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MASTER THESIS

THE IMPACT OF ESG PERFORMANCE ON STOCK PRICE VALUE	**ASV VEIKSNIŲ POVEIKIS AKCIJŲ KAINOS VERTEI**

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Table of Contents

LIST OF TABLES

LIST OF FIGURES

Introduction

Relevance of topic

Global businesses are under scrutiny and deep pressure from lawmakers, regulators, and the investment community. Every year, we notice a new international agreement on sustainability that influences companies' operations and shareholders' investment decision-making. The way to reduce that substantively valuable risk gap could be the company's decision to publicly declare the ESG performance.

Recently, ESG performance has become recognized by the governments of different continents. According to the previous research they are willing to benefit companies declaring it, and accordingly minimize the possibility of legal interventions to internal companies' operations.

Listed advantages also are attracting investors who are willing to invest their money in companies that will have fewer legal interventions from the government side and are more financially resistible to the changes related to the sustainability factor. However, ESG performance still is accepted as non-financial information even though the negative news about company sustainability will affect the stock prices.

The level of exploration of the topic

We have noticed that research on sustainability and ESG relevance was conducted before by many researchers (Klassen and McLaughlin in 1996.; Khan et al. (2016); Davidson et al. (2019); Sini (2012); Zhu (2017) Manchiraju and Rajgopal (2017), Chen et al. (2018), Flammer's (2013); Jia et al. (2020); Koh et al. (2014); Mithani (2017), Dauglas et al. (2019), etc.). Literature suggests that the ESG topic is still contradictory. Most of researchers agree with Khan (2016) and Orlitzky & Swanson, (2008). They have demonstrated that companies which achieve growth concerning sustainability requirements benefit from in-the market performance and show better results in overall stakeholders' satisfaction. On the other hand, the scientists like MacMahon (2020) argues that the concept of ESG is valuable. According to the research, ESG ratings is hard to value due to the difficulties in measurements of environmental and social impact. Also, Siew, Balatbat, and Carmichael (2011), have declared that the mechanism in deriving ESG scores is subjective and hence may not reflect on the actual ESG performance of firms due to the differences in the ESG rating values in accordance with

the rating agencies. Therefore, there are many underlying conditions and relations which should be investigated to understand how and if ESG performance is impacting stock price value.

The novelty of the Master thesis

Due to such a variety of opinions from the scientific society it would be great to conduct the research which would show the Value relevance of ESG variable on the stock prices in the current market affected by the Covid -19 crisis. We trust that this research could show the importance of non-financial information value such as ESG impact on the stock price.

The problem of the Master thesis: How does ESG non-financial information Environmental, Social, and Governmental (ESG) performance impact Stock Prices.

The aim of the master thesis: To investigate and determine the impact of Environmental, Social, and Governmental (ESG) performance on stock price.

The objectives of the master thesis

1. To perform theoretical background analysis on the ESG concepts, rate its factors influences on stock prices, and relevance.
2. To investigate and prepare the methodological requirements in order to find the best fit statistical models for raised Hypothesis.
3. To determine the impact of ESG score on stock prices by using panel data models.
4. To provide comparable results of performed theoretical analysis and research model.
5. To summarize conclusions, provide suggestions and indicate errors.

The structure of the Master thesis:

Master thesis contains 3 main parts: Theory analysis (Chapter 1), Research methodology (Chapter 2) and Research results (Chapter 3) as well as conclusions and recommendations.

In the first part we collect, analyze, and present secondary data. The second part includes demonstration of hypotheses models and methods to be used for analysis of a new data. In the last part we present survey analysis results, it's interpretation and formulation of conclusions. At the end we provide final conclusions, suggestions and limitations, the list of used scientific literature and appendixes.

1 THEORETICAL BACKGROUND: ESG PERFORMANCE IMPACT ON COMPANIES STOCK PRICES.

This Chapter represents the main concepts of Environmental, Social and Government (ESG) index and its theoretical affect on stock prices based on the results gathered from the previously made research to design the hypotheses for this thesis. Further, content is divided in to two specific parts of: 1. “Environmental, Social, and Government Concept and Relevance” – representing the detailed introduction to the conceptual background of the ESG index and its separate elements. While 2 part “Environmental Social and Governance Value Relevance and Its Impact on Stock Performance” - nonmaterial information relevance on a company's stock price and the specification of the pricing models to be applied for this thesis.

1.1. Environmental, Social, and Government Factors Concepts and Relevance

This section represents the primary introduction to the conceptual background of Environmental Social and Governance (ESG) Index and its separate elements. Also, its primary factors and theories related to ESG performance. Furthermore, it incorporates evaluation of transparency in relation to the final ESG score creation as well as Benefits and downsides of ESG - gathered from the previously made research - to create and design the hypotheses for this thesis.

1.1.1. Structure of Environmental, Social, and Government (ESG)

Environmental, Social, and Governance (ESG) criteria are multiple standards that modify companies' operations. Owing to the influence of international agreements on environmental sustainability, companies are highly aware of ESG performance importance due to the protentional investors' interests. New external factors motivated companies to make internal policy changes related to the ESG performance development. This diverse stakeholder focuses on sustainability performance (Rezaee, 2015). Additionally, Firms are willing to publish ESG information to meet the need of public investors and shareholders as they assume the relation between CSR and financial returns (Busch & Hoffmann, 2011). According to Khan (2016), Companies that achieve growth concerning sustainability requirements benefit from in-market performance. These advantages include a decrease in the cost of Debt (Herbohn & Clarkson, 2014), cost of capital (Bachoo et al., 2013), and externally related costs related to environmental disasters, financial lawsuits, and

consumer avoidance (Marsat & Williams, 2011). Those factors improve expected future return and cash flows (Bachoo et al., 2013) that influence overall firm value (Jo & Harjoto, 2011).

Sustainable and Responsible Investment (SRI) is a highly developed methodology that combines fundamental analysis with the evaluation of Environmental, Social, and Governance (ESG) factors. The ESG and SRI data fluctuation help investors to capture data for long-term returns prediction as well as creating the beneficial situation for society by influencing companies - since exceptional ESG ratings and innovative implementation ways reveal companies' efforts for social development concerning three broad areas: Environmental, Social and (Corporate) Governance. (Table 1).

Table 1. ESG pillars description

	Description
Environmental	*Environmental criteria*- Companies worldwide are affected by the environment due to the activities and resources they are using. It includes the resources company takes in and wastes daily. "E" ***encompasses carbon emissions, climate change, pollution, resource efficiency, and biodiversity***
	Thomson Reuters (2021) Compromise environmental pillar based on company's made impact on ecosystems including the air and water pollution and its reduction with Innovative management systems, environmentally green revenues on its behalf.
Social	*Social criteria*, include the company's reputation within and outside the institution, including people and communities operating business when they operate within a broader, diverse society. ***"S" includes human rights, labor relations, health, safety, and diversity, community relations, development of human capital (health & Education***).
	Thomson Reuters (2021) Use social pillar based on: Company commitments to all stakeholders regarding ethical principles incorporate working environment and product responsibility. To measure capability, generate trust and loyalty within a stakeholder.
(Corporate) Governance	*governance*, companies required a corporate system of practices for control and procedures of the effective decision-making process to comply with the law and provide the solutions for external shareholders' needs. ***"G" includes corporate governance, corruption, rule of law, institutional strength, transparency***.

	Thomson Reuters (2021) Governance pillar can comprise management score, shareholder rights, and CSR strategy. This factor evaluates the company's systems capabilities that ensure the best interest of its shareholders.
ESG Controversary	Thomson Reuter's (2021) ESG controversy score is compiled based on the 23 ESG controversy topics that have been reported and overlay the information captured from mass-media sources.

Compiled by the author based on Henisz, W.; Koller, T. and Nuttall, R. (2019). There are five ways that ESG creates value; Inderst, G. and Stewart F. (2018). Incorporating ENVIRONMENTAL, SOCIAL, and GOVERNANCE (ESG) Factors into FIXED INCOME INVESTMENT; REFINITIVE (2021). ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (ESG) SCORES FROM REFINITIV.

As for external analyzers, ESG is an excellent company social responsibility performance index. Douglas et al. (2017) affirm that companies benefit from public ESG rate exposure and modify the risks better than competitors. ESG rate exposure contributes to environmental and financial performance as well as to stakeholder satisfaction (Orlitzky & Swanson, 2008) for the reason that it reduces costs (Delmas & Blass, 2010; Hart & Ahuja, 1996; King, 2007) and attracts the clients (Matute-Vallejo, Bravo, & Pina, 2011).

Lately, due to the rapid market and environmental changes, specifically Covid -19 pandemic, increased attention to ESG and sustainable investing - supported the growth of the Global ESG market. It brought awareness to Socially responsible companies, impact on fiscal sustainability, and CSR. As a result, the ESG index as a legitimate official rate became an integral topic of companies and investors' routine for corporate development and financial growth. Li, Gong, Zhang, Koh (2018) found that transparency on ESG factors increases the trust of shareholders and creates a positive connection between the level of transparency and the value of the firm.

Garcia, Mendes-Da-Silva, and Orsato (2017) defined four sensitive industries: energy (oil and gas), chemicals, pulp and paper, steel making, and mining. According to Garcia (2017), operating in the listed industries are often exposed to legal and political pressure because of the negative socio-environmental impact that might cause a lower ESG rate. However, author findings show that companies in sensitive industries perform with a higher ESG rate than other sectors (Garcia et al., 2017, p. 146). These findings indicate that higher ESG performance helps defend a firm reputation and reduce future risk.

To increase competitive potential and competitiveness in the market, companies are driven to mark the positive changes and tend to eliminate the unusual information about ESG performance in their final reports. Such speculations were observed in the energy sector by Talbot – Boiral (2018).

To conclude, ESG is a concept of three pillars - Environmental, Social, and governance, which overall is constructed to review the company's internal performance in relation to sustainability. Lately, due to global warming, pollution, and other harmful environmental events cases, world leaders and the government has shown great interest in the topic of sustainability and ESG performance. It affected the sensitive industries that may cause those environmental issues. The second group of people showing their interest was investors - as the companies officially declaring ESG performance offer more stability and fewer fluctuations in stock prices. The same conclusions were proposed by Khan et al. (2016), who claims that growth in sustainability requirements benefits the overall company's market performance (Khan et al., 2016). Although, the topic is still debatable as an ESG opponent marks the possibility of data manipulation in Sustainability reports.

ESG Scores and ratings

The ESG concept was first proposed in the report of the United Nations Principles of Responsible Investment, which recommends that investors consider ESG scores as a critical factor in their investment decisions as the operational plan, inclusively ESG represents the ability to overcome the risk with the minimal losses (B. Lee, 2018). What is more, according to the United Nations Sustainable Stocks Exchange initiative (SSE), at the latest by 2030, all big sizes should report on their environmental and social impact and explain why if they do not do so (SSE, 2015). ESG analysis is based on publicly available non-profitable information data reported by the companies, NGOs, trade unions, and governmental organizations. That comes from the "Declarative rating" that can be done according to the ESG audit performance.

Audit performance is evaluated by two types of ESG rating agencies global scale operation agencies and limited geographic coverage agencies. Nowadays, we can see three international financial services leading in the market: Bloomberg, Thomson Reuters, and MSCI. A recent publication uncovers that ESG rating agencies have improved their models during the last ten years by including new criteria for the more accurate evaluation of new challenges. However, the process

is still not perfect and needs to be reviewed in the conceptual matter of environmental differences and details of the methodology used before approving the conclusions (Escrig-Olmedo et al., 2019). Due to the unavailability of a mutual framework, agencies refer to the uniform international guidelines, including the International Labour Organization (ILO) Convention, Global Responsible Initiative (GRI), the UN Principles for Responsible Investments (PRI), United Nations (UN) Global Compact, Kyoto Protocol, and other international sustainability frameworks.

Also, it is worth mentioning the study by Siew, Balatbat, and Carmichael (2011), which declare that the mechanism in deriving ESG scores is subjective and hence may not reflect on the actual ESG performance of firms if the scores have not been completed by experts familiar with and within each industry sector. For instance, if the representative of one sector has scored, it may show a bias scoring in favor of their industry sector. Although, each agency has developed its methodology to keep stability and create common ground for international development when no common framework exists for ESG ratings. However, most agencies use the same base of international standards to establish opposable rating criteria—the Industry Adjusted Score variates between the best (A) and the worst (D-). Or in the ABC system from AAA till the CCC. These assessments of company performance are not absolute but are explicitly intended to be relative to the standards and implementation of a company's industry peers. For instance, Figure 2 represents the score tables of two international ESG Rating agencies - MSCI and Refine scores, representing different score systems thought to represent the same rating value.

Table 2. International ESG agencies 'ratings difference

Refinitiv ESG rating												
Ratings	A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-
	0.92 <1	0.83 <0.92	0.75 <0.83	0.67 <0.75	0.58 <0.67	0.5 <0.58	0.417 <0.5	0.333 <0.41	0.25< 0.333	0.167 <0.25	0.083 <0.167	>0.08
Description	"A" score indicates excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.			"B" score indicates good relative ESG performance and above average degree of transparency in reporting material ESG data publicly.			"C" Score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.			"D" score indicates poor relative ESG performance and insufficient ESG Description degree of transparency in reporting material ESG data publicly.		
	0.8571 <1		0.714< 0.8571		0.571 <0.714		0.4286 <0.5714		0.2857 <0.4286		0.1429 <0.2857	>0.1429
Ratings	AAA		AA		A		BBB		BB		B	CCC
MSCI Ratings												

Compiled by the author based on REFINITIVE (2021). *ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG) SCORES FROM REFINITIV*. MSCI. (2020, December). *MSCI ESG RATINGS METHODOLOGY*

1.1.2. ESG Benefits and Downside

Generally, Companies discuss external value-proposition and implement the CSR reporting as a corporate structure instrument to improve their ESG performance (Sumiani, Haslinda, & Lehman, 2007). Many works highlight the benefit of ESG reporting and performance (Cheung, Welford, & Hills, 2009; Dobers & Halme, 2009). However, Liu and Anbumozhi (2009) determined that pressure from non-governmental organizations and external regulatory diverse about the allocated region. Hence, Clarkson, Li, Richardson, and Vasvari (2008) found an affirmative connection between the level of flexible environmental disclosure and environmental performance. As well as Heinz. et al. (2019) found five ways that ESG creates value for the companies (Henisz et al., 2019). including: 1. ESG Influence on Top line Growth; 2. ESG Influence on Company Cost reduction; 3. ESG Influence on Regulatory and legal interventions; 4.ESG influence on Productivity uplift; 5. ESG Influence on Investment and Assets optimization.

1. ESG Influence on Top Line Growth

According to Henisz et al. (2019), a Strong ESG proposition and implementation can affect the dynamics of company expansion in the new or existing market. Due to the company's CSR activities, authorities would positively look at the actor in the financial market and facilitate the process of receiving approvals and licenses required. (Henisz et al., 2019). Also, Dorobantu et al. (2014) evaluated the company's social engagement activities' influence on the company's valuation and found a significant public stakeholder's interest increase compared to other competitors. It also included that Stakeholder interest was boosted due to fewer operational delays and less extensive planning after ESG implementation. (Dorobantu et al., 2014).

The growth is real. 70 years ago, Finland's Neste, established as a petroleum-refining company now makes more than 2/3 of its profits from renewable and sustainability-related products. According to that fact, research completed in 2012 showed that most consumers are willing to spend an additional 5% fee for a green product to meet the performance rate like the alternatives. (Miremadi et al., 2012). With Miremadi's (2012) study, it's been revealed consumers' willingness to pay increases for green products (Miremadi et al., 2012).

2. ESG Influence on Company Cost reduction

PwC (2016) Claims that future success cannot be imagined without optimizing costs efficiency and operational cost reduction. Henisz et al. found that higher resource efficiency influences the best financial performance in the long-run sustainability strategy. After performing the analysis, a significant correlation of economic performance and resource efficiency was found by comparing the amount of water, energy, and waste used within companies with their revenues. This concluded that ESG could affect operating profits up to 60% (Henisz et al., 2019).

3. ESG Influence on Regulatory and Legal Interventions

Henisz et al. claim that ESG creates strategic freedom and eases regulatory pressure. Implementing such an external value proposition would minimize government intervention risk within companies at different geographies and sectors. It also can benefit the player by generating additional government support (Henisz et al., 2019).

Due to the government regulations defers within industry sectors, Companies with a poorer EBITDA (percentage of net earnings before interest, taxes, depreciation, and amortization) Henisz

et al. (2019) further describe how the value at stake from government regulation differs within various industry sectors. Companies with a poorer EBITDA (percentage of net earnings before interest, taxes, depreciation, and amortization) are associated with higher risk and dependency on government support through regulatory purposes (Henisz et al., 2019). Although Henisz et al.'s findings include that higher risk industries could particularly benefit from regulatory purposes.

4. ESG influence on productivity uplift

Employees' motivation is developed through a reason of purpose, which increases operation and overall productivity (Henisz et al., 2019). Since an increased perception of the positive social impact of work promotes a significant feeling of value-creation, employees are motivated to act in a prosocial way (Grant, 2008) ESG proposition helps companies attract and retain employees. A strong ESG proposition thus promotes employee satisfaction, which correlates positively with shareholder returns (Edmans, 2011). Research show that when companies reimburse their workers through, e.g., charitable actions, they'll respond with enthusiastic behavior (De Neve et al., 2018). For example, chanced selected employees at an Australian bank who received bonuses within the sort of company payments to local charities reported better and more immediate job satisfaction than their colleagues who weren't chosen for the donation initiative program (De Neve et al., 2018).

5. ESG Influence on Investment and Asset optimization

Derwall et al. (2005) find that higher average returns come with more socially responsible portfolios. The same effect was discovered by Henisz et al., who suggested that a Strong ESG Proposition positively affects the rate of return on wise investment with higher sustainable opportunities. Also, according to Henisz et al., an ESG performance plan can enhance efficiency, leading to operational performance optimization.

At first, optimization and investments costs might look higher. However, Baker et al. (2018) found that green bonds are issued at a premium (controlling for risk), hence delivering lower returns though its value increases in benefit of the company in the long-term perspective. Also, it increases value for investors. Riedl and Smeets (2017) performed survey data and found that moral preferences are essential factors for decisions by this type of investor. (Riedl &Smeets,2017)

Likewise, constantly evolving business regulations directly affect energy costs (EU Commission, 2020). It inspires carbon-intensive industries to adopt new sustainability measures to

avoid adverse effects on the balance sheet. (EU Commission, 2020). To conclude, Margolis et al. (2007) find an ambiguous correlation between social responsibility and financial returns.

6. ESG influence on Company reputation

In 21century, the time of social media and massive daily information flow, and inexorable customers interest, companies' reputations are constantly being held at stake (Ma & Osiyevskyy, 2017). Any time, the slightest mistake can become a global sensation. Therefore, it is unacceptable to allow reputational damages as the company must maintain its growth and positive image (Ma & Osiyevskyy, 2017). Though to uphold the situation, Levine (2021), Assure that ESG disclosure can increase the company attractiveness with performed values and positive changes. Zhou and Wang (2020) found that even the success of subsidiaries' social responsibilities hides parent company spillovers. Specifically, subsidiaries' CSR activities may influence parent company social legitimacy. (Zhou & Wang,2020)

Significantly, younger customers become highly aware of sustainability issues and carefully choose brands according to their beliefs. (Levine,2021). To attract and keep a new customer, companies implementing ESG into corporate operations increase public transparency and heat the interest around the company (Levine, 2021). Thought, the impact of ESG reporting varies in relation to positive or negative company operations regarding ESG metrics (Fatemi et al., 2018). For example, actions conflicting with the ESG framework to make the company appear more environmentally conscious than it may damage companies' reputation and value (Fatemi et al.). On the other hand, coordinated, sustainable operations and value-related actions in line with ESG metrics contribute to amplified transparency, consequently developing the company mission and value at the market (Fatemi et al., 2018).

7. Downfalls of ESG disclosure

MacMahon (2020) argues that the concept of ESG ratings is hard to value due to the difficulties in measurements of environmental and social impact. Mac Mahon stresses that standardized financial data is more accurate than non-financial data and is more polite concerning accuracy. Kotsantonis and Serafeim (2019) and Eccles and Stroehle (2018) enlighten that ESG disclosure is not standardized and does not have a set of rules for systematic data disclosure. Kotsantonis and Serafeim have presented inconsistency among exposure on account of multiple

ways of companies reports which represent employee's health and safety data. At the same time, Eccles and Stroehle (2018) highlight that the complexity of ESG data disclosure changes every year and confuses companies. Moreover, measurements deviation– diverge ESG ratings. Berg et al. (2020) stress that the same company performance differs according to the ESG rating agency they choose.

To conclude, ESG is a concept constructed on the three main pillars, including Environmental, Social, and governance aspects. This concept has been promoted and developed since the 20th century. Although the environmental changes due to pollution, global warming, etc., have pushed governments to sign an international agreement on ecological sustainability. It has affected the companies and boosted the investors' interest in publicly performing ESG reports. According to Khan et al. (2016), the gradual growth of sustainability requirements benefits companies' market performance, including topline growth, cost reduction, rare or no regulatory and legal interventions, productivity uplift, investment, and asset optimization and boost of company reputation.

1.2. Environmental Social and Governance Value Relevance and Its Impact on Stock Performance

This section represents the importance of Environmental Social and Governance (ESG) nonmaterial information relevance on a company's stock price and the specification of the pricing models to be applied for this thesis. Secondly, it includes the main factors gathered from the previous research explaining the benefit of the public ESG performance and its separate parts influence the company value. Moreover, it constitutes the information about the ESG related news influence on its stock prices during the crisis. all the gathered data will be used to develop the hypothesis and develop the models used to create the methodology for this thesis.

1.2.1. ESG Value relevance and its impact on stock performance

Value relevance Concept

Value relevance theory is used to evaluate how information about various indicators provided to the market affects company value. Barth, Beaver, and Landsman (2001, p. 95) described value relevance as "the association between accounting amounts and equity market values". And as per Beisland (2009), "the usefulness of accounting information from the perspective of equity

investors. “Later on, the theory was applied to estimate how non-financial and financial information fluctuate insight data on firm value” (De Klerk, De Villiers, and Van Staden, 2015). Most financial literature accepts that the value of Equity is an adequate indicator of the company's value. Based on that evidence, Ohlson in 1995 proposed a model for companies' valuation where the market value of Equity is based on function, which includes both financial and non-financial factors. Ohlson reports the relative value relation between firms' value to future earnings, book value, and dividends. Those data sets give a clean surplus relation, requiring equality between book value and revenues minus dividends. (Ohlson, 1995). However, Ohlson did not identify additional information that might fluctuate the specific content. This module allows including the ESG score as non-financial information.

Ohlson (1995) specify four assumptions for the valuation model:

1. A linear model frames the stochastic time-series behavior of abnormal earnings.
2. The present value of anticipated dividends determines the unique market value.
3. The model satisfies the clean surplus relation.
4. Dividends decrease book value without influencing current earnings.

Ohlson (1995) has escalated given assumptions to formulate a linear, closed-form, valuation solution expressing equation which contains book value, linear function of current abnormal earnings, and scalar variable of other information. All those variables represent the goodwill of a business (Ohlson, 1995). This model also does not place any restrictions on the modifications and covariances of the disturbance conditions (Ohlson, 1995, p. 668).

Barth and Clinch (2009, p. 254) explore a Modified Version of the Ohlson (1995) valuation model. He integrates five potential scale-related effects, including scale-varying valuation parameters, survivorship, scale-related heteroskedasticity, multiplicative and additive correlated omitted scale variables (Barth & Clinch, 2009), to determine how given effects can cause an interference problem and incorrect Interference. After investigating several workable solutions to the presence of the scale effect, results showed that share price specification and undeflated market value of equity specifications are most effective (Barth & Clinch, 2009, p. 255).

Value relevance impact on ESG

ESG recognition in capital markets is gaining a portion of attention due to the international interest of global investors who are declaring support for ESG practices (White, 2012). Each dimension of the ESG rate has been evaluated by multiple researchers to its impact on Value relevance.

Hassel et al. (2005) decided to use the accounting based Ohlson method (1995) to model the specific market to environmental performance ratio. It was necessary to determine if the value relevance increased - with a broader base of financial statement that would include additional ecological performance rating. The findings of this research were the following: value-relevant information to investors is associated with economic indicators such as net income or book value of Equity. At the same time, environmental performance was valuable for the market value of listed companies with a significantly negative relationship, as non-financial information for investors was a piece of additional bonus information. (Hassel et al., 2005, p. 45).

On the other hand, Schadewitz and Niskala (2010) apply the Ohlson residual income valuation model with a GRI as a proxy to the extra information in the model. Additionally, they specify the sectors (excluding financial and insurance firms) and leave only positive earnings. Lastly, the authors estimated a maximum 10% portfolio weight to avoid the more prominent firm domination. Findings showed that "disclosure of GRI have value-relevant information above and beyond that given in the earnings and book value" (Schadewitz & Niskala, 2010, p. 103). Likewise, they conclude that GRI responsibility reporting can decrease information asymmetry between shareholders and the company.

In 2015, De Klerk, De Villiers, and Van Staden used the modified Ohlson model suggested by Barth and Clinch (2009) to examine whether the level of CSR disclosure is associated with share prices. The authors have analyzed three measures of CSR Disclosures: First, GRI framework influence on CSR disclosure. Second, level of compliance with these guidelines, and third, compound third-party CSR disclosure practices data measure (De Klerk et al., 2015, p. 212). According to work done, research outcomes represented that GRI- related disclosure levels and share prices are positively associated (De Klerk et al., 2015). They add that CSR disclosure for

investors is an essential company future cash flow risk assessment tool of the company's future cash flow.

Also, Kaspereit and Lopatta (2016) studied 600 largest European SAM (Sustainability assets Management group) listed companies to elaborate if SAM ranking and GRI sustainability reporting are value relevant and related to the upper market valuation. In this study, the authors used the Ohlson and Feltham valuation model. Given models allowed researchers to measure the value relevance for corporate sustainability of a particular sector and evaluate the value relevance of self-reported data according to the GRI guidelines (Kaspereit & Lopatta, 2016). Adopted techniques lead them to the following: First, CS has a positive connection with the market valuation. Second, they did not distinguish between being sustainable and claiming to be sustainable. Lastly, they saw that sustainable and ethical business are two components of a shareholders' value-increasing strategy. (Kaspereit & Lopatta, 2016)

To conclude, Value relevance theory is used to evaluate nonmaterial information's effect on company value. In 1995 Ohlson created the value relevance model developed by the authors like Barth and Clinch 2009 who have incorporated both non-financial and financial information for a company stock price valuation. After, the various research was conducted to evaluate the ESG dimensions (Hassel et al. (2005); Schadewitz and Niskala (2010); De Klerk et al., (2015); Kaspereit and Lopatta (2016)

ESG performance influence on stock performance

Recent studies have debated ESG performance's influence on stock price performance. Part of studies declare that higher social performance scores lower returns than those with more minor social performance scores (Brammer et al. 2006) and Kruger (2015). They received equivalent results and committed that ESG related information potentially might damage companies' market value in a relatively short run. On the other hand, Sini (2012) shows how ESG is negatively associated with the short-term reaction of stock prices. While in the perspective of long-term investment, it brings value and higher returns.

The next aspect is conventional mutual funds SR funds expressing lower returns during non-crisis times and statistically higher returns during the crisis periods for raw and risk-adjusted

returns. Other empirical studies consent to the previous information and provide an even more optimistic view on Stock performance changes according to ESG performance results.

First, on the list - Lee and Kim used ESG grade data to examine the market valuation of ESG. They presented that level of CSR practices is positively associated with the corporate value. Davidson et al. (2019) stated that stock price performance positively correlates with enterprises with higher social responsibility performance and are led by non-materialistic CEOs approach. Similarly, studies have reported that investors' preferences for ESG might affect market efficiency. Cao et al. (2019) report that stocks performing higher ESG scores tend to be evaluated more highly. It is constant with other evidence that institutional investment restraints may affect stock prices (Cao, Han, and Wang, 2017). Borgers et al. (2012) presented that ESG stocks accomplish actual earnings announcements more often above earnings estimates. Derawall et al. (2005) find that an eco-efficient portfolio performs an upper abnormal risk-return since ESG stocks in a short evaluation horizon are mispriced in the market.

Further in 2011, Derwall presented an idea that market inefficiency vanishes as soon as the market understands ESG's effect on expected future cash flow. This effect comes from expectation hypothesis errors. A deeper evaluation showed that abnormal risk-adjusted return on stocks with solid employee relations diminishes with the increase of evaluation horizon. In conclusion, the effect has appeared because of increased investors' competencies to evaluate incorrect expectations related to future earnings.

Subsequent work of Hartzmark and Sussman (2019) report the funds with good (poor) fund level SR ratings and their Cash flows. With this report, the authors stressed the relationship between inflows (outflows) of funds and SR ratings to encourage investors to focus on ESG characteristics of stock and pay less attention to fundamentals (Cao et al., 2019). Likewise, Zhu (2017) report that even after brand-damaging news – responsible funds are less likely to sell stocks with leading ESG rating. Also, according to Eccles et al. (2012), those leading ESG companies are more profitable in terms of ROE and capacity for growth which is visible in the results of the market and accounting-based financial performance compared to low sustainability companies. The same effect was found by Klassen and McLaughlin (1996), who has observed 22 negatives and 140 positive environmental effects extracted from the Nexis database. This data showed the abnormal negative post negative event returns of 1,5% ($0.7 per share), whereas positive events lead to significant positive post-event returns of 0.82% ($0.37per share).

To conclude, Davidson et al. (2019) stated that stock price performance positively correlates with enterprises with higher social responsibility performance and is led by non-materialistic CEOs approach. Even though some researchers are stressing the negative ESG performance approach Sini (2012) explains that a particular effect might appear due to the observing period. In 2012, Sini discovered the short-term adverse reaction of stock prices, although it brings higher returns from the long-term investment. According to Zhu (2017), this growth effect stays even after the brand-damaging news. Klassen and McLaughlin confirmed the same result in 1996.

1.2.2. ESG Risk, its prevention and insurance role for stock price

In recent years, many researchers have analyzed the relationship between the ESG profile of companies and their financial risk and performance characteristics. The research results were inconclusive: though researchers found a positive, negative, and non-existing correlation between ESG and risk. As a result, due to the market volatility and possibility of environmental disaster, this topic is still escalated and evaluated by researchers taking each ESG dimension separately and compounding them together.

Environmental (E) dimension - Flammer (2013), by investigating the stock market's reaction to environmental, social responsibility, found the correlation between the company's participation in environmental events and the increase of one competitive resource. Also, he mentions that ESG performance plays an insurance role. It makes the brand name look representative in the view of shareholders. They are Willing to react positively to companies that announce eco-friendly initiatives. Equally, in case of eco-harmful event occurs, it will play an insurance-like role allowing the company to suffer fewer losses. (Flammer, 2013)

Social (S) dimension - Shiu and Yang (2017) found that CSR can help companies in adverse events of stock and bond prices suffer fewer losses (Shiu & Yang, 2017). Similarly, Jia et al. (2020) studied corporate risk prevention through CSR investments - especially when companies face higher external risk. For example, pilot companies may follow corporate social responsibilities to reduce their shortage position by gaining an insurance-like effect. Also, the threat of short selling may increase their CSR performance by addressing the challenging items of corporate social responsibility to deal with the short-selling threat. Finally, the reduction of Equity might be manipulated with amplified social responsibility. The created decrease is qualified to the insurance effect of CSR (Jia et al., 2020).

Governance (G) dimension - Flammer (2013) found that CSR as a strategic tool lowers the possibility of valuable information leakage and reduces employee retention for the competitors. Bertrand et al. (2021) witnessed that companies that hire foreign CEO improve CSR practice and corporate social performance to respond to bias from outside. (Bertrand, 2021)

Researchers believe that financial performance is dependable on corporate philanthropy. This corporate philanthropy thought might be modified by inspiring a company's key stakeholder and stimulating a favorable response, and acquiring political resources from the government (Kaul, A.; Luo, J.,2018). Mithani (2017) found that philanthropy can alleviate the liability of foreignness (LOF) of companies after disasters in a specific country and strengthen multinational companies' position. Therefore, the charity has important strategic significance for international companies after disasters. Furthermore, Kaul and Luo (2018) studies have detected the positive effect from corporate social responsibilities that can be achieved if activities are related to the company's core business and do not operate on a non-profitable basis. At the same time, Manchiraju and Rajgopal (2017) showed a significant negative correlation between corporate social responsibility and shareholder value (Manchiraju, H.; Rajgopal, S.,2017). As well as Chen et al. (2018) discovered that public social responsibility disclosure reduces performance and increases the costs at the shareholder's expense. Also, considerable research found an indirect relationship – between CSR and company value. Ramchander et al. (2012) discovered that asymmetry information is a crucial indicator between SCR and financial performance. Similarly, Lys et al. (2015) found that the positive correlation between corporate performance and CSR is more likely to cause corporate social responsibility expenditure. Furthermore, Surroca et al. (2020) found that companies are fronting tremendous pressure to attain short-term goals in a free-market economy when they participate in CSR projects and the combination of managerial entrenchment provisions and corporate social responsibility that creates shareholder value.

In overall relation to the ESG risk prevention abilities. Koh et al. (2014) used ESG as a research facility and presented a risk management approach. The author constructed the CS Performance index from multiple standardized social dimensions (community relation, employee relations, environment…). The results confirmed Flammer's (2013) and Jia et al. (2020) theory that social performance could be used as an insurance mechanism for a higher litigation risk company (Koh et al. 2014). For example, Mithani (2017) stresses that foregone philanthropy could ease the liability of forgiveness (Mithani 2017). Another author, Zhou, and Wang (2020) found that

corporate structures can manipulate the corporate responsibilities within the system to protect parent company reputation. For example, if Subsidiaries fulfill the social responsibility activities, they will have the ability to achieve social legitimacy and form an insurance-like mechanism.

To conclude, researchers have found a positive, negative, and non-existing correlation between ESG and risk. A closer look at each of the ESG pillars separately has brought a lot of research information that shows the beneficial effect for the companies, which includes sustainability programs. Researchers believe that financial performance is dependable on corporate philanthropy. On the other hand, Manchiraju and Rajgopal (2017) stress the significant negative correlation between corporate social responsibility and shareholder value (Manchiraju, H.; Rajgopal, S.,2017). However, most of the literature confirms that social performance may be used as an insurance mechanism for higher litigation risk companies (Flammer's (2013); Jia et al. (2020); Koh et al. (2014); Mithani 2017).

Stock price reaction to ESG news

2014 is memorable because of the Volkswagen emission scandal, which has caused the fluctuation of stock prices by more than 18%. This was an example for different industries of how environmental standards could impact a company's financial performance. Multiple studies have examined the effect of positive and negative ecological news on a company's stock prices.

Capelle-Blancard and Petit (2019) escalates that the stock market correlates with ESG news in an asymmetric manner. It says that negative ESG News such as significant fines or sanctions substant drop stock prices compared to the good news that brings a little positive reaction. The same outcomes were received by Klassen and McLaughlin (1996). Researchers find that stock returns' absolute value after positive news is smaller than negative stock returns after poor information. Given the situation creates a risk factor for companies up to the point when investors will demand to increase a rate of return (market risk factor) based on evaluated stock pricing information. Moreover, it created an unstable environment.

Although Cho et al. (2012) find that CSR performance scores diminish information asymmetry by assessing company market value, Aouadi and Marsat (2018) believe that ESG controversies impact high attention firm market value in countries with higher-level analysts' coverage and press freedom. With the dataset of more than 3000 ESG controversies provided by

Asset4 Thomson Reuters – they prove that a higher CSP score impacts market value for listed firms. Naughton et al. (2019) find that during the times' investors set a valuation premium on ESG performance - officially announced companies ESG Activities generates abnormal positive returns.

Arisen conflict of positive and negative ESG news effects pushed the idea that investors overreact to ESG news. Cui B. and Docherty P. used event study methodology to examine how stock return reacts around news announcements. Evidence showed that the market overreacts to ESG news. Also, they stressed the negative consequences for market efficiency and investors' behavior.

Although given examples do not show the full picture of ESG news influence on the stock's market value as they measure the announcement period returns around ESG news release date, just a few studies have examined the long-run post-announcement returns to investigate whether the market reacts efficiently to ESG news releases. Also, Zhang and Arya (2009) escalate those other social issues than the news can influence stock prices variability.

To conclude, Klassen and McLaughlin (1996) and Capelle-Blancard and Petit (2019) argue that negative news creates a stronger adverse reaction on the stock price compared to the positive effect after the positive news reaction. On the other hand, Cho et al. (2012), Aouadi and Marsat (2018), and Naughton et al. (2019) presented the works where the ESG news impact helps not only to increase the value but also receives an abnormal positive return. Although, the effect of ESG news on stock price value is still debatable due to the lack of information on short and long-term post-announcement returns.

1.2.3. ESG scores efficiency during Covid 19 pandemic

Douglas et al. (2017) affirm that companies benefit from public ESG rate exposure and modify the risks better than competitors (Orlitzky & Swanson, 2008). 2020 has brought the terrifying pandemic. World Health Organization (WHO) has declared the spread of COVID-19 in March 2020 - which caused a sharp decline in the market. The beginning of the year crisis has caused S&P to fall by 32.11%. (March 2020). Although nobody knows the natural effect of the commonly taken decision of Covid -19 prolonging. In current circumstances, investors are searching for low-risk and high-performance investments. Not to mention that ESG funds Captured $51.1 Billion from new investors during the same period. It led to the beneficial increase of ESG

stock indices, including MSCI emerging markets ESG leading index S&P 500 ESG index and MSCI Asia ESG leader index, which has outperformed their parent indexes by 0.6% percent, 0.5% 3.83%, respectively on a total return basis. (Khew, 2020).

According to Hoang, Segbotangni, and Lahiani (2020b), companies' behavior toward ESG performance and its transparency help to reduce stock volatility. Especially during the Covid-19 shock - the authors stress the higher ESG companies' capabilities to remain stable in the market and overcome the problems with lower losses. Albuquerque et al. (2020) explained the same point of view. The author positively evaluated higher ESG ratings companies' performance, low volatility, and higher operating profit margins during the market crash. Likewise, Mitra & Pria (2021) analysis showed that in the conditions before and during COVID 19, concern for the environment was able to have a positive influence on the performance of the organization, especially judging by market factors; measured through the company's EBIT growth, as well as the financial market; assessed by net profit and market capitalization. It has confirmed the Ding et al. (2020) outcomes which showed that historical data of CSR activities during the world-famous covid-19 pandemic materialized in a moderate decline of stock prices compared to the competitors.

The Effect of ESG performance during the Covid 19 pandemic was so strong that even the studies which did not identify the o significant relationship between ESG ratings and stock performance anyway distinct the companies which are part of ESG funds. Those companies proved the higher performance rates.

Literature review				
Authors	**Sample**	**Time frame**	**Model**	**Relation**
Cheng et al. (2014)	49 countries	2002-2009	OLS regression	Positive
De Klerk et al. (2015)	UK	2007-2008	Ohlson model, Barth and Clinch	Positive
Kaspereit & Lopatta (2016)	Europe	2001-2011	Feltham & Ohlson model	Positive
Miralles-Quirós et al. (2018)	Brazil	2010-2015	Ohlson model, Barth and Clinch	Positive
Schadewitz & Niskala (2010)	Finland	2002-2005	Ohlson model	Positive
Kirkerud &Tran (2019)	Europe	2011-2017	Ohlson model, Barth and Clinch	Positive
Hassel et al. (2005)	Sweden	1998-2000	Ohlson model	Negative
Albuquerque, R., Koskinen, Y., Yang, S., & Zhang, C. (2020)	US	2017-2019	Cross-sectional regression	Positive

Amal Aouadi & Sylvain Marsat, (2018)	58 Countries	2002-2011	OLS regression	Negative
Garcia et al. (2017)	BRICS	2010-2012	Multiple regression with panel data	Negative

To conclude, the constructed concept of ESG which has a history from 20th century impacted the perception of companies position in society. Due to the environmental changes, social responsibilities and governmental awareness ESG has become the index representing non-material companies' performance for a public investor. According to Khan et al. (2016) the improvement of sustainability requirements benefits the top line growth, reduction of legal intervention and uplift of investments. Also, based on the previous research, we can mention that most of scientists have allocated the positive correlation between the growing stock prices and higher social responsibility performance indicated by ESG rates. (Klassen and McLaughlin in 1996.; Davidson et al. (2019); Sini (2012); Zhu (2017)). Contrary, Manchiraju and Rajgopal (2017) have discovered that public social responsibility disclosure reduces performance and increases the costs at the shareholder's expense. likewise, previous studies have found a positive, negative, and non-existing correlation between ESG and risk. (Flammer's (2013); Jia et al. (2020); Koh et al. (2014); Mithani 2017). Has confirmed the possibility of ESG ratings benefiting the companies risks reduction as an insurance mechanism for a higher litigation risk company. However, Manchiraju and Rajgopal (2017) stress the negative impact not only on the ESG influence on company's risk reduction but also stronger negative reaction from unexpected unpleasant news than positive reaction from good news. The same ideas were shared with other authors. (Klassen and McLaughlin (1996) and Capelle-Blancard and Petit (2019)). On the other hand, Cho et al. (2012), Aouadi and Marsat (2018), and Naughton et al. (2019) escalated that companies publicly performing ESG valuation has a stock price increase in the post-announcement period and shows the lower drop in the stock prices after the negative news announcements. This was confirmed by A, Segbotangni, and Lahiani (2020b), Albuquerque et al. (2020), and (Khew 2020). Throughout the first wave of Covid-19 period. Researchers were sharing the same aspect of the beneficial ESG performance effect during the crisis in the presented works. It helps reduce the stock volatility and shows higher operating profit margins during the market crash.

2. METHODOLOGIES FOR A RESEARCH: ESG PERFORMANCE IMPACT ON THE STOCK PRICES

This chapter presents the research design including the models - its variables and methods used to construct research on extracted data for 3 hypotheses related to the ESG performance influence on stock prices based on the literature shown above.

2.1. Aim and Hypothesis of the research.

The research aims to investigate how Environmental, Social, and Governmental (ESG) performance influences the changes in Stock Prices.

Hypotheses

This chapter presents the 3 hypotheses related with the ESG performance influence on stock prices based on the literature presented above.

The first hypothesis was inspired by Hassel et al. (2005), De Klerk et al. (2015), Kruger (2015) Miralles-Quirós et al. (2018), who made a significant impact on the understanding of ESG relevance on the company stock price. They have explored the common idea thought conclusions were different.

Schadewitz and Niskala (2010) have concluded that GRI reporting decreases the information asymmetry between stakeholders and firms, positively affecting stock prices. De Klerk. et al. (2015) finds that CSR disclosure is value-relevant for stock prices in developed economies. Related results were presented by Kaspereit and Lopatta (2016) and Miralles-Quirós et al. (2018).

Although Hassel et al. (2005) disagree with those statements and mention that relevant information to investors is associated with financial indicators such as net income or book value of Equity. According to Hassel, environmental performance was value appropriate for the market value of listed companies with significantly negative relationship (Hassel et al., 2005, p. 45). Likewise, Kruger (2015) received a similar result and committed that ESG related information potentially might damage companies' value in the short run.

In conclusion, the more studied article presented the supporting behavior toward ESG transparency importance and its significant value to the stock prices. Based on this reasoning, I am offering the first hypothesis.

H1. Higher company ESG score value positively affects stock prices.

H_A: Higher Company ESG Score value negatively affects stock prices.

The second is since each company develops its business plan differently according to its activities, the economy in which the company exists, and governmental provision.

Even in 1979, Carroll has highlighted the importance for corporations to fulfill their economic responsibilities to meet consumer needs in society. This reasoning was backed in 2012 by Mermaid, which found that during the last decade, consumers are willing to spend an additional 5% fee for a green product in condition to meet the performance rate like the alternatives (Miremadi et al., 2012). However, each pillar's value is different from the overall performance indicator. Ziegler et al. (2007) determine that environmental company performance has a more substantial effect than social performance on overall company value.

With boosting society's interest in environmental issues, I want to investigate whether the environmental factor influences a company's stock prices more than social or governance factors. Regarding that information, I would like to present Hypothesis 2.:

H2. The environmental pillar score impacts the stock price more than social or governmental pillars.

H_A: The Environmental pillar score impacts the stock prices less than social or governmental pillars.

Due to the Covid-19 pandemic, 2020 has become an opportunity to study the ESG rating real value and risk aversion capabilities mentioned in the literature for over 50 years. Economy shock has made most of the world's indexes fall. Although the daughter indexes, which included stock prices of companies performed ESG reports, has shown better results.

This unpredictable period has endorsed the Albuquerque et al. (2020) results which mentioned that higher ESG ratings companies' performance maintains low volatility and higher operating profit margins during the market crash. Likewise, Hoang, Segbotangni, and Lahiani's (2020b) theory that companies' ESG performance and its transparency helps to reduce stock volatility.

Considering that numerous variances of covid-19 appear in the various parts of the world, it is unpredictable when the next crash might happen. Regarding the circumstance, I would like to present Hypothesis 3 and Hypothesis:

H3. Performed ESG score protects company's Stock price stability during the covid-19.

H_A: Performed ESG score do not protect company's Stock price stability during the covid-19.

2.1. Stock price performance models with ESG performance element

First, we introduce the 2 price models we include in our analysis. First model includes the financial measures required for share price explanation. Proposed by Ohlson (1995) and Barth and Clinch (2009) , second model is an extension of Ohlson model with the inclusion of non-financial information as an additional variable for a better stock price prediction.

Next, we describe the statistical method used in the analysis and lastly, we present the selection of data.

1. **Price model 1**

Ohlson (1995) has offered the baseline valuation model. In 2009 Barth and Clinch offered the developed model with the stock prices specifications and modifications. This model will help to evaluate the financial state of stock price

$$P_{i,t} = \beta_0 + \beta_1 BVPS_{i,t} + \beta_2 EPS_{i,t} + \varepsilon_{i,t} \quad (1)$$

Variables:

$P_{i,t}$ - Stock price of company i at year-end t is the dependent variable in all our models.

$BVPS_{i,t}$ – Book Value per share of company i at year-end t (independent variable).

EPS $_{i,\,t}$ - earnings per share of company i at year-end t (Independent variable).

$\varepsilon_{i,\,t}$ - is the disturbance of company i in year t which contains unobserved factors.

Although to test this model, based on the Collins et al. (1997) and Francis and Schipper (1999), it is necessary to separate two independent variables in order to isolate BVPS and EPS from the influence of each other.

$$P_{i,t} = \beta_0 + \beta_1 BVPS_{i,t} + \varepsilon_{i,t} \quad (1.1)$$

$$P_{i,t} = \beta_0 + \beta_1 EPS_{i,t} + \varepsilon_{i,t} \quad (1.2)$$

Calculation 1.1 - Analyze the stock price $P_{i,\,t}$ of company i at year-end t and book value per share $BVPS_{i,\,t}$.

Calculation 1.2 - Analyze the stock price $P_{i,\,t}$ and earnings per share $EPS_{i,\,t}$.

2. **Price model 2**

The second model is an extension of the baseline model (1), which includes the ESG score variable for the company i as year-end t to see if a piece of additional non-financial information provides additional value on stock price.

$$P_{i,\,t} = \beta_0 + \beta_1 BVPS_{i,\,t} + \beta_2 EPS_{i,\,t} + \beta_3 ESG_{i,\,t} + \varepsilon_{i,\,t} \quad (2)$$

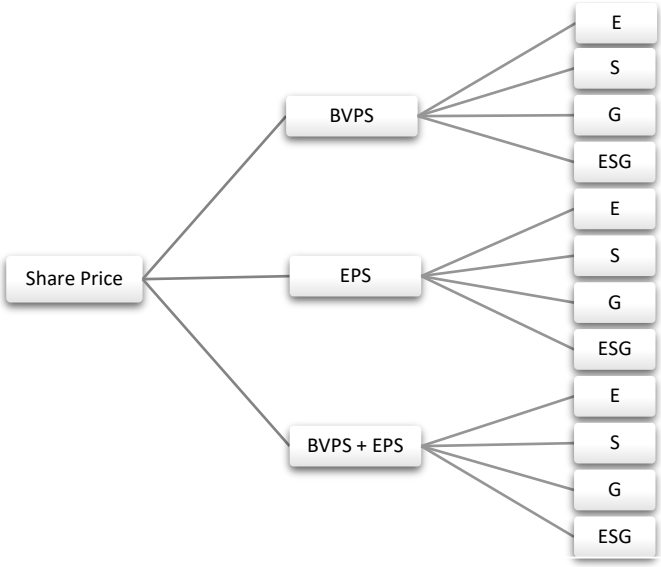
Cao et al. (2019) state that stocks with greater ESG scores also tend to position more highly. This represents that the ESG score and non-financial information it presents tend to be relevant for a stock price. From this model, it is expected that the coefficient for ESG score $\beta 3$, will be significant. According to the collected results, I will accept or decline hypothesis 1. Additionally, I will use the same model to regress the ESG scores to three pillars: Environment, Social and governmental for each company to determine which factor is the most relevant for a stock price. According to the results, I will accept or decline Hypothesis 2.

Also, hypothesis 3 will be approved or denied by using the same models for a period from March 2020 (the start covid -19 Pandemic) to check if the stock prices have remained stable or showed the better performance in comparison to other companies in the period of crisis as it was found in the works of Hoang, Segbotangni, and Lahiani (2020b) and Ding et al. (2020).

Research model

Figure 1 presents the 12 core analysis models. Model (1) – (4) is an extension of Calculation 1, in which we include the ESG variable. Model (5) – (8) is an extension of Calculation 2, and finally model (9) – (12) represents price model 2. We further extend these models to include a dummy variable for sensitivity

Figure 1: Core models



Notes: The figure shows the total of 12 core models conducted for our analysis.

2.2. Data

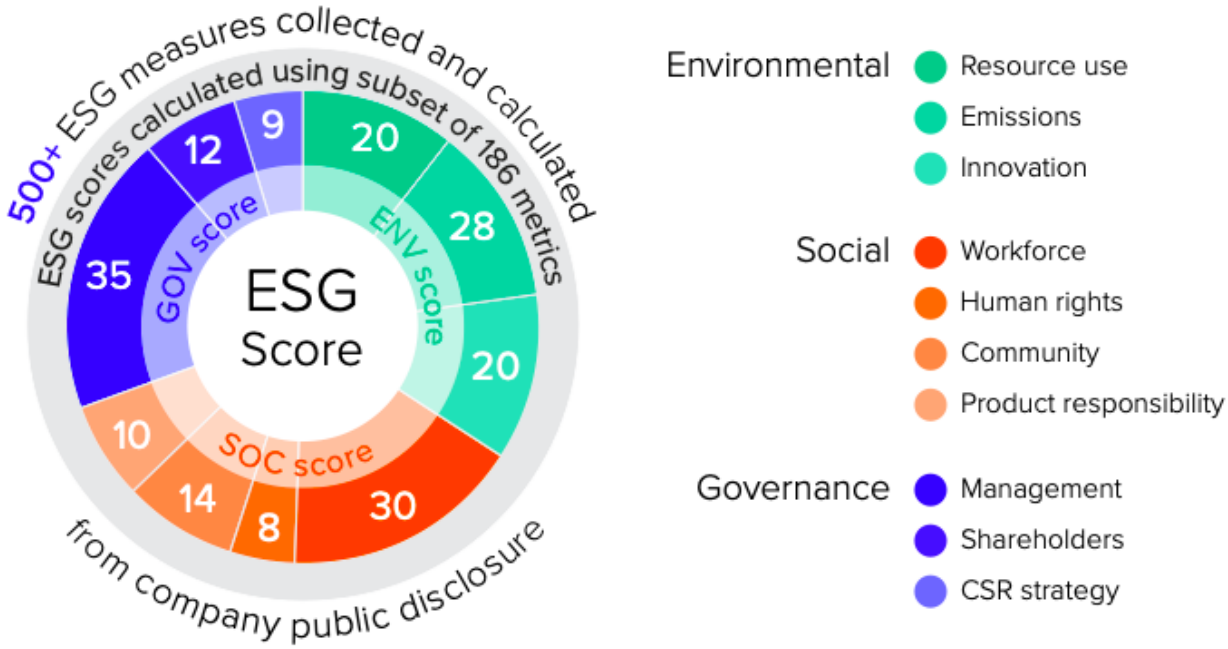
To gather the data, we will use ESG Book database. Due to the accurate data and detailed insights, this information provider is widely used by researchers, analysts, and investors. This database has complete access to more than 9,000 companies headquartered in Europe.

To have clean data, we will use the criteria for a filter which will include the Location in Europe and United states a specific sample period. To measure the difference of stock prices, its variable will characterize closing price at the end date of the fiscal period. The EPS variable will be characterized by the division of Diluted EPS discounting the items for the fiscal period and diluted

weighted average shares. Finally, Book Value per share or BVPS is counted out of total Equity to basic weighted average shares outstanding at the fiscal period end date.

ESG book scores are composed of three environmental, social, and governance pillars. This ESG score reflects the companies' performance, commitment, and effectiveness based on the reported information.

Figure 2: ESG Score Calculation



Source: ” ESG BOOK” database 2021

Overall, more than 350+ measures are included o compose that score based on annual reports, NGO websites, Stock exchange filings, and CSR reports. Overall ESG scores are updated once a year (Thomson Reuters, 2021), and this frequency will be used for analysis.

Statistical methods

Following the examples of Kirkerud & Tran (2019), Cucari et al. (2018) and Garcia et al. (2017) we use panel data to investigate the companies at numerous points in time and observe the relationship between variables that naturally show the changes during the time. According to Brooks, Panel data consists of both time series and cross-sectional elements (Brooks, 2014, p. 526).

The Ordinary least square (OLS) method will be applied to analyze the proposed model. This method was chosen to estimate the fixed effect model analysis. It allows measuring the effect of the independent variable selected on the dependent variable while the independent variable is held fixed. (Wooldridge, 2016). To use chosen method Gauss-Markov, five assumptions must be fulfilled. If beliefs are violated, the regression might be biased, and significantly important variables may be omitted.

Following assumptions:

- Constant linearity in the parameters.
- Random sample of n observations
- The independent variables should be not perfectly correlated
- The error term u is expected to be zero for all values of x
- Assuming homoskedasticity, the variance of the errors must be constant

OLS estimators are totally unbiased only if the listed assumptions are fulfilled in a great manner. (Wooldridge, 2016).

This paper will follow the same OLS practice as the previous researcher (Hassel et al., 2005; Cheng et al., 2014). According to that research to conduct cross section and time-series analysis, it is a common experience to use price models, return models, or both models- due to the fact, that ESG scores are posted once a year best opportunity is to use the Price model, which is based on the share price at a particular point in time. Also, panel data sets allow for controlling unobserved factors which may be correlated with explanatory data (Wooldridge, 2016). Brooks (2014) explains that balanced panel data shows the same observation amount for every cross-sectional unit while missing observations at a particular time represent unbalanced panel data with the variating number of cross-sectional elements. To estimate the panel, we choose between Fixed and random effects.

Random Effect Model – assumes that explanatory variables have fixed relationships with the response variable across all observations, but that these fixed effects may vary from one observation to another (Kumar et al, 2021). Those Statistical models always describe variation in observed variables in terms of systematic and unsystematic components. for the entity, unusual intercepts tend to be constant and presumed to have a mutual intercept that is equal for all cross-sectional units (Brooks, 2014).

Fixed effect model – assumes that the explanatory variables have different relationships with the response variable within groups (e.g., subjects) but share the same fixed relationship across groups (Kumar et al, 2021). According to Brooks (2014), Fixed effect model is better when the entire population Is presented while the random effect model is more appropriate with the randomly selected entities from the population.

Since in our research we are interested to analyze the impact of the variables over time according to Oscar Torres-Reyna (2007) it's, the best to use the fixed-effect model. This model will allow us, to explore the relationship between predictors and outcomes within an entity (company). using the fixed-effect model we assume that something within the individual may impact or bias the predictor or outcome variables and we need to control for this Oscar Torres-Reyna (2007). Another crucial assumption of the Fixed Effect model is that those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics.

Value relevance – R^2

To evaluate the variation of the dependent variable Y by independent variable X in this work, R^2 measure will be used for multiple regression analysis. (Wooldridge, 2016). With the new amendments in the model and additional variables included the measure of R^2 will always grow, regardless of the relevance of those variables. The adjusted R^2 levy a penalty for having other independent variables in the model. (Wooldridge, 2016). If the additional variable's T- value is higher than the absolute value variable, then R^2 will show an increase. This variable was used among studies on estimating the value relevance of financial and non-financial factors on firm value. Schadewitz and Niskala (2010) have used R^2 to support or decline the hypothesis.

Value relevance - Regression coefficients

Regression coefficient significance is equally important as an adjusted R^2 measure obtained in the analysis. This approach was commonly used by several previously mentioned research in the thesis before (Garcia et al., 2017; Miralles Quirós et al., 2018). The significance of coefficients will allow us to discuss the statistical economic, and practical significance of the estimates (Wooldridge, 2016). Due to the specifics of the topic, the excessive focus on the statistical significance of variables may affect the actual interpretation. (Wooldridge, 2016). Finally, as Wooldridge (2016) suggested, 5 % significance will be settled for our variables.

Robustness tests

For a robustness test, it is required to complete several modifications of the panel data baseline price model to prove the validity of statistics and conclusions. The robustness test allows performing a regression with the generalized least square estimation (GLS) method. Performed regression is solid for autocorrelation and heteroskedasticity (Wooldridge, 2016). This method permits to control of unobservable effects in the independent variables. GLS evaluation is conducted according to the panel data model, which allows us to study the change in price reflection in the internal company operation over time (Brooks,2014). After, it is necessary to amend the model with a control variable for size to investigate the effect of firm features on the stock prices in the model. The same path was used by the Kaspereit and Lopatta (2016), Cheng et al. (2014) and Miralles-Quirós et al. (2018). Further, the transformation of financial variables to a logarithmic form is required. In 1999 the, the data transformation as a robustness test was performed by Francis and Schipper (1999). Logarithmic models will eliminate book values and earnings observations. In log form, the model will have a greater chance of fulfilling the OLS assumptions and lead to a lower variation of variables and outliers influence (Wooldridge, 2016). In this case, the coefficients are interpreted in percentage change which suits the best or monetary value (Wooldridge, 2016). Conclusively, extraction of the finance and insurance sectors company is required to check if its characteristics make an influence on analysis the same as it was done by Miralles-Quirós et al. (2018).

3. EMPERICAL RESEARCH RESULTS OF ESG IMPACT ON COMPANIES STOCK PRICES.

This section will present the analysis of gathered data, results, and discussions. We will start by presenting data of our data set. The second step will present the descriptive statistics, Correlation matrix, Multicollinearity, and heteroskedasticity. In the third part, we will present the analyses and comment on the results concerning ESG performance impact on stock prices and our hypotheses. Also, the results will be compared with the previous research. Further, a robustness test will be performed and compared with the main model results to increase the validity and reliability of our study. Lastly, we summarize the results and hypotheses.

3.1. Data modifications

To make the analysis more reliable and accurate, we focus on the companies where ESG Book has reported an ESG score over the last five years, from the year 2017 to 2021. Considering the companies presented by the ESG Books it was decided to leave the Finance and insurance companies sectors Kasper and Lopatta (2016)) for overall analysis. Instead, a robustness check will be used to overview the model results. Rather, we do a robustness check where we look for any changes in our results when excluding these companies, as these companies' financial data might be less compared to other companies. We choose a data set of 150 companies and 750 firm-year observations. List of companies was compounded from 3 different capital sizes mid, large and mega capital allocated in US and Europe. All companies have a full set of BVPS, EPS, E, S, G, and ESG period data for years 2017-2021. Following Collins et al. (1997), observations were identified as outliers in the regressions. We have excluded the upper and lower 1 % of the observations, in line with Francis and Shipper (1999) and Kaspereit and Lopatta (2016). This is done for all three financial variables, price, earnings per share, and book value per share. Removing 17 companies' observations from our data set, EPS and BVPS, share price respectively. This gives us a total of 665 firm-year observations in our analysis.

Descriptive statistics and correlation matrix

Table 3, Panel A shows the descriptive statistics of our dependent and independent variables. It includes mean, median, standard deviation, minimum and maximum values. Panel A of Table 3 shows that the mean ESG score for European and US companies in our sample is 60.84. The actual ESG scores range from 37.08 to 75.44 out of the potential score from 0 to 100. This shows that there

is a variation in the best performing and less successfully performing companies in our sample. For the individual ESG factors, the mean is 64.17 for the environmental score, 61.49 for the social score, and 58.13 for the governance score. The median of these variables is slightly higher, indicating that some companies obtain a low score that decreases the mean values.

Table 3. Summary Statistics

Panel A: Descriptive statistics

	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
Share Price	.85	665.00	61.43	67.2	4.042	26.67
BVPS	.001	1999.50	40.51	149.96	9.332	95.872
EPS	-2.5	132.61	4.77	10.02	6.334	56.656
Environment	32.54	82.98	64.17	9.37	-1.018	1.083
Social	32.2	80.68	61.49	7.17	-.669	.905
Governance	7.81	81.11	58.13	11.93	-.766	.621
ESG	37.08	75.44	60.84	6.73	-.712	.218

Panel Correlation matrix

	Share Price	BVPS	EPS	Environment	Social	Governance	ESG
Share Price	1						
BVPS	.302**	1					
EPS	.448**	.232**	1				
Environment	.096*	.064	-.028	1			
Social	-.115*	-.046	.005	.695**	1		
Governance	.128*	.058	.087*	-.038	.075	1	
ESG	.174**	.082*	.074	.511**	.619**	.761**	1

This table shows the descriptive statistics (mean, maximum, minimum, and standard deviation) and the correlation matrix of the financial variables: Price (share price), Book value per share (BVPS), and Earnings per share (EPS), and the environmental (Environment), social (Social), and corporate governance (Governance) performance variables, as well as a general ESG performance measure obtained from the arithmetic, mean of the previous three. **. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

According to Brooks (2016) Skewness measures to what extent the distribution of observations is symmetric about its mean value. A normal distribution is supposed to have a zero skewness. The presented financial variables including, Price, EPS, and BVPS, are all positively skewed, which means that the tail of the distribution is stretching towards the right and the data is grouped towards the left. The BVPS, with a presented skewness measure of 9.33, is the most skewed variable which is to be expected as large mean values drag the data in one direction. Also, all ESG variables are slightly negatively skewed. Also, normal distribution will have a coefficient of kurtosis of minus 3 (Brooks, 2014, p. 66). Further, a normal distribution will have an excess kurtosis equal to zero, as this measure equals kurtosis -3. Our financial data have a leptokurtic distribution. This is

ordinary in economic time series (Brooks, 2014, p. 67). It has fit coefficients of kurtosis ranging from 26.67 to 95.872.

Table 3 Panel B data presents a correlation matrix with the correlation coefficients between the variables in our data set. A correlation coefficient lies between the values 1 and -1, where a correlation of 1 indicates a perfect positive correlation and -1 a perfect negative correlation (Brooks, 2014, p. 69). Table 3 shows that there are negative correlations of Environmental with EPS and Governance, Social with Share Price and BVPS. All the coefficients are significant except for the governance score which has insignificant correlation coefficients with financial variables. This may suggest that the governance score is less important concerning financial performance. EPS and BVPS both show a high correlation with Price, with a correlation coefficient of 0.448 and 0.302 respectively. This approves the value relevance theory, which indicates the high correlation between these variables. The variables E, S, G, and ESG have a lower correlation with Price, where S has the lowest with a correlation coefficient of -0.155 (significant). E, S, and G are correlated with ESG which is to be expected as these are all included in the ESG measure.

Multicollinearity and Heteroskedasticity

To investigate whether there is a problem with collinearity in our independent variables, we use the variance-inflation factor (VIF) to find how much of the variation of the slope coefficient is determined by the correlation between xj and the explanatory variables (Wooldridge, 2016, p. 86). Multicollinearity occurs when the correlation is high (but not perfect) between two or more independent variables (Wooldridge, 2016, p. 84). This may lead to large standard errors in the OLS estimates. Even if there exists a high correlation between the explanatory variables, it will not violate any OLS assumptions, but it might be difficult to estimate the partial effect of the explanatory variables (Wooldridge, 2016, p. 293). We do a two separate VIF test in SPSS for separate ESG elements and common ESG indicator which shows that our variables have a VIF value below 10. This indicates that there are no problems estimating bj, and assumption 3 is not violated. assumption 3 is not violated.

When the variance of the errors in a model is not constant, the errors are heteroscedastic (Brooks, 2014, p. 182). To see whether our data suffers from heteroskedasticity we use Breusch-Pagan/Cook-Weisberg's general test for heteroskedasticity. In addition to these tests, we can detect whether the errors are heteroskedastic by plotting the estimated residuals against one of the

explanatory variables. In this scatter plot, no apparent pattern would imply that the errors are homoscedastic. Results from the Breusch-Pagan/Cook-Weisberg tests in SPSS indicate that we should reject the null hypothesis of homoskedasticity and constant variance. The scatter plot yields the same results, which indicate that our data suffers from heteroskedasticity. To deal with the heteroskedasticity in our data, we use heteroskedasticity-consistent standard error estimates, also known as robust standard errors (often attributed to White (1980)). This estimate is a correction for degrees of freedom and the squared OLS residuals are the same for all observations (Wooldridge, 2016, p. 246).

Table 4. Panel data price model regression results

	Model (I)	Model (II)	Model (III)	Model (IV)	Model (V)	Model (VI)	Model (VII)
BVPS	.058		.051	.051	.051*	.052*	.050*
EPS		.297*	.276*	.277*	.276*	.277*	.270*
Environmental				.169*			
Social					-.001		
Governance						.374**	
ESG							.522**
Constant	8.971**	8.926*	8.880*	-.880*	72.872*	-18.353**	-14.759*
Observation	665	665	665	665	665	665	665
Adjusted R-squared	.916	.917	.917	.917	.917	.919	.918
F-Test	58.585**	58.709**	58.439**	57.970**	57.878**	59.233**	58.56**

Notes: This table shows the results obtained for estimates of the regression model using the baseline models (I) - (VII). Robust standard errors in parentheses, ** $p < 0.05$; * $p < 0.1$ based on two-tailed tests.

We can see that environmental and governance performance is positive and significantly related to the price of shares. In the case of social performance, this is positively associated with the price of shares, even though it is not statistically significant. In addition, when ESG or its separate variables information is included in the model the adjusted R^2 increases and the F tests are statistically significant, which suggests that information from a given set of data is applicable for the valuation of the stock market. Along, with the accounting information stressed by Ohlson. And like in most previous studies in which dummy variables were used, social responsibility reports or the inclusion of the company in a sustainability index, in this study we use the three innovative ESG pillars and discover that investors do not significantly value those pillars.

It is important to stress that the given result brings the conclusion that investors taking decisions regarding the listed companies may require to include the sustainability strategy information for firms.

In Table 4, we can see the model (I) – (III) which includes estimation based on the Ohlson price model, with the size specification suggested by Bart and Clinch (2009), by looking at the financial information BVPS and EPS. In model (IV) – (VII), we include the set of sustainable scores as independent variables in addition to the financial variables to examine the value relevance of ESG. In Table 4, both β_1 and β_2 are statistically significant at the 5 % level in the model (III). The coefficient of BVPS has a value of 0.051, which implies that an increase in book value per share of USD 1 leads to, on average, an increase in the stock price of USD 0.051. Earnings per share have a coefficient of 0.276 which implies that the price is more sensitive to changes in earnings than in book value per share. If only one of the two financial variables is included in the model (model (I) and model (II)), the regression coefficient increases, which indicates that price is more sensitive to either when this is the only explanatory variable in the model.

H1. A higher company ESG score value positively affects stock prices.

$H1_A$: Higher Company ESG Score value negatively affects stock prices.

Table 5 obtained from the panel data and OLS regression presents 12 core models. Model (1) – (4) consider only BVPS as the financial variable together with ESG and individual ESG factors as non-financial variables. Models5) – (8) include EPS and the ESG factors, and models (9) – (12) consider both the financial variables BVPS and EPS. Overall, all coefficients are positive and significant except for the social score, which is positive and insignificant in models (II), (VI), and (X). When we include the overall ESG scores in the models, we see that the coefficient for ESG is highest in the model (IV), with 0.530, in which BVPS is included as 0.056 respectively as a part of financial information. In model (VIII), the coefficient for ESG is 0.528 when controlling for EPS. The ESG coefficient is significant at the 5 % level in all models. When we include both financial variables BVPS and EPS in the regression, this increase the adjusted R^2 from models (1) – (8). The F-test shows that the increase is statistically significant at the 1 % level. The lowest explanatory power of models (9) – (12) is 0.916 in the model (X), and the largest is 0.918 in models (XI) and (XII).

Table 5. Panel data regression analysis

	Model (I)	Model (II)	Model (III)	Model (IV)	Model (V)	Model (VI)	Model (VII)	Model (VIII)	Model (IX)	Model (X)	Model (XI)	Model (XII)
BVPS	.057*	.057*	.059*	.056*					.051	.051*	.052*	.050*
EPS					.298*	.296*	.298*	.290*	.277*	.276*	.277*	.270*
Environmental	.164*				.175*				.169*			
Social		.043				.013				-.001		
Governance			.374*				.373**				.374**	
ESG				.530**				.528**				.522**
Constant	-.523*	6.41*	-18.244*	-25.210*	61.034**	72.719	-18.19**	-25.11*	-.880	72.872*	-18.35**	-14.759*
Observation	665	665	665	665	665	665	665	665	665	665	665	665
Adjusted R-squared	.916	.916	.918	.917	.917	.917	.918	.917	.917	.917	.919	.918
F-Test	58.105**	58.023**	59.364**	58.717**	58.241**	58.143**	59.486**	58.838**	57.970**	57.878**	59.233**	58.56**

*This table shows the results obtained by applying the modified version proposed by Barth and Clinch (2009) of Ohlson's model for the valuation of listed companies for the years 2017–2021. The results are presented first without including the ESG information and subsequently adding the different ESG performance measures to the model. The last rows include the adjusted R^2 and F test statistics. In brackets is the p-value, indicative of the significance of each coefficient and of the F test. **, represent the 1%, significance levels, respectively*

H2: The Environmental score is more value relevant than the Social and Governance score.

$H2_A$: The Environmental Score is less value relevant than the Social or Governance score.

Table 5. We find that the coefficient for the environmental score is positive and significant at the 5 % level for models (I), (V) and (IX) (0.164, 0.175 and 0.169 respectively) as well as the governance score in models (III), (VII) and (XI) (0.374, 0.373 and 0.374 respectively). The coefficient for social score is insignificant in models (II), (VI) and (X). The social score has a lower coefficient than the environmental or governmental score in all models, indicating that both are more value relevant for the stock price than the social score. In comparison with the social and environmental score - governance is the most significant indicator. All in all, environmental coefficients show lower impact on the share price in comparison with the governmental factor. Based on gathered results we partially agree with the hypothesis 2 on the basis that the environmental score is more value relevant than the social score although this variable is making lower impact to the value relevance for stock prices than Governmental score. These findings are the same as presented by Flammer (2013) who

find that governance score has a positive effect on stock price more than social effect. Although, due to the fact of the positive and significant environmental variable we can partially take in consideration the ideas of Ziegler et al. (2007) who find that environmental performance has a positive effect on stock price, but the social performance is insignificant.

3.2. Robustness tests

Following De Klerk et al. (2015), and Miralles-Quirós et al. (2018) we exclude companies from the finance and insurance sector in the analysis to see whether this influences our results. Removing observations related to these sectors leaves us with date firm-year observations.

Exclusion of sectors

Exclusion of sectors Following previous research we exclude companies from the finance and insurance sector in the analysis to see whether this influences our results. Removing observations related to these sectors leaves us with ninety-four firm-year observations

Table 6 Panel regression excluding financial sectors

	Model (I)	Model (II)	Model (III)	Model (IV)	Model (V)	Model (VI)	Model (VII)	Model (VIII)	Model (IX)	Model (X)	Model (XI)	Model (XII)
BVPS	.018*	.016*	.020*	.016*					.018*	.016*	.020*	.016*
EPS					.116	.094	.113	.106	.115	.094	.112	.105
Environmental	.141*				.153*				.143*			
Social		.300				.292				.279		
Governance			.187*				.187*				0.186*	
ESG				.386*				.387*				.380*
Constant	24.397*	15.442	21.751	8.730	23.313*	15.788**	21.610**	8.431	23.486*	16.180	21.105	8.45
Observation	633	633	633	633	633	633	633	633	633	633	633	633
Adjusted R-squared	0.851	0.852	0.853	0.853	0.852	0.852	0.853	0.853	0.851	0.852	0.852	0.853
F-Test	29.49**	29.581**	29.71**	29.78**	29.49**	29.57**	29.71**	29.78**	29.19**	29.262**	29.41**	29.47**

*Notes: This table shows the results obtained for estimates of the regression parameters, excluding observations from the finance and insurance sector. Robust standard errors in parentheses; ** p < 0.05; * p < 0.1 based on two-tailed t-test*

The results in Table 8 are consistent with the results reported in Table 6, even after excluding observations from the finance and insurance sector. We notice that the coefficient for governance score is currently significant at the 5 % level in the model (III), (VII) and (XI) and Environmental

score in the model (I), (V) and (IX). Further, the coefficients for the financial variables, governance and ESG score are all positive and significant at the 5 % level. This is consistent with the results reported in Table 5 and gives us reason to believe hypothesis 1 -when firms from the finance and insurance sector are excluded from the sample. These results again partially deny the hypothesis 2 that the environmental score is more value relevant than the social and governance score as Governance score in current pool of data is representing the highest significance and impact. Although, the exclusion of financial sector had decreased the impact of the governance score which according to the table 8 increasing the importance of environmental factor.

Variables in logarithmic form

We want to test our models using a different functional form of the financial variables, taking the natural logarithm of the price, book value and earnings variable. Following Francis and Schipper (1999), we include this as a robustness test in our analysis.

Table 7: Regression with logarithmic values

	Model (I)	Model (II)	Model (III)	Model (IV)	Model (VI)	Model (VI)	Model (VII)	Model (VIII)	Model (IX)	Model (X)	Model (XI)	Model (XII)
LN(BVPS)	22.690**	22.82**	22.77**	22.428**					20.85**	20.874**	21.073**	20.777**
LN(EPS)					6.241**	6.38**	5.907**	5.982**	4.684**	4.785**	4.306**	4.436**
Environmental	.094*				.119*				.061*			
Social		.060				-.183				-.155		
Governance			.369**				.330*				0.337**	
ESG				.474**				.377*				.346*
Constant	3.028	4.885	-18.349	-22.08**	8.70	26.63**	-8.787	-8.997	9.853*	22.809	-11.508	-9.197
Observation	525	525	525	525	525	525	525	525	525	525	525	525
Adjusted R-squared	660	660	660	660	660	660	660	660	660	660	660	660
F-Test	62.25**	62.231**	63.713**	62.86**	58.56**	58.58**	59.57**	58.86**	61.662**	61.702**	62.884**	61.975**

*Notes: This table displays the results obtained for estimates of the regression parameters, with logarithmic transformation of the financial variables Robust standard errors in parentheses,; ** p < 0.05; * p < 0.1 based on two-tailed tests*.

Table 7 shows that the results stay unchanged when including book value and earnings in their logarithmic form. From Table 7 we see that the number of observations is reduced to 660 as we cannot take the logarithm of negative values or zero. The coefficients for environmental, social and

governance score, as well as the ESG score, all show the same tendencies as in Table 5. The coefficient for social and environmental score is still insignificant, and the coefficients for governance score and ESG score are positive and significant at the 5 % level. When including the financial variables in their logarithm form, the coefficient for governance score is significant at the 5 % level in model (III), (VII) and model (XI). The environmental score is affected by the transformation of the financial variables and is less relevant for the stock after the transformation. The result strengthens the assumption from the Table 5 that hypothesis 2 cannot be fully acceptable. We should not directly compare the adjusted R 2 from these models with the ones reported in Table 5, as the variables are no longer the same due to the logarithmic transformation (Wooldridge, 2016, p. 173). However, we see that the adjusted R 2 in model (I) – (XII) in Table 7 are all significant at the 1 % level, which further increases our confidence in supporting hypothesis 1.

Other techniques

In the next robustness test we will show the results obtained from the feasible GLS regression. The results show that the coefficients for BVPS, governance, and ESG score are significant in all models. The coefficient for governance score is significant at the 1 % level in the models (XI), and (VII) at the 5 % level in model (VII). The coefficients for governance score in model (III), (VII) and (XI) are .100, .100 and .100, respectively. This approves the main analysis in Table 5, which shows that the coefficient for governance is more significant than Environmental. According to the results in Table 8, the environmental score is not significant for company stock price. All other relations remain qualitatively unchanged from the main analysis. We find the highest measure for overall R^2 in model (9) – (12) with 0.998, These measures are significant at the 1% level in all models.

Table 8: Panel data regression parameters FGLS

	Model (I)	Model (II)	Model (III)	Model (IV)	Model (VI)	Model (VI)	Model (VII)	Model (VIII)	Model (IX)	Model (X)	Model (XI)	Model (XII)
BVPS	.044	.048*	.046*	.041					.043	.048*	.046*	.039*
EPS					.048	.019	.019	.097	.034	.006*	.007	.086
Environmental	.060				.069*				.063*			
Social		.016				.018				.017		
Governance			.100***				.100**				.100***	
ESG				.265***				.277**				.273**
Constant	31.62**	34.82**	32.60**	23.03**	31.27**	35.12**	32.99**	22.54*	31.29**	34.77**	32.58**	22.363*
Observation	665	665	665	665	665	665	665	665	665	665	665	665
Adjusted R-squared	.998	.998	.998	.998	.998	.998	.998	.998	.998	.998	.998	.998
F-Test	1613**	1603**	1676**	1733**	1604**	1592**	1665**	1729**	1598**	1588**	1660**	1721**

*Notes: Shows the results achieved using a FGLS estimation method. Standard errors in parentheses, ** p < 0.05; * p < 0.1 based on two-tailed tests. Overall R-squared represents a weighted average of the variance in the model*

3.3. Price model application on companies' performance

H3: Performed ESG score protects company's Stock price stability during the covid-19.

$H3_A$: Performed ESG score harms company's Stock price stability during the covid-19.

Table 9. represent the computed models based on Ohlson and Barth and Clinch (2009) assumptions. The coefficient for BVPS is significant at the 5 % level in all models. These constructed models are significant at 1% level and allow us to calculate and observe how ESG affects the growth of stock prices over the years of Covid-19. For calculations, we will use the financial variables: BVPS, EPS, and Price of shares, also including the average ESG for a particular year. Computed results will show the company's share price fluctuations with the average ESG performance.

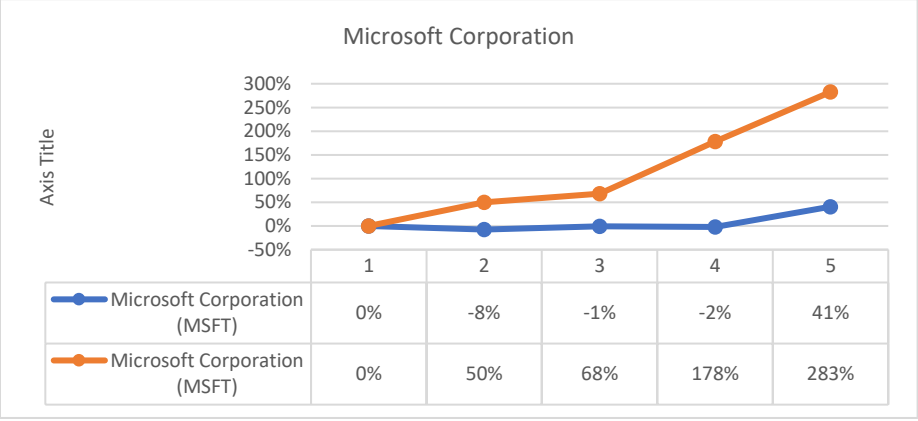
Table 9: Panel data models for 2017-2021

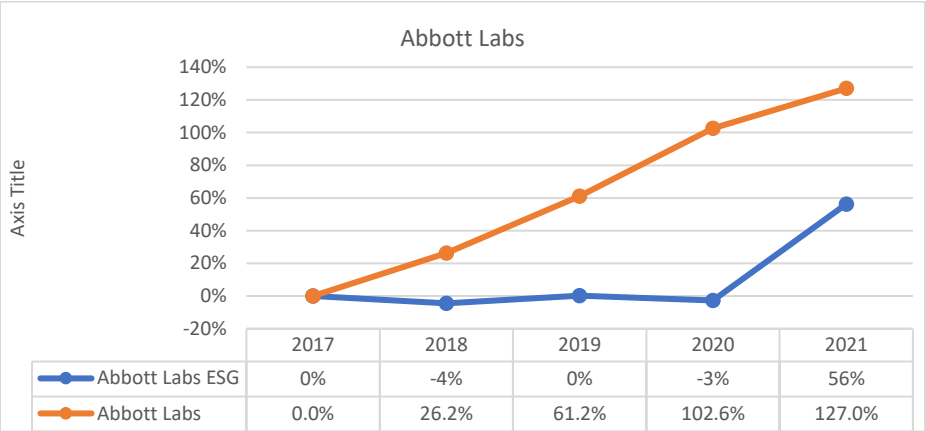
	Model (2017)	Model (2018)	Model (2019)	Model (2020)	Model (2021)
Beta (Constant)	-14.59*	-24.877*	-21.78	-24.59*	14.17**
BVPS	.062*	.110*	.106*	.101*	.047*
EPS	.213*	.180	.169	.201	.084*
ESG	.399**	.520**	.488*	.517**	.164**
Error	15.233	15.999	15.902	15.968	15.046
Observation	116	116	116	116	116
Adjusted R-squared	0.93	0.94	0.925	0.924	0.928
F-Test	64.67***	59.50***	60.42***	59.68***	63.81***
Average ESG	60.6800	60.7300	60.86	61.0600	61.8300

*Notes: Reveals the results obtained using an OLS estimation method. Standard errors in parentheses, ** p < 0.05; * p < 0.1 based on two-tailed tests. Overall R-squared represents a weighted average of the variance in the model*

To create a fair analysis, we will use the companies that do not provide the ESG information and compare their Stock price growth rate from 2017 to 2021 with the Share price including the ESG variable.

Figure 3: *Stock price growth over the years (Microsoft & Abbott Labs)*

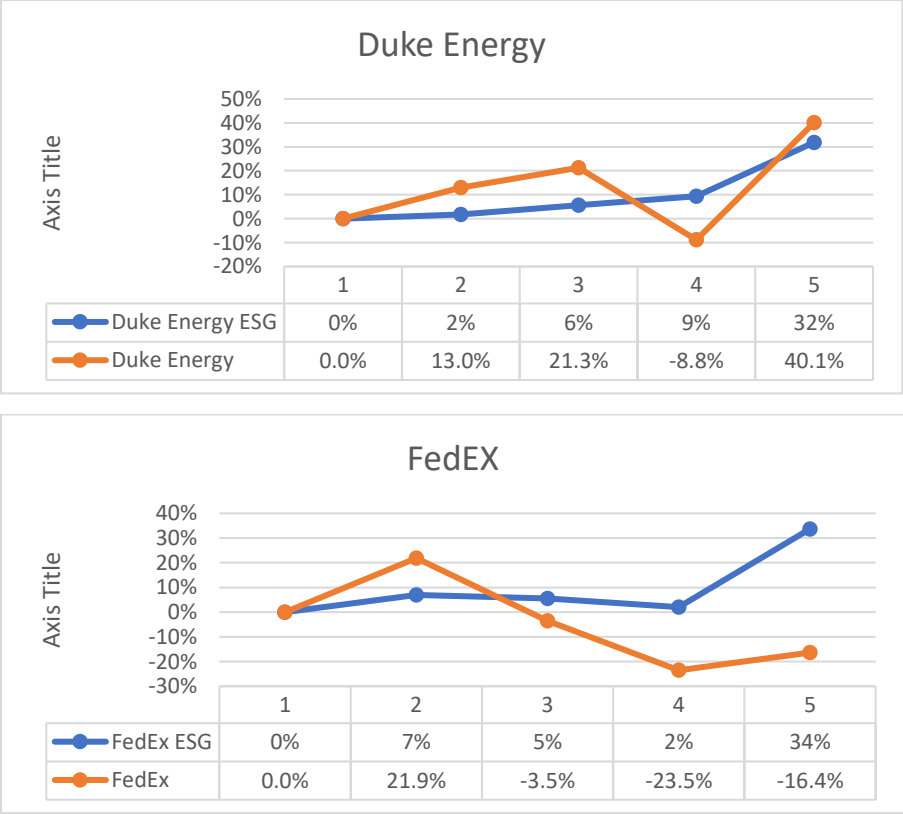




Source: Compiled by the author

The results presented in Figure 3 show that during the Covid-19 period of 2020 and 2021 two of seven companies were showing a better performance of real share price growth in comparison with share price growth that has included the ESG variable.

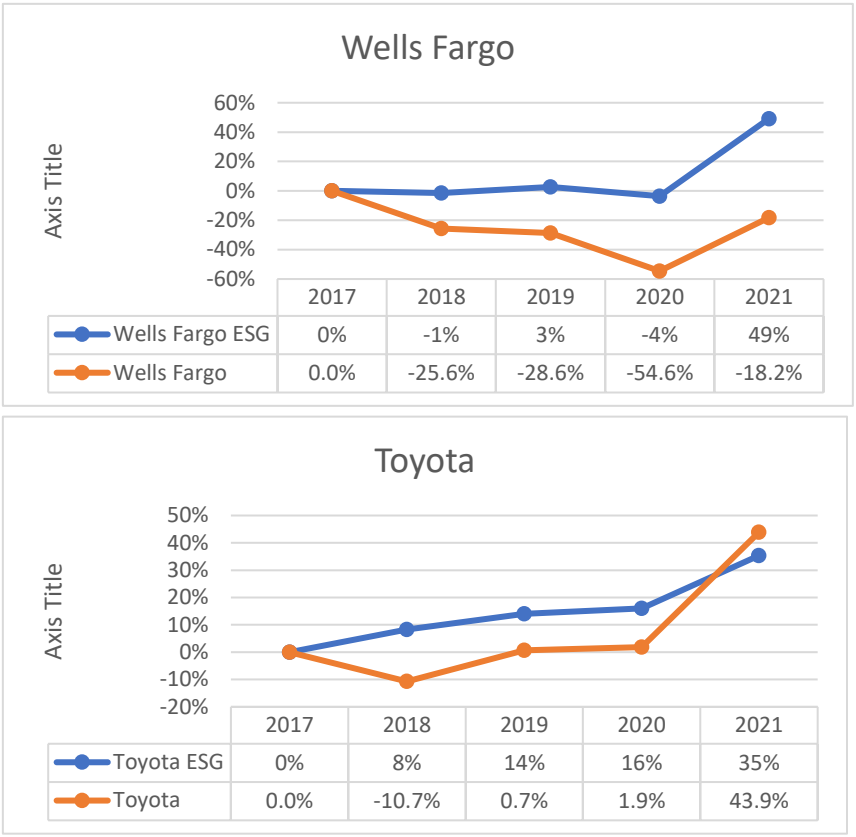
Figure 4: Stock price growth over the years (Duke Energy & FedEx)



Source: Compiled by the author

On the other hand, the result presented in Figure 4 presents Novartis and FedEx company results where it shows the significant importance of the ESG variable. It presents that during the period of Covid-19, declared ESG information would significantly increase the share prices and company's financial performance.

Figure 5: *Stock price growth over the years (Wells Fargo & Toyota)*



	2017	2018	2019	2020	2021
Wells Fargo ESG	0%	-1%	3%	-4%	49%
Wells Fargo	0.0%	-25.6%	-28.6%	-54.6%	-18.2%

	2017	2018	2019	2020	2021
Toyota ESG	0%	8%	14%	16%	35%
Toyota	0.0%	-10.7%	0.7%	1.9%	43.9%

Source: Compiled by the authors

And to finalize the figure 5 shows the overall higher performance of companies "Wells Fargo" and "Toyota" during the periods between 2017-2021. These results are going along with the assumptions presented by Aouadi and Marsat (2018), and Naughton et al. (2019) which mention that ESG performance helps not only to increase the value but also receives an abnormal positive return during the crisis periods.

In summary, Table 10 presents the results of conducted research on the hypotheses created by investigating and analyzing previous literature. In addition, the robustness tests described in the previous chapters yield the same results. Here we see that our analysis is robust for different statistical methods.

Table 10: Summarized results of our hypotheses		
Hypothesis		Conclusion
H1	*A higher company ESG score value positively affects stock prices.*	Accepted
$H1_A$	*A higher company ESG score value negatively affects stock prices.*	Rejected
H2	*The Environmental score is more value relevant than the Social and Governance score.*	Rejected
$H2_A$	*The Environmental score is less value relevant than the Social and Governance score.*	Accepted
H3	*Performed ESG score protects company's Stock price stability during the covid-19.*	Accepted
$H3_A$	*Performed ESG score harms company's Stock price stability during the covid-19.*	Rejected

We find support for hypotheses 1 – "*A higher company ESG score value positively affects stock prices"* - by analyzing the regression results presented in Tables 4-7. Based on primary Ohlson model and further modifications we see the results that goes along with De Klerk et al. (2015), Kaspereit & Lopatta (2016), Miralles-Quirós et al. (2018), and Kirkerud & Tran (2019) who discovered the significance of ESG on stock prices. In this case, the hypotheses 1_A – *"A higher company ESG score value negatively affects stock prices"* is rejected.

Furthermore, recent literature has been implementing the environmental issues as a criterion for crisis management during the downfall moments in a financial market. Taking into consideration the results gathered from our empirical research Table 5. We find that the coefficient for the governmental score is higher than Environmental scores and significant at the 5 % level for models (III), (VII) and (XI). Similar results were obtained by Flammer (2013) who determine a substantial effect of governmental company performance than social or environmental performance on company value. Based on that, we reject hypothesis 2 -*"The Environmental score is more value relevant than the Social and Governance score*" -and partially accept hypothesis 2_A – *"The Environmental score is less value relevant than the Social and Governance score*" (Table 10). - as the environmental score is more significant than the social score but less significant in comparison to the governance.

Although to benefit the brand name and market position Ziegler et al. (2007) offers to strengthen Environmental variable for over-all better ESG performance.

Lastly, Table 9 has shown the significant ESG impact on stock prices over the period of 2017-2021. It Presents the importance of ESG score as in the periods of stable growth, so during the Crisis times such as Covid-19. Figures 3, 4, and 5 from empirical research have shown the three different types of ESG impact on stock price during the examined period. Figure 3 represented that 2 out of 6 companies would have lower financial performance with the ESG indicator rather than without it. These results go along with the Kruger (2015) who committed that ESG-related information potentially might damage companies' value in the short run. Controversially, Figure 4 proves that an implication of the Non-financial ESG indicator maintains low volatility and higher operating profit margins during the market crash. as was mentioned before by Hoang, Segbotangni and Lahiani's (2020b). They stress that companies' ESG performance and transparency help to reduce stock volatility. Figure 5 presents the companies that have shown a higher Stock price performance with the ESG over all periods. Presenting that implementation of ESG reporting would be beneficial and crucial for those companies in times of crisis or stock price decrease. Analogous conclusions were made by Schadewitz and Niskala (2010) who have concluded that GRI reporting decreases the information asymmetry between stakeholders and firms, positively affecting stock prices. Based on that, we support Hypothesis 3 (Table 10) that *"Performed ESG score protects the company's Stock price stability during the covid-19"*. And reject the Hypothesis 3A- *"Performed ESG score harms company's Stock price stability during the covid-19".*

To conclude, we find that ESG performance is value relevant and positively associated with the stock price (H1), which is consistent with the stakeholder theory. These findings suggest that companies with a high ESG score are valued by stakeholders and that ESG investments lead to value creation. A more detailed examination of separate ESG pillars brought the result that the Environmental score is not more value relevant than the Governance score (H2). Even though the environmental score was showing significance - the coefficients of governance scores were higher in comparison with social or environmental. Also due to the results of performed research on price models we were interested in its effects on stock prices during the covid-19 period (H3). The outcomes were the following - during Covid-19 ESG performance brings the benefits of lower volatility, stronger robustness, and the ability to recuperate faster from the impact of the crisis.

CONCLUSIONS AND RECOMMENDATIONS

There is a considerable debate in the academic field on whether the ESG positively affects the financial well-being of the company. Over the year's management and shareholders' awareness about the companies, sustainability has shown the growth of interest around ESG Topic and its effectiveness. In order to investigate the ESG relevance in the current market this study carry the aim to analyze and conduct research on ESG's impact on stock prices combining theoretical (historical) and practical (Research) aspects by applying the panel data models for a company's which performing ESG. However, most of the existing literature on ESG value creation is based on companies during the stable period in financial markets and little is known about the influence of ESG during the Covid-19. Therefore, to create a better understanding of full ESG potential for a stock price it is necessary to fill in this gap. For that, we conducted the research and come up with the conclusions:

1. *According to the previously analyzed literature* company's investments in sustainable operations improve its image and reputation. This effect attracts investors and brings financial benefits to a given entity. To finish, those results imply that the governments are supposed to motivate companies to invest in CSR indicators to keep operating sustainably.
2. *Based on analyzed literature* companies performing great governmental pillar results attracts investors who are interested in the trustable and transparent companies. Mostly, these suggestions could be applied to industries or even companies existing in the strictly governed countries. At the same time the improvement of environmental pillar creates a better brand image for the government (company is located at), as well as attracts investors who are highly interested in the green markets. Mostly, these suggestions could be applied to environmentally sensitive industries
3. *Based on analyzed literature ESG performance brings the benefits of* lower volatility, stronger robustness, and the ability to recuperate faster from the impact of the crisis. As a result, ESG performance can operate as a good hedge in a crisis
4. *Based on the research created by other authors*, the effect of ESG performance news on stock price is still debatable due to the lack of information on short and long-term post-announcement returns.
5. *Conducted research showed that a Higher ESG score value positively affects the stock prices of the company*. This suggests that companies should invest in ESG performance to operate sustainably as it brings potential financial advantages to the markets. It also might

imply the international organizational interest and decisions to publish adjusted policies that focus on sustainability.

6. *From the conducted research we see that the Governmental score is more value relevant than the Social and Environmental score.* This suggests that to increase companies' financial well-being they should pay more attention to the activities associated with corporate governance, corruption, rule of law and transparency. Minor adjustments for suggested activities could drastically increase the overall performance of the company in the market. Also, to strengthen the ESG indicator companies may strengthen another significant Environmental score by improving the activities associated with emission, resource use, and innovation
7. *Completed research indicates- that ESG score protects the company's Stock price stability during the covid-19. O*ur results suggest that 4 out of 6 public companies which were not publishing the ESG score would show better stock performance with the average ESG score in comparison with the real stock price performance. Also, research indicates the benefits of ESG performance which go along with the analyzed literature

Implications

For investors: to avoid costly risks investors should implement ESG as an indicator for the company valuation process. In this way, investors will be able to detect companies with low ESG scores and steer clear of the possibility to lose money.

For Enterprises: to avoid the possibility of bankruptcy or valuable financial losses due to external factors. Enterprises should integrate the ESG concept into the operational structure – it will bring the clarity of actions during the crisis moments and company will be prepared for an emergency plan. This will increase the risk awareness around the issues related with Environmental, Social and governmental aspects of enterprises. Also, it will be easier to plan the operational losses during the periods of crisis and decreases the stock volatility during periods of crisis.

For Policymakers: since companies' ESG performance shows the capability to reduce a general risk of enterprises, the government and relevant departments should support the sustainable, green enterprises and encourage their participation in the market. It will allow the minimization of possible bankruptcies and stability of the local markets from the vicious damages.

Direction for the further research

This paper in the future could be used for more detailed research with the inclusion of additional research elements:

1. This paper Sample consists of 133 companies - in the future, researchers could increase the number of samples to evaluate the ESG index influence on stock prices with more accuracy.
2. Future research could use division of the companies to the industries in order to check the ESG effect to evaluate its pillars influence for each of them.
3. This study uses companies which has a full history of ESG performance for periods from 2017 to 2021 – Currently companies starting to recognize the ESG as an indicator for success, although future research will have wider data set to process and include more than 5 years data for a specific company.
4. Future studies could be performed with an additional inclusion of variables such as life cycle or R&D.
5. Controlled location – In the future research it would be great to include the controlled location to see the effect of ESG in the regional aspect of the country.

THE IMPACT OF ESG PERFORMANCE ON STOCK PRICE VALUE

Irina Žigaitė

Final Master Thesis

Finance and Banking Programme

Faculty of Business and administration, Vilnius University

Supervisor prof. Greta Keliuotytė – Staniulienė

SUMMARY IN ENGLISH

50 Pages, 5 Figures, 10 Tables 53 References

The main Purpose of this master thesis is to determine the factors of ESG that impact the stock price value and evaluate the benefits of the ESG score on Stock price.

The Master thesis consists of three main parts: the analysis of literature, the research and its results, a conclusion, and recommendations.

Literature analysis reviews the development of ESG concept over the years, presents the structure of ESG and ESG scores value. Introduce the variables and methodology of the rating agencies who evaluates and ranks the companies according the ESG performance. Specifies the benefits and disadvantages that companies may experience with the decision to implement the changes and publicly declare its ESG performance. As well as, explains the ESG performance impact on stock prices during the growth and the crisis times.

Following the literature analysis, has included the Examination of value relevance model with the inclusions of non-financial information variable to the Price model in order to calculate the ESG performance influence on the stock prices. Data collection from the ESG book rating agency and examination of the Statistical literature to assure the correctness of the data.

The performed research: revealed that ESG impact the Stock price of the company. The implementation of ESG in operational company structure may not only increase the stock prices but also reduce the volatility of stock prices in the market during the periods like Covid-19.

The conclusions and recommendations: summarise the main concepts of literature analysis as well as the results of the performed research. We believe that the results of the study could give useful knowledge to the companies, investors, and policymakers on how the ESG impacts the company prices and what benefits it brings to each of them.

ASV VEIKSNIŲ POVEIKIS AKCIJŲ KAINOS VERTEI

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SANTRAUKA LIETUVIų KALBA

50 puslapių, 5 paveikslai, 10 lentelių 53 literatūros sąrašas

Pagrindinis šio magistro darbo tikslas – nustatyti ESG veiksnius, turinčius įtakos akcijų kainos vertei, ir įvertinti ESG balo naudą akcijų kainai.

Magistro baigiamasis darbas susideda iš trijų pagrindinių dalių: literatūros analizės, tyrimo ir jo rezultatų, išvados ir rekomendacijų.

Literatūros analizėje: apžvelgiama ESG koncepcijos raida bėgant metams, pateikiama ESG ir ESG balų reikšmės struktūra. Supažindinama su reitingų agentūromis, kurios vertina ir reitinguoja įmones pagal ESG rezultatus, kintamuosius ir metodiką. Nurodoma nauda ir trūkumai, kuriuos įmonės gali patirti priimdamos sprendimą įgyvendinti pakeitimus ir viešai deklaruoti savo ESG veiklą. Taip pat paaiškinama ESG veiklos įtaka akcijų kainoms augimo ir krizės laikais.

Atlikus literatūros analizę, į Kainos modelį įtrauktas Vertės aktualumo tyrimo modelis su nefinansinės informacijos kintamojo įtraukimu, siekiant apskaičiuoti ESG veiklos įtaką akcijų kainoms. Duomenų rinkimas iš ESGBOOK reitingų agentūros ir statistinės literatūros nagrinėjimas, siekiant užtikrinti duomenų teisingumą.

Atliktas tyrimas: atskleidė, kad ESG turi įtakos bendrovės akcijų kainai. ESG įdiegimas veikiančioje įmonės struktūroje gali ne tik padidinti akcijų kainas, bet ir sumažinti akcijų kainų nepastovumą rinkoje tokiais laikotarpiais kaip Covid-19.

Išvados ir rekomendacijos: apibendrinti pagrindines literatūros analizės sąvokas taip pat atliktų tyrimų rezultatus. Manome, kad tyrimo rezultatai galėtų suteikti naudingų žinių įmonėms, investuotojams ir politikos formuotojams apie tai, kaip ESG įtakoja įmonių kainas ir kokią naudą ji duoda kiekvienai iš jų.

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Appendix

Appendix 1

VIF Test

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-14.759	20.689		5.975	.000		
	BVPS	.050	.015	.201	5.828	.000	.942	1.062
	EPS	.270	.231	.392	11.369	.000	.943	1.060
	ESG	.522	.336	-.129	-3.834	.000	.990	1.010

a. Dependent Variable: SP

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	12.903	22.187		5.815	.000		
	BVPS	.090	.015	.201	5.834	.000	.941	1.062
	EPS	0.265	.232	.395	11.417	.000	.938	1.066
	E	.061	.338	-.008	-.180	.000	.506	1.975
	S	-.898	.442	-.096	-2.034	.042	.505	1.979
	G	.426	.192	-.075	-2.218	.027	.968	1.033

a. Dependent Variable: SP

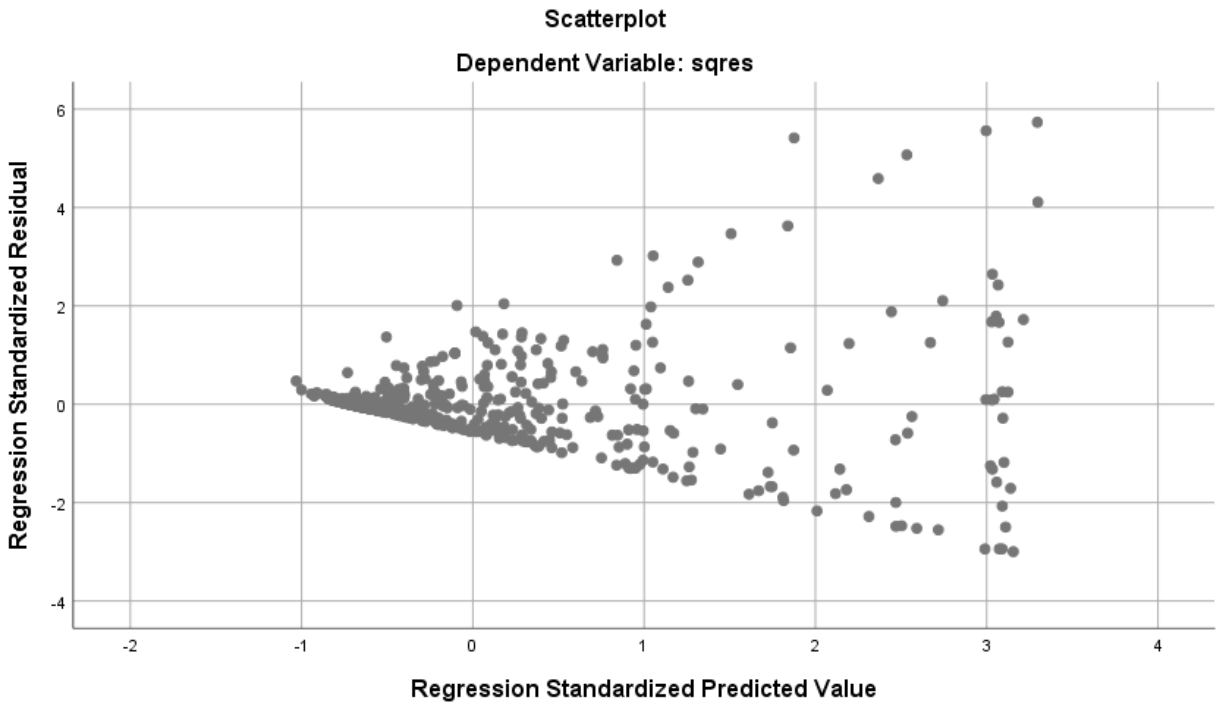
Breusch pagan test

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	154900945.665	3	51633648.555	12.395	.000[b]
	Residual	2761957930.300	663	4165849.065		
	Total	2916858875.965	666			

a. Dependent Variable: sqres

b. Predictors: (Constant), ESG, EPS, BVPS


Scatterplot
Dependent Variable: sqres
Regression Standardized Residual
Regression Standardized Predicted Value
6
4
2
0
-2
-4
-2
-1
0
1
2
3
4

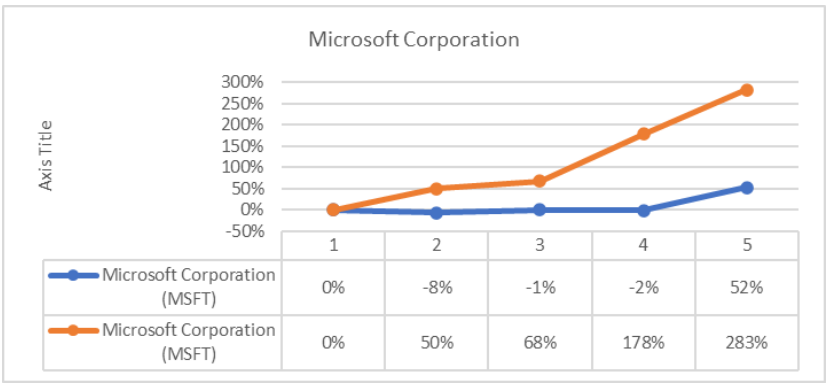
Appendix 2: List of companies

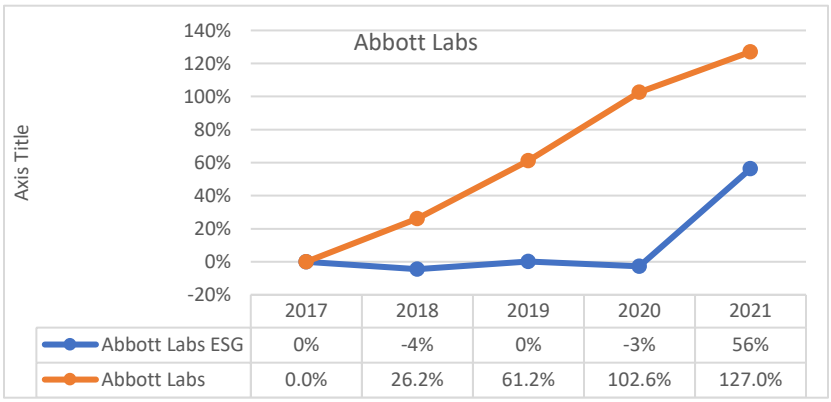
Table 10. ESG impact on stock prices

	Date	BVPS	EPS	Share Price growth over the year	Share price growth including ESG variable
Microsoft Corporation	2017	11.38	3.25	0%	0%
	2018	10.78	2.13	50%	-8%
	2019	13.39	5.06	68%	7%
	2020	15.63	5.76	178%	-2%
	2021	18.88	8.05	283%	52%
Toyota	2017	121.43	15.71	0%	0%
	2018	126.47	11.61	-10.7%	8%
	2019	138.46	13.38	.07%	14%
	2020	154.02	14.62	1.9%	16%
	2021	160.64	17.31	43.9	35%
Abbott Labs	2017	17.72	0.27	0%	0%
	2018	17.39	1.33	26.2%	-4%
	2019	17.64	2.06	61.2%	0%
	2020	18.51	2.50	102.6%	-3%
	2021	20.30	3.94	127%	56%
FedEx	2017	32	3.25	0%	0%
	2018	34.02	5.38	21.9%	7%
	2019	24.49	5.06	-3.5%	5%
	2020	25.08	3.52	-23.5%	2%
	2021	30.27	10.63	-16.4%	34%
Wells Fargo	2017	37.12	4.1	0%	0%
	2018	37.75	4.28	-25%	-1%
	2019	40.05	4.09	-28%	3%
	2020	39.47	0.43	-54.6%	-4%
	2021	43.12	4.95	-18.2%	49%
Duke Energy	2017	58.63	4.36	0%	0%
	2018	59.62	3.76	2%	13%
	2019	60.29	5.06	6%	21.3%
	2020	65.42	1.72	9%	-8.8%
	2021	63.96	4.94	32%	40.1%

List of Figures

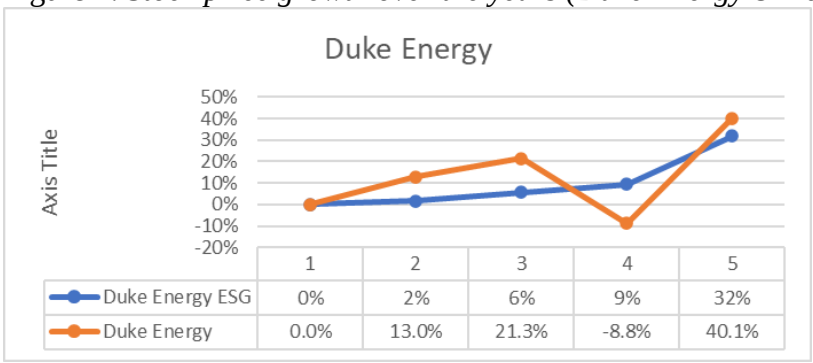
Figure 3
Stock price growth over the years (Microsoft & Abbott Labs)

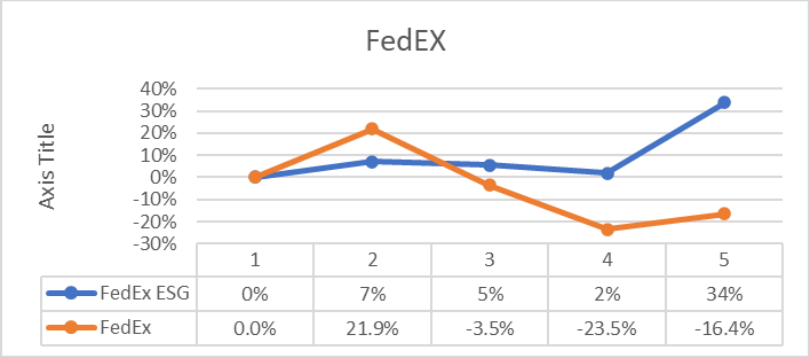




Source: Compiled by the authors

Figure 4: *Stock price growth over the years (Duke Energy & FedEx)*

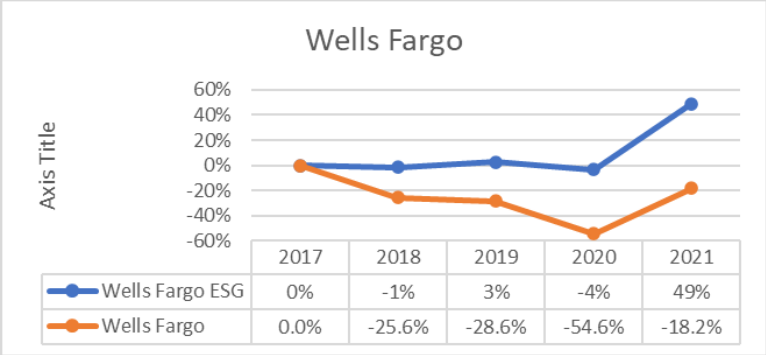


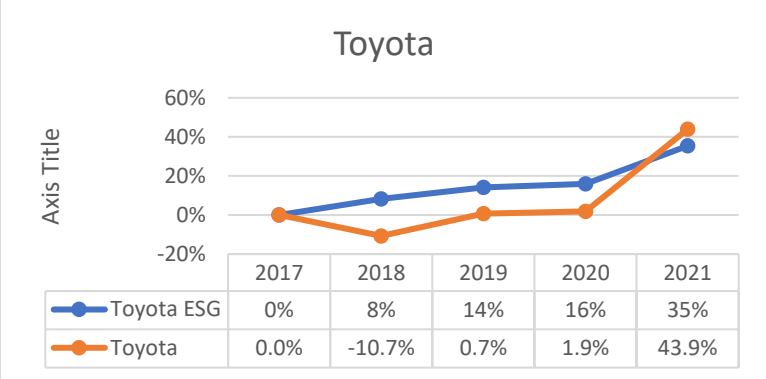


Source: Compiled by the authors

Figure 5

Stock price growth over the years (Wells Fargo & Toyota)





Source: Compiled by the authors

List of Tables

Table 1. ESG pillars description

	Description
Environmental	*Environmental criteria*- Companies worldwide are affected by the environment due to the activities and resources they are using. It includes the resources company takes in and wastes daily. "E" ***encompasses carbon emissions, climate change, pollution, resource efficiency, and biodiversity***
	Thomson Reuters (2021) Compromise environmental pillar based on company's made impact on ecosystems including the air and water pollution and its reduction with Innovative management systems, environmentally green revenues on its behalf.
Social	*Social criteria*, include the company's reputation within and outside the institution, including people and communities operating business when they operate within a broader, diverse society. ***"S" includes human rights, labor relations, health, safety, and diversity, community relations, development of human capital (health & Education***).
	Thomson Reuters (2021) Use social pillar based on: Company commitments to all stakeholders regarding ethical principles incorporate working environment and product responsibility. To measure capability, generate trust and loyalty within a stakeholder.
(Corporate) Governance	*governance*, companies required a corporate system of practices for control and procedures of the effective decision-making process to comply with the law and provide the solutions for external shareholders' needs. ***"G" includes corporate governance, corruption, rule of law, institutional strength, transparency***.
	Thomson Reuters (2021) Governance pillar can comprise management score, shareholder rights, and CSR strategy. This factor evaluates the company's systems capabilities that ensure the best interest of its shareholders.
ESG Controversary	Thomson Reuter's (2021) ESG controversy score is compiled based on the 23 ESG controversy topics that have been reported and overlay the information captured from mass-media sources.

Compiled by the author based on Henisz, W.; Koller, T. and Nuttall, R. (2019). There are five ways that ESG creates value; Inderst, G. and Stewart F. (2018). Incorporating ENVIRONMENTAL, SOCIAL, and GOVERNANCE (ESG)

Factors into FIXED INCOME INVESTMENT; REFINITIVE (2021). ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (ESG) SCORES FROM REFINITIV.

Table 2. International ESG agencies 'ratings difference

Refinitiv ESG rating												
Ratings	A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-
	0.92 <1	0.83 <0.92	0.75 <0.83	0.67 <0.75	0.58 <0.67	0.5 <0.58	0.417 <0.5	0.333 <0.417	0.25< 0.333	0.167 <0.25	0.083 <0.167	>0.083
Description	"A" score indicates excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.			"B" score indicates good relative ESG performance and above average degree of transparency in reporting material ESG data publicly.			"C" Score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.			"D" score indicates poor relative ESG performance and insufficient ESG Description degree of transparency in reporting material ESG data publicly.		
	0.8571 <1		0.714< 0.8571	0.571 <0.714		0.4286 <0.5714	0.2857 <0.4286		0.1429 <0.2857		>0.1429	
Ratings	AAA		AA	A		BBB	BB		B		CCC	
MSCI Ratings												

Compiled by the author based on REFINITIVE (2021). *ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG) SCORES FROM REFINITIV*. MSCI. (2020, December). *MSCI ESG RATINGS METHODOLOGY*

Table 3. Summary Statistics

Panel A: Descriptive statistics

	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
Share Price	.85	665.00	61.43	67.2	4.042	26.67
BVPS	.001	1999.50	40.51	149.96	9.332	95.872
EPS	-2.5	132.61	4.77	10.02	6.334	56.656
Environment	32.54	82.98	64.17	9.37	-1.018	1.083
Social	32.2	80.68	61.49	7.17	-.669	.905
Governance	7.81	81.11	58.13	11.93	-.766	.621
ESG	37.08	75.44	60.84	6.73	-.712	.218

Panel Correlation matrix

	Share Price	BVPS	EPS	Environment	Social	Governance	ESG
Share Price	1						
BVPS	.302**	1					
EPS	.448**	.232**	1				
Environment	.096*	.064	-.028	1			
Social	-.115**	-.046	.005	.695**	1		
Governance	.128*	.058	.087*	-.038	.075	1	
ESG	.174**	.082*	.074	.511**	.619**	.761**	1

This table shows the descriptive statistics (mean, maximum, minimum, and standard deviation) and the correlation matrix of the financial variables: Price (P), Book value per share (BVPS), and Earnings per share (EPS), and the environmental (ENV), social (SOC), and corporate governance (GOV) performance variables, as well as a general ESG performance measure obtained from the arithmetic, mean of the previous three. **. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

Table 4. Panel data price model regression results

	Model (I)	Model (II)	Model (III)	Model (IV)	Model (V)	Model (VI)	Model (VII)
BVPS	.058		.051	.051	.051*	.052*	.050*
EPS		.297*	.276*	.277*	.276*	.277*	.270*
Environmental				.169*			
Social					-.001		
Governance						.374**	
ESG							.522**
Constant	8.971**	8.926*	8.880*	-.880*	72.872*	-18.353**	-24.759*
Observation	665	665	665	665	665	665	665
Adjusted R-squared	.916	.917	.917	.917	.917	.919	.918
F-Test	58.585**	58.709**	58.439**	57.970**	57.878**	59.233**	58.56**

Notes: This table shows the results obtained for estimates of the OLS regression using the baseline models (I) - (VII). Robust standard errors in parentheses, *** p < 0.01; ** p < 0.05; * p < 0.1 based on two-tailed tests.

Table 5. Panel data regression analysis

	Model (I)	Model (II)	Model (III)	Model (IV)	Model (V)	Model (VI)	Model (VII)	Model (VIII)	Model (IX)	Model (X)	Model (XI)	Model (XII)
BVPS	.057*	.057*	.059*	.056*					.051	.051*	.052*	.050*
EPS					.298*	.296*	.298*	.290*	.277*	.276*	.277*	.270*
Environmental	.164*				.175*				.169*			
Social		.043				.013				-.001		
Governance			.374*				.373**				.374**	
ESG				.530**				.528**				.522**
Constant	-.523*	6.41*	-18.244*	-25.210*	61.034**	72.719	-18.19**	-25.11*	-.880	72.872*	-18.35**	-24.759*
Observation	665	665	665	665	665	665	665	665	665	665	665	665
Adjusted R-squared	.916	.916	.918	.917	.917	.917	.918	.917	.917	.916	.918	.918
F-Test	58.105**	58.023**	59.364**	58.717**	58.241**	58.143**	59.486**	58.838**	57.970**	57.878**	59.233**	58.56**

*This table shows the results obtained by applying the modified version proposed by Barth and Clinch (2009) of Ohlson's model for the valuation of listed companies for the years 2017–2021. The results are presented first without including the ESG information and subsequently adding the different ESG performance measures to the model. The last rows include the adjusted R^2 and F test statistics. In brackets is the p-value, indicative of the significance of each coefficient and of the F test. **, represent the 1%, significance levels, respectively*

Table 6 Panel regression excluding financial sectors

	Model (I)	Model (II)	Model (III)	Model (IV)	Model (V)	Model (VI)	Model (VII)	Model (VIII)	Model (IX)	Model (X)	Model (XI)	Model (XII)
BVPS	.018*	.016*	.020*	.016*					.018*	.016*	.020*	.016*
EPS					.116	.094	.113	.106	.115	.094	.112	.105
Environmental	.141*				.153*				.143*			
Social		.300				.292				.279		
Governance			.187*				.187*				0.186*	
ESG				.386*				.387*				.380*
Constant	24.397*	15.442	21.751	8.730	23.313*	15.788**	21.610**	8.431	23.486*	16.180	21.105	8.45
Observation	633	633	633	633	633	633	633	633	633	633	633	633
Adjusted R-squared	0.851	0.852	0.853	0.853	0.852	0.852	0.853	0.853	0.851	0.852	0.852	0.853
F-Test	29.49**	29.581**	29.71**	29.78**	29.49**	29.57**	29.71**	29.78**	29.19**	29.262**	29.41**	29.47**

*Notes: This table shows the results obtained for estimates of the regression parameters, excluding observations from the finance and insurance sector. Robust standard errors in parentheses, *** p < 0.01; ** p < 0.05; * p < 0.1 based on two-tailed t-test*

Table 7: Regression with logarithmic values

	Model (I)	Model (II)	Model (III)	Model (IV)	Model (VI)	Model (VI)	Model (VII)	Model (VIII)	Model (IX)	Model (X)	Model (XI)	Model (XII)
LN(BVPS)	22.690**	22.82**	22.77**	22.428**					20.85**	20.874**	21.073**	20.777**
LN(EPS)					6.241**	6.38**	5.907**	5.982**	4.684**	4.785**	4.306**	4.436**
Environmental	.094*				.119*				.061*			
Social		.060				-.183				-.155		
Governance			.369**				.330*				0.337**	
ESG				.474**				.377*				.346*
Constant	3.028	4.885	-18.349	-22.08**	8.70	26.63**	-8.787	-8.997	9.853*	22.809	-11.508	-9.197
Observation	660	660	660	660	660	660	660	660	660	660	660	660
Adjusted R-squared												
F-Test	62.25**	62.231**	63.713**	62.86**	58.56**	58.58**	59.57**	58.86**	61.662**	61.702**	62.884**	61.975**

*Notes: This table shows the results obtained for estimates of the regression parameters, with logarithmic transformation of the financial variables Price, Book value per share (BVPS(LN)) and earnings per share (EPS(LN)). Robust standard errors in parentheses, *** p < 0.01; ** p < 0.05; * p < 0.1 based on two-tailed tests.*

Table 8: Panel data regression parameters FGLS

	Model (I)	Model (II)	Model (III)	Model (IV)	Model (VI)	Model (VI)	Model (VII)	Model (VIII)	Model (IX)	Model (X)	Model (XI)	Model (XII)
BVPS	.044	.048*	.046*	.041					.043	.048*	.046*	.039*
EPS					.048	.019	.019	.097	.034	.006*	.007	.086
Environmental	.060				.069*				.063*			
Social		.016				.018				.017		
Governance			.100***				.100**				.100***	
ESG				.265***				.277**				.273**
Constant	31.62**	34.82**	32.60**	23.03**	31.27**	35.12**	32.99**	22.54*	31.29**	34.77**	32.58**	22.363*
Observation	665	665	665	665	665	665	665	665	665	665	665	665
Adjusted R-squared	.998	.998	.998	.998	.998	.998	.998	.998	.998	.998	.998	.998
F-Test	1613**	1603**	1676**	1733**	1604**	1592**	1665**	1729**	1598**	1588**	1660**	1721**

Table 9: Panel data models for 2017-2021

	Model (2017)	Model (2018)	Model (2019)	Model (2020)	Model (2021)
Beta (Constant)	-14.59*	-24.877*	-21.78	-24.59*	14.17**
BVPS	.062*	.110*	.106*	.101*	.047*
EPS	.213*	.180	.169	.201	.084*
ESG	.399**	.520**	.488*	.517**	.164**
Error	15.233	15.999	15.902	15.968	15.046
Observation	116	116	116	116	116
Adjusted R-squared	0.93	0.94	0.925	0.924	0.928
F-Test	64.67***	59.50***	60.42***	59.68***	63.81***
Average ESG	60.6800	60.7300	60.86	61.0600	61.8300

*Notes: Shows the results obtained using an OLS estimation method. Standard errors in parentheses, *** p < 0.01; ** p < 0.05; * p < 0.1 based on two-tailed tests. Overall R-squared represents a weighted average of the variance in the model*

Table 10: Summarized results of our hypotheses		
Hypothesis		Conclusion
H1	*A higher company ESG score value positively affects stock prices.*	Accepted
H_A	*A higher company ESG score value negatively affects stock prices.*	Rejected
H2	*The Environmental score is more value relevant than the Social and Governance score.*	Rejected
H_A	*The Environmental score is less value relevant than the Social and Governance score.*	Accepted
H3	*Performed ESG score protects company's Stock price stability during the covid-19.*	Accepted
H_A	*Performed ESG score harms company's Stock price stability during the covid-19.*	Rejected