of investors is scarce. Companies that have lower levels of information asymmetry, meaning that they disclose more financial and non-financial information, will tend to have higher market values, which goes accordingly with the results obtained: companies that present lower levels of information asymmetry, have a stronger positive relationship between ESG measures and Firms' Market Value.

These results are consistent with the ones found by Lee and Yeo (2016), that concluded that firms tend to mitigate their agency cost when in need of external financing, resulting in the enhancement of the positive association found between  $\langle IR \rangle$  and firms' valuation.

The same results were found for both ESG measures (ESG score and ESG combined score), which emphasise the conclusions found in this study. Regarding the models using the ESG Combined Score (Appendix B), they are significant to explain the relationship between Firms' Market Value and the independent and control variables ( $F_{Model 1} = 116.799$ ;  $F_{Model 2} =$

115.228; and  $p - values < 0.001$ ), and strongly explain Firms' Market Value ( $Adjusted R^2_{Model 1} = 54.2\%$ ;  $Adjusted R^2_{Model 2} = 55.2\%$ ). In both models, ESG measures positively and significantly affect Firms' Market Value ( $\beta_{ESGCS 1} = 0.003$ ;  $\beta_{ESGCS 2} = 0.004$ ; and  $p - values < 0.001$ ), and the expected moderating effect of Information Asymmetry was verified ( $\beta_{ESGCS*IA} = -0.003$ ;  $p - value < 0.001$ ), in other words, firms' with lower levels of Information Asymmetry present a stronger relationship between the ESG measures and Firms' Market Value.

Additionally, it has been conducted an analysis using panel data regression techniques. In panel data, the fixed effects approach is frequently used to limit selection bias problems (Brown et al., 2011) and controls unobserved firm-specific and/or time invariant heterogeneities. The untabulated results show that main findings remained unchanged. However, the panel data diagnostic statistic tests (F statistic, Breusch-Pagan statistic, and Hausman statistic) validated the pooled model, the one we present in Table 5.3, Table 5.4, and Appendix B.

## 5.4 Additional Analyses

To further analyse the previous results, the same models were applied for each ESG dimension, and the results are presented in Table 5.4. Panels A and B contain the coefficients and model summaries for the six regression models. In the models were included control variables for Size, Profitability, Leverage, Loss, Complexity and Country, Year and Industry effects, and the normality assumptions were verified.

**Table 5.4 – Regression Models for Env, Soc and CG Scores**

<b>Panel A: Model 1 Coefficients</b>							
	Predicted sign	Firms' Market Value					
		ENV		SOC		CG	
Intercept		12.655 (0.193)	***	12.783 (0.187)	***	12.593 (0.186)	***
ENV Score	+	0.001 (0.001)		-		-	
SOC Score	+	-		0.005 (0.001)	***	-	
CG Score	+	-		-		0.001 (0.001)	
Information Asymmetry	-	-254.230 (25.258)	***	-254.399 (25.037)	***	-250.862 (25.466)	***
Control Variables	?	included		included		included	
Industry effects	?	included		included		included	
Year effects	?	included		included		included	
<b>Model Fit:</b>							
R Squared		0.544		0.553		0.544	
Adjusted R Squared		0.539		0.548		0.539	
F Statistic		115.553	***	119.816	***	115.628	***
VIF		< 6.770		< 6.715		< 6.702	

## Panel B: Model 2 Coefficients

	Predicted sign	Firms' Market Value					
		ENV		SOC		CG	
Intercept		12.795 (0.191)	***	12.907 (0.186)	***	12.705 (0.185)	***
ENV Score	+	0.003 (0.001)	***	-		-	
SOC Score	+	-		0.006 (0.001)	***	-	
CG Score	+	-		-		0.003 (0.001)	***
Information Asymmetry	-	-124.132 (31.452)	***	-121.965 (31.453)	***	-127.361 (31.500)	***
IA x ENV Score	-	-0.003 (0.001)	***	-		-	
IA x SOC Score	-	-		-0.003 (0.000)	***	-	
IA x CG Score	-	-		-		-0.004 (0.001)	***
Control Variables	?	included		included		included	
Industry effects	?	included		included		included	
Year effects	?	included		included		included	
<b>Model Fit:</b>							
R Squared		0.555		0.563		0.555	
Adjusted R Squared		0.551		0.558		0.550	
F Statistic		114.722	***	118.209	***	114.384	***
VIF		< 6.772		< 6.716		< 6.705	

Statistically significant at the levels of \*\*\*0.001, \*\*0.01 and \*0.05 (2-tailed). The t-values are given in parenthesis. Standard errors are heteroskedasticity-adjusted and clustered at the firm level. The Firms' Market Value, Env Score, Soc Score, CG Score and Information Asymmetry were winsorised at the 5 and 95 percentiles.

Definition of variables: Firms' Market Value = natural logarithm of Tobin's Q (book value of assets minus book value of equity minus deferred taxes plus market value of equity over book value of assets); ESG Score = measured in a scale from 0 to 100; Information Asymmetry (measured by the Bid-Ask Spread) = natural logarithm of the median daily bid and ask prices; Size = natural logarithm of total of assets; Profitability = Return on assets ratio; Leverage = Debt to Equity ratio; Loss = dummy variable that assumes 1 if the value of Net Income is lower than 0, and 0 otherwise; Complexity = number of segments the company operates on; GDP (Gross Domestic Product) = growth on GDP.

**Source:** Own elaboration, data from Eikon database

As it is possible to analyse in Panel A, all three dimensions of ESG measures positively impact Firms' Market Value ( $\beta_{Env} = 0.001$ ;  $\beta_{Soc} = 0.005$ ;  $\beta_{CG} = 0.001$ ), but only the Social measures do it significantly ( $p - value < 0.001$ ), meaning that the report of each dimension increases Firms' Market Value, but only the Social measures are significant. Likewise Cho (2022), who did not find a significant relationship between Eco-friendly strategies, which were measured by the CDP score that focuses on environmental matters, and Tobin's Q ratio. These

results can be explained by the trend in the awareness of social matters among developed countries, especially in Europe, and the need for companies to meet those concerns and take action.

All three models are significant to explain the relationship between Firms' Market Value and the independent and control variables ( $F_{Env} = 115.553$ ;  $F_{Soc} = 119.816$ ;  $F_{CG} = 115.628$ ; and  $p - values < 0.001$ ), and strongly explain Firms' Market Value ( $Adjusted R_{Env}^2 = 53.9\%$ ;  $Adjusted R_{Soc}^2 = 54.8\%$ ;  $Adjusted R_{CG}^2 = 53.9\%$ ).

Regarding Panel B, which tests the scores for each dimension on the scope of the second hypothesis, it confirms the expected results, as all three dimensions positively and significantly affect Firms' Market Value ( $\beta_{Env} = 0.003$ ;  $\beta_{Soc} = 0.006$ ;  $\beta_{CG} = 0.003$ ; and  $p - values < 0.001$ ), and the moderating effect of Information Asymmetry goes accordingly with the expected and found in the main results ( $\beta_{Env*IA} = -0.003$ ;  $\beta_{Soc*IA} = -0.003$ ;  $\beta_{CG*IA} = -0.004$ ; and  $p - values < 0.001$ ), in other words, for each ESG dimension, the positive relationship between ESG measures and company market value is more intense as information asymmetry levels become lower.

All three models are significant to explain the relationship between Firms' Market Value and the independent and control variables ( $F_{Env} = 114.722$ ;  $F_{Soc} = 118.209$ ;  $F_{CG} = 114.384$ ; and  $p - values < 0.001$ ), and strongly explain Firms' Market Value ( $Adjusted R_{Env}^2 = 55.1\%$ ;  $Adjusted R_{Soc}^2 = 55.8\%$ ;  $Adjusted R_{CG}^2 = 55\%$ ).

Even though the three dimensions are significant in the second model, once more the variations by one percentile point in the Social dimension represent a higher total variation in Firms' Market Value (0.6%). The moderating effect of Information Asymmetry is most felt in the Governance dimension, meaning that for each increase of one percentile point on the levels of Information Asymmetry regarding Governance disclosure, the Firms' Market Value total variation will decrease by 0.4%.



## **6 CONCLUSION**

This study aimed to analyse the relationship between the adoption of ESG measures and the Firms' Market Value, of the European non-financial firms of the Stoxx 600 Index, during the 2014 to 2018 period. Furthermore, it was analysed the moderating role of information asymmetry in the previous relationship. The data for the study was taken from the Eikon database and resulted in a final sample of 353 companies, and 1,765 observations.

It was concluded that the disclosure of ESG measures has a positive and significant impact on the Firms' Market Value, meaning that the investment in ESG actions creates value for the companies, and it is not just a cost for them. More specifically, the investment in social matters is the most beneficial of the three dimensions, once it was concluded that it was the only dimension of ESG that significantly improved the firms' valuation, even though the environmental and governance dimensions were also proven to increase the firms' valuation, these were not proven significant.

Moreover, it tested the effect of information asymmetry on the relationship between firms' market value and the adoption of ESG measures, through the agency theory, and concluded that firms that have lower levels of information asymmetry tend to have a stronger positive relationship between ESG measures and firm valuation, and this was verified for the ESG measures as a whole and the three dimensions: environmental, social and governance.

Overall, it is possible to generalize that the disclosure of non-financial information, specifically ESG reporting, has positive effects on the companies' financial performance, and companies benefit for them both economically and through the improvement of the perception of stakeholders. ESG reporting has been beneficial for companies in need of external financing and will be a requirement in the future, as more and more investors require a bigger picture of the companies' short-, medium- and long-term plan for the decision-making process, and banks in the European system have adopted the ESG ratings to beneficiate (penalize) companies in need of credit, for their good (bad) ESG performance.

### **6.1 Limitations**

This study is bound to the information disclosed by the companies for the period between 2014 and 2018, which resulted in the elimination from the sample of many companies that did not disclose information in some parameters at the beginning of the period but did at the end of it, especially regarding ESG information.

## 6.2 Recommendations / Future investigations

ESG disclosure has been expanding both in Europe and the whole world. Yoon et al. (2018) defend that emerging countries have a more relevant opportunity in the disclosure of non-financial information, which also highlights the possibility of more extensive studies in those countries.

This study did not include the impacts of Covid-19, and it is an opportunity to study, as it was also mentioned by Tsang et al. (2023) and Yu and Xiao (2022), if the pandemic influenced the relationship between ESG measures and firms valuation, as it was a period where ESG concerns risen among the society, and also other movements such as *Black Lives Matter*, LGBT communities, the *Me Too* movement and others, and most recently the impacts of the Ukraine war, which created an energy crisis and migration issues, especially in Europe.

With the implementation of the new directive and ESG norms, it will be interesting to study the impacts when compared with the previous directive.

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## APPENDIXES

### Appendix A - ESG materiality categories

Dimension	Categories	Themes
E n v i r o n m e n t a l	Emmissions	Emissions
		Waste
		Biodiversity
		Environmental management systems
	Innovation	Products innovation
		Green Revenue / R&D / Capex
	Resource use	Water
		Energy
		Sustainable packaging
		Environmental supply chain
S o c i a l	Community	Equally important to all industry groups, hence a median weight of 5 is assigned to all industry groups
	Human rights	Human rights
	Product responsibility	Responsible marketing
		Product quality
		Data privacy
	Workforce	Diversity and Inclusion
		Career development and Training
		Working conditions
Health and Safety		
G o v e r n a n c e	CSR Stratey	CSR Strategy
		ESG Reoirting and Transparency
	Management	Structure (independence, diversity, committees)
		Compensation
	Shareholders	Shareholder rights
		Takeover defenses

**Source:** Own elaboration, data from Refinitiv (2020)

## Appendix B – Regression Models for ESG Combined Score

	Predicted sign	Firms' Market Value			
		Model 1 Coefficients		Model 2 Coefficients	
Intercept		12.576 (0.186)	***	12.663 (0.184)	***
ESG Combined Score	+	0.003 (0.001)	***	0.004 (0.001)	***
Information Asymmetry	-	-250.763 (25.196)	***	-125.899 (31.792)	***
IA x ESG Comb. Score	-	-		-0.003 (0.001)	***
Size	?	-0.342 (0.011)	***	-0.354 (0.011)	***
Profitability	?	0.074 (0.018)	***	0.070 (0.018)	***
Leverage	?	-0.023 (0.016)		-0.013 (0.016)	
Loss	?	-0.405 (0.054)	***	-0.398 (0.053)	***
Complexity	?	-0.029 (0.006)	***	-0.026 (0.006)	***
GDP	?	0.019 (0.007)	**	0.018 (0.007)	**
Industry effects	?	included		included	
Year effects	?	included		included	
<b>Model Fit:</b>					
R Squared		0.546		0.556	
Adjusted R Squared		0.542		0.552	
F Statistic		116.799	***	115.228	***
VIF		< 6.708		< 6.712	

Statistically significant at the levels of \*\*\*0.001, \*\*0.01 and \*0.05 (2-tailed). The t-values are given in parenthesis. Standard errors are heteroskedasticity-adjusted and clustered at the firm level. The Firms' Market Value, ESG Combined Score and Information Asymmetry were winsorised at the 5 and 95 percentiles.

Definition of variables: Firms' Market Value = natural logarithm of Tobin's Q (book value of assets minus book value of equity minus deferred taxes plus market value of equity over book value of assets); ESG Score = measured in a scale from 0 to 100; Information Asymmetry (measured by the Bid-Ask Spread) = natural logarithm of the median daily bid and ask prices; Size = natural logarithm of total of assets; Profitability = Return on assets ratio; Leverage = Debt to Equity ratio; Loss = dummy variable that assumes 1 if the value of Net Income is negative, and 0 otherwise; Complexity = number of segments; GDP (Gross Domestic Product) = growth on GDP.

**Source:** Own elaboration, data from Eikon database