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To what extent do ESG scores affect firm valuation?

Evidence based on large Dutch enterprises

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Abstract

The purpose of this study is to research the impact of environmental, social and governance performance (ESG), divided in each component and evaluate the impact on firm valuation. The study covers a sample selection of companies listed on the Amsterdam Exchange Index (AEX) and Amsterdam Midcap Index (AMX) for the years 2018-2020. A correlation and regression analysis have been carries out to evaluate the possible impact of ESG scores and firm valuation. Data has been gathered by the Asset4 database of Thomson Reuters. The results of this study show higher social score negatively impacting firm valuation. Indicating firm in the Netherlands to be over-invested in the social dimension. There is no significant relationship between environmental score and firm valuation within the sample, environmental scores are embedded in firm valuations. The governance dimension has no effect on firm valuation, because it is difficult to quantify qualitative governance measurements. This study cannot reveal a relationship between ESG controversies and firm valuation. All of the ESG dimensions show significant relationships with firm size, indicating large firms to be more invested in ESG scores. This analysis contributes to the empirical corporate social responsibility (CSR) research. Not only management of the firms but also regulators and researchers are affected by the results. The results state not all investments in ESG performances to be beneficial for economic performances.

Table of content

Introduction

Corporate social responsibility (CSR) is an important topic for academics, scholars, and practitioners (Caroll, 1991). Research about the concept of CSR originates from the need for improvements in societies, communities and for stakeholders (Bowen 1953; Carroll 2010). In the late 1990s a key concept in the research regarding CSR was discovered by Elkington (1994), the term triple bottom line. This concept entails firms should commit focus on social and environmental concerns, as well as financial objectives. Since the emergence of the triple bottom line, this concept was used in many studies regarding CSR (Slaper 2011; Gimenez, Sierra, & Rodon 2012). Following the research on CSR, a set of actions could be defined, which can be seperated in two classes. The first class involves crafting innovative solutions for social challenges a firm might experience, the second class involves declaring commitment towards social responsibility (Sigurdsson & Candi, 2019). Firms should be aware and act upon these two sets of action to involve CSR in their strategy.

Later in in time academics, scholars and practioners wanted to assess firms based on CSR measurements. This is when a joint effort between governements, banks and other financial institutes published a framework. This framework was the foundation for the environmental, social and governance (ESG) scores. (Knoepfel, 2004;UNEP, 2007). By merging different aspects of CSR, a standardized framework in which firms were rated on ESG dimensions was developed. Since then, many studies have used this framework to research the impact of ESG scores on corporate financial performance (CFP) (Sassen, Hinze & Hardeck 2016; Velte 2017; Chen et al. 2021). With the increasing field of quantitative research on ESG and CFP the discussion on whether sustainability goals would affect CFP increased.

ESG scores are increasingly being used by investors to valuate and select companies based on how they treat their stakeholders, as well as the effect they have on the environment (Signori, San-Jose, Retolaza, & Rusconi, 2021). ESG scores therefor may be indicated as a good representation for the stakeholder theory. The stakeholder theory is a way of viewing capitalism that stresses the relationships between business and its customers, suppliers, employees, investors and others who have a stake in the business. The theory suggests that a firm should create value for all stakeholders not just shareholders. (Freeman R. E., 1984)

Another part of ESG scores is managing the corporate governance of the business. This is where ESG scores may be infused with another theory called the agency theory. The agency theory discusses the conflict of interests between management and shareholders (principals). Research about the seperation of ownership and control issue has extensively been done. Jensen and Meckling (1976) are the first and most cited authors in the literature. Agency issues appear within a firm when managers have incentives to pursue their own interests at the expense of shareholders (Connely, Hoskisson, Tihanyi, & Certo, 2010). Corporate governance may help reduce the agency problems.

The objective of this research is to examine the effect of environmental, social and governance scores on firm valuation. There are different valuation methods for valuing a firm. The method used in this research is the market to book ratio. The market to book ratio indicates the difference between what the financial statements under generally accepted accounting principles (GAAP) report as the common equity and what the market asses as the market value of common equity (Beaver & Ryan, 1993). This method of valuation is often used to compare the impact of different factors on share prices, because it compounds different share prices to its book value.

In relation to this research the market to book ratio indicates whether investors include ESG scores when estimating the market value of common equity. Since the increase in research regarding the impact of ESG on CFP, the focus has been on a wide scale mostly focusing on global effects of ESG, meanwhile increasing the discussion whether the ESG scores impact CFP. According to Ortas, Alvarez, and Garayar (2015) one of the reasons for mixed results is because of geographical differences. The impact of ESG scores on CFP variates between different countries. (Ortas, Alvarez, & Garayar, 2015) The following research question (RQ) was formulated based on evidence from large Dutch enterprises: To what extent do ESG scores affect firm valuation?

The results show that engagement in environmental score does not affect firm valuation within the sample. The environmental score is embedded in the firm valuation, therefor not affecting the market to book ratio. Meanwhile engagement in social score has a negative impact on firm valuation. This

indicates that firms in the Netherlands are overinvested in the social dimension causing a negative relationship between social score and firm valuation. For the governance dimension there is no effect between governance score and firm valuation, because it is difficult quantifying qualitative governance measurements. This study cannot reveal a relationship between ESG controversies and firm valuation. All of the ESG dimensions show a significant relationship with firm size, suggesting large firms to be more invested in ESG scores. The findings are in line with the study of Halbritter and Dorfleitner (2015) which imply ESG scores to not have an economic impact on the firm, and Chen et al. (2021) which imply firms leading in sustainability are lagging in financial result.

Literature review

Corporate social responsibility

Going back in time, CSR can be tied to a couple of businessmen in the late 1800s who were committed to social responsibility (Heald, 1957). During this time CSR was not discovered yet, however according to Heald (1957) this could have been the start of CSR. For these businessmen CSR mostly implied one-time donations to charitable events for public welfare (Baxi & Rupamanjari, 2012). The discovery of the term CSR was much later in time, firstly mentioned in the twentieth century (Caroll & Shabana, The Business Case for Corporate Social Responsibility: A Review of Concepts, Research and Practice, 2010). In which CSR was still a blurry concept of charity or philanthropy. The true debate regarding CSR and its influence could be traced back to Bowen's (1953) "Social responsibility of the businessmen" which led to a better understanding of CSR. As a result of this movement general opinion shifted, resulting in support for social responsibility.

A transitional period that resulted into the concept which is currently known as CSR started to evolve through the academic literature in 1970s and beyond (Sigurdsson & Candi, 2019). As a result, current opinion regarding CSR implies shared corporate concerns for stakeholders and shareholders. At the bottom-line corporations should be equally engaged in economic gains, environmental objectives and social engagement (Aguinis, 2011). The interest in bottom-line research started with the research of Elkington (1994) which discovered the concept "triple bottom line". The triple bottom line implied a framework in which firms are reviewed based on economic, environmental, and social aspects. This framework functioned as a starting point in which many scholars and academics decided to research CSR (Slaper 2011; Gimenez, Sierra, & Rodon 2012). As a result, a consensus about firm's responsibility regarding social and environmental objectives had emerged (Wickert & Risi, 2019). Global opinion had shifted from firms merely focusing on economic gains to firms having to reach environmental and social impact besides obtaining economic gains.

In current literature, CSR is still a prominent term when looking at a firm. Many scholars and academics still research different aspects of CSR and its impact on businesses. CSR can be seen as an umbrella term describing how firms are implementing environmental, social and economic responsibilities in their value chain (Wickert & Risi, 2019). CSR can also function as a starting point for scholars to investigate the impact of environmental and social achievements on the economic results of the firm. Despite the widespread acceptance of CSR, the conceptual and methodological challenges remain considerable and complicated (Bice, 2017); because CSR is a much-contested term defined differently by different groups the term is not uncontested (Wickert & Risi, 2019). Dahlsrud (2008) identified and analyzed 37 different definitions of CSR. This research identified the various dimensions and composed the mutual concepts which these definitions had in common. Most of the concepts of CSR agreed upon the importance of stakeholders, social aspect, economic aspect, voluntariness, and environmental aspect. Combining these factors Dahlsrud (2008) implied the concept of CSR to be firms voluntarily adopting social and environmental factors in their strategy.

Concept of ESG and discovery

As previously stated, the concept of CSR functioned as an umbrella term in which environmental and social aspects were tied to economic performances of the firm. The umbrella effect of CSR had a widespread impact on businesses' strategies (Wickert & Risi, 2019). As for scholars, CSR involve conceptual and methodological challenges (Bice, 2017). This is when ESG scores were invented. Environmental, social and governance concerns were first noticed in 2004 when the report 'Who cares wins' was published (Knoepfel, 2004). The objective of the report, as stated by Knoepfel (2004, p. 8) "Better consideration of environmental, social and governance factors will ultimately contribute to stronger and more resilient investment markets, as well as contribute to the sustainable development of societies". Thus, creating awareness among participants in the financial industry can lead to better investment markets and more sustainable societies.

ESG measurements are mainly important due to the ability to gather corporate performances which are not stated in public accounting data (Bassen & Kovacs, 2008). Bassen and Kovacs (2008) revealed that corporate financial statements are not able to inform management and investors about reputation value, product quality, brand value, workplace culture and strategies. The implementation of ESG scores for this instance can indicate the non-financial performances of the firm. This is essential for management purposes, as managers need to have extensive and timely data on their widespread operations (Tarmuji, Maelah, & Tarmuji, 2016). This is the basis information managers must possess in order to make appropriate business decisions. Companies with strong ESG performance are more aware of long-term strategic difficulties within the industry. By possessing this knowledge appropriate adjustments can be made; these long-term decisions ensure the firm to remain sustainable over a longer time period. (Tarmuji, Maelah, & Tarmuji, 2016)

While ESG scores being the subject of many papers written by scholars and academics, there are also difficulties facing the framework. Since the development of ESG in early 2000s the concept is now widely known, resulting in major global attention for the concept. According to Bergman et al. (2021), over 125 different institutes currently are gathering ESG data and formulating ESG scores. The scope of ESG has increased significantly, generating new problems for the sustainable finance climate. Even though many different institutes are generating ESG scores, this has not led to clarity and uniformity in the industry. The institutes are not on the same line when measuring ESG scores. The main difficulty in formulating an ESG score, is to combine the three distinctive factors equally (Bilio, Costola, Hristova, Carmelo, & Pelizzon, 2020).

Environmental dimension

The World Commission on Environment and Development (1987) published the report "Our common future" in which the uncommon term sustainable development was described. The concept sustainable development was described as limitations by technological and social developments on environmental resources and the ability of the biosphere to absorb the effects of human activities. The report served as a starting point for scholars and research to study the impact of large firms on the environment. Internal and external stakeholders are increasingly interested in environmental performances of firms. This shift is a consequence of increasing attention for global pollution (Jasch, 2006). Internal stakeholders are affected by the pollution created by the firm in their daily workspace. External stakeholders are affected by local pollutions, environmental activists' groups, and governmental regulators (Tarmuji, Maelah, & Tarmuji, 2016). Therefore, the company's management should focus on reducing the impact of the firm on global pollution. One of the main incentives for management to increase environmental performance is the increase in organizational value it may result in. According to Melnyk, Sroufe, and Calantone (2003) stronger environmental performance can improve the value of the firm and attract new stakeholders to the firm.

Following up on environmental challenges the study of Robbins (2001) separates environmental challenges in different categories. Atmosphere, toxic chemicals and waste, freshwater, land, oceans, biotechnology, and biodiversity are all environmental challenges firms must deal with. However, clear actions to tackle environmental issues were still lacking. Apart from government regulations, large corporate firms did not yet have guidelines for environmental goals. In the upcoming years awareness of environmental issues increased, causing large firms to become more aware of the firm's environmental performance (Huang, Chen, Zhou, Zhang, & Duan, 2019).
Lyon and Maxwell (2008) stated that more firms desired to go 'green' and are complying with Leadership in Energy and Environmental Design (LEED) standards. Firms are producing corporate social reports to publicly present their environmental performance in accordance with the Global Reporting Initiative. One of the reasons for this trend is responsible managers taking pro-active steps in reducing the risk of creating negative publicity surrounding the firm's environmental performance. More recent literature agrees with the benefits of this approach. Marsat, Pijourlet, and Ullah (2022) state that firms with higher environmental performance tend to overcome environmental controversies quicker. Preventive actions are preferred over damage control when it comes to environmental controversies (Lyon & Maxwell, 2008; Jia, Gao & Scott, 2019).

In modern days manufacturers are still presenting their businesses as "green" in order to convince customers from the increasing environmentally aware segment. The rewards for presenting the business practices to be green are increasing (Sobral, Netto, Ribeiro, & Soares, 2020). As a result, firms who are presenting to be green, show vague and often false claims (Furlow, 2010). Firms promoting their sustainable performances, while in reality not performing environmentally friendly are guilty of "greenwashing" (Seele & Gatti, 2015). Greenwashing has become a common phenomenon in the market, the increasing concerns regarding greenwashing has led EnviroMedia to create the greenwashing index to monitor greenwashing advertisements (Miller, 2008). The greenwashing index is composed by the public, to serve as a channel to judge corporate messages.

Higher environmental scores are expected to have better financial performance. The study of Yadav, Han and Rho (2016) investigated the relationship between environmental performance indicators and performance on the stock market. The study found that high environmental performance scores result in significant positive stock returns. For firms to gain high environmental scores the firm is expected to have a positive impact on the environment and can mitigate risks concerning the environment. A reduced carbon footprint, increased energy efficiency and waste management will benefit the environmental score[1]. However, Lu and Taylor (2018) reveal a negative relationship between environmental performance and financial performance. The study suggests that financially successful firms are less likely to be good environmental performers. This study examines the effect of environmental scores on firm valuation through the following hypothesis:

H1: A firms environmental score affects firm valuation.

[1] https://www.thebalance.com/what-are-environmental-social-and-governance-esg-criteria-5112974

Social dimension

In 1984 R. Edward Freeman wrote a book called "Strategic Management: A Stakeholder Approach" in this book Freeman mentioned the stakeholder theory. This theory implied firms to have an action plan when acting on stakeholders. The stakeholder's approach should fit within their strategic management approach. "Stakeholder management as a concept, refers to necessity for an organisation to manage the relationship with its specific stakeholder" R. Edward Freeman (1984, p. 53). During this time the managerial environment was subset to turbulent environmental changes. Managers expressed concerns because traditional strategies did not produce enough guidance during this period. The stakeholder theory suggested that success of the firm was determined by the satisfaction of stakeholders (Freeman & Mcvea, 2001).

Before Freeman in 1984 referred to the stakeholder's approach in 1976 Jensen and Meckling acknowledged the importance of stakeholders to the firm. Managers should act in the best interest of stakeholders. Jensen and Meckling (1976) stated a firm to be part of society, therefore generating value is tied to generating societal wealth. The idea of impact of ownership structure on firm valuation since then has constantly been evolving. Sachs and Rühli (2011) suggested firms and stakeholders working together will improve the firm's performances as well as generate societal value. Following the theories about stakeholder- and societal impact on managerial decision making, studies such as (Clarkson, Li, Gordon, & Vasvari, 2008) and (Velte, 2017) agreed on the impact stakeholder trust can have on CFP. Increased stakeholder trust can lead to better (non) financial circumstances and therefore increase financial performances of the firm.

The social criteria of current ESG scores are related to the firm's relationship with other businesses and the relationship towards local community. Inclusion and diversity among workforce and board of directors are part of the social dimension. In addition, employee policies that foster health and safety are assessed for the social score[2]. Apart from benefitting from social scores, negative attention to social scores can also penalize firms. The study of Wei and Peng (2020) reveals that social irresponsibility results in negative firm performances. The study states investors do not appreciate firms that engage in corporate social irresponsible activities. Neves (2012), suggests higher costs for social factors will have a negative impact on CFP. The expenses made to increase social factors are not contributing to generating extra profits, therefor reducing CFP. This study examines the effect of social scores on firm valuation through the following hypothesis:

H2: A firms social score affects firm valuation.

[2] https://www.thebalance.com/what-are-environmental-social-and-governance-esg-criteria-5112974

Governance dimension

Interests in corporate governance have increased in the late 1990s, when large firms felt global public pressure. Large scandals and collapses had happened during this period which caused scholars and researchers to increasingly research this topic (Abid & Ahmed, 2014). Research revealed that firm's market value is not based merely on investment projects but on other variables such as dividend policy, financial structure, and ownership structure. Ownership structure can increase firm's market value by reducing information asymmetry within the firm and by reducing agency challenges, along with reducing unbalanced information disclosure. (Wahla & Ali Shah, 2012)

One of the much-debated and basic issues in corporate governance has been the agency problem (Abid & Ahmed, 2014). Jensen and Meckling (1976) are the first to research a theory in which the separation of ownership and control problem is described. The agency or principal-agency theory is based on circumstances in which managers might not act in the best interest of the principals. Instead of representing the principals, managers might put their own interests first, creating agency problems. The level of agency problems can be reduced by monitoring. The level of monitoring is affected by information asymmetry, managers and principals not sharing the same information, reducing the levels of control the principals have over the manager. (Fama & Jensen, 1983; Mishra, Heide, & Cort, 1998)

Corporate governance can be defined as the nature of interactions and relationships between the firm and its stakeholders, affecting the process of decision making and controlling firm recourses (Van Hees, Gabrielsson, & Huse, 2009). Controlling firm recourses shifted from profit-based control to sustainability focused control. Gani, Rahbi and Ahmed (2021) state that corporate governance measures can positively affect CFP in which transparent reporting may lead to increased financial performances (Gani, Al Rahbi, & Ahmed, 2021). It is essential that managers select and implement strategies that would result in good governance, transparency, and integrity, both in individuals as leaders and in the corporate culture is necessary for long term success and corporate sustainability (Duggar, 2011).

Corporate governance is essential for optimizing performances of the business in the best interest of shareholders. Corporate governance can assist in optimizing performances by limiting agency costs and favouring the survival of corporations (Fama & Jensen, Separation of Ownership and Control, 1983). The concept of corporate governance was discovered to coordinate firms to deal with upcoming challenges. A fundamental part in corporate governance is assisting the firm's board in managing their operations (Ponnu, 2008). The board of directors is one of the most important elements of corporate governance mechanisms (Tarmuji, Maelah, & Tarmuji, 2016).

The literature is clear, not all aspects of corporate governance are positively affecting a firm's CFP. Board size is negatively associated with CFP, suggesting a larger board size will have negative impact on CFP (Veklenko, 2016). The financial resources spent on board members can influence the positive impact of corporate governance Besides board size, ownership structure also can have a negative impact on CFP. Managerial ownership has a negative impact on CFP of the firm. Increase in proportionate share of managers in the total shareholding will have a negative impact on CFP (Veklenko, 2016). The reason for managerial ownership to negatively affect CFP is because the increase in agency problems (Wahla & Ali Shah, 2012). This study examines the effect of governance scores on firm valuation through the following hypothesis:

H3: A firms governance score affects firm valuation.

ESG-controversy dimension

ESG-controversies are corporate environmental, social or governance news stories which place the firm under the media spotlight. These stories involve negative news regarding the impact of the firm's practices on the environment or social factors. (Aouadi & Marsat, 2018). These scandals reach investors' attention, raising doubt regarding the firm's prospects and reputation, therefore possibly impacting firm value. ESG-controversy score introduces a channel which is not controlled by the firm, they are disclosed by the media (Refinitiv Eikon, 2022). By adding ESG-controversy scores to the variables, this research will extend the findings of Servaes and Tamayo (2013) which argues the value of CSR only to be associated with high-awareness firms (Aouadi & Marsat, 2018).

Legitimacy is a desirable concept for firms to ensure long-term prosperity. Suchman (1995) describes legitimacy to be a generalized perception or assumption the actions of the firm are desirable, proper or appropriate within a socially constructed system of norms, values, beliefs and definitions. When firms are lacking acceptable legitimacy, firms experience controversies and find their organizational legitimacy challenged. ESG-controversies are expected to be associated with decreased firm value (Wei & Peng, 2020). According to a meta-analysis by Frooman (1997), the stock market negatively reacts to the firm's involvement in socially irresponsible or suspicious social behavior. However, there is insufficient evidence to identify a link between socially responsible activities and firm value (Frooman, 1997).

While being clear that bad news draws more attention than good news, social misconduct can be completely overlooked. Hoffman (2001) has researched the impact of ESG-controversies on stakeholders. In the results Hoffman (2001) shows that stakeholders may even ignore extreme situations of crisis. Controversies can be outside of their diligence, therefore not be of interest for particular stakeholders. Another explanation for stakeholders ignoring ESG-controversies as stated by the media, can be the overload of information, which results in results being overlooked (Kiesler & Sproull, 1982).

By adding ESG-controversies to the list of variables, this study creates a new set of data. One in which firms have no active role in publishing. ESG-controversies are published by media channels and are not coordinated by firms, therefore out of reach for firms to create a distorted image. The expectation is for ESG-controversy score to have a negative impact on firm value, in accordance with the studies of (Aouadi & Marsat, 2018; Wei & Peng, 2020; Frooman, 1997). However, according to Halbritter and Dorfleitner (2015) ESG scores in general have no effect on CFP, due to the validity of ESG rating systems. The following hypothesis has been formed to test the impact of ESG-controversies on firm valuation:

H4: A firms ESG controversy score affects the firm's valuation.

Market to book ratio

The market to book ratio is a financial valuation metric used to evaluate a company's current market value relative to its book value. The market value comprises the value of all shares multiplied by the market price per share[3]. The book value is the value the firm displays on the balance sheet, if the firm had to liquidate and pay all the liabilities by selling assets. Fama and French (2006) researched the topic of market to book ratio compared to other financial performance variables, market to book ratio may indicate higher expected returns.

Multiple off-balance variables can have an impact on market to book ratio, for example growth rate, R&D expenses, advertising, and human capital (Noxy-Marx, 2013). The earnings of an income statement are reduced by investments such as R&D and advertisement–these investments are treated as expenses. These expenses directly affect the book value of the firm, by reducing the earnings without increasing the equity of the firm. This will, however, affect the market value of the firm; by increased future profits the market value of shares will rise and the market to book ratio will rise (Noxy-Marx, 2013).

The market to book ratio can give different indications to investors. A market to book ratio of less than one could indicate the stock to be undervalued, the share price indicates this company is not performing well or having challenges in their business model. A market to book ratio higher than one could mean the stock is overvalued, indicating the market price of the firm is rated high. Undervalued shares may seem like a good investment option however that indicates that something is wrong with the company. ESG scores may also have an impact on market to book ratio. Higher ESG scores could indicate the firm is performing in a sustainable way, therefore, increasing the market value of the firm while not directly increasing the book value of the firm. Low ESG ratings could indicate the firm is not performing in a sustainable manner, therefore, reducing the market value of the firm (Mervelskemper & Streit, 2016).

[3] https://corporatefinanceinstitute.com/resources/knowledge/valuation/market-to-book-ratio-price-book/

Conceptual framework

Fig. 1 shows the research framework of this study. The framework indicated the market to book ratio is de dependent variable, while the independent variables are environmental score, social score, governance score and ESG-controversy score. This research framework indicates the relationship between these four independent variables on the dependent variable market to book ratio. The control variables return on equity (ROE), firm size and debt ratio control for other relationships.

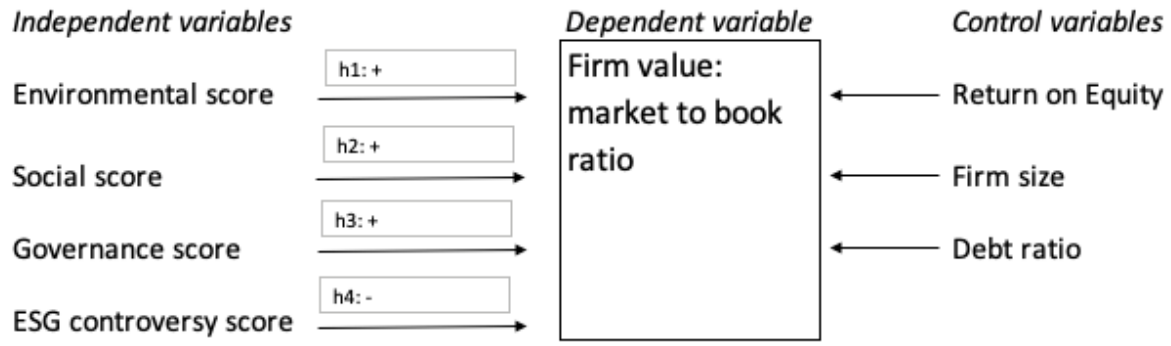

Figure 1:
Hypotheses summary

The model is based on the assumption that investors take ESG variables in consideration when evaluating the market value of the firm. In accordance with the independent variables the hypotheses have been formulated:
H1: A firms environmental score affects firm valuation.
H2: A firms social score affects firm valuation.
H3: A firms governance score affects firm valuation.
H4: A firms ESG controversy score affects the firm's valuation.
All of the hypothesis mentioned above assist in answering the research question of this study:
RQ: *How do ESG scores affect firm valuation for large Dutch firms?*

Research method

Research design

The selection of the statistical test is important to answer the null hypotheses. The statistical test calculates the test statistic which describes the relationship between the variables and from the null hypothesis[4]. By establishing significance in accepting or rejecting the null hypotheses formulated in previous chapters, the statistical test can accept or reject the null hypothesis. Because this research comprises quantitative variables and more than one predictor variable, the most suited statistical test for this research would be multiple regression (Allison, 1999).

Sample selection and collection

Before implementing the research method, it is important to retrieve the necessary data from the population. This research studies the effect of ESG scores on firm valuation for large Dutch firms, the population consists of the top 50 largest firms in the Netherlands. These are the Amsterdam Exchange Index and the Amsterdam Midcap Index firms combined. Sample selection is based on the theory of Israel (1992). The theory "Using a census for small populations" this theory states for small population sizes the entire population can be used as a sample. Financial institutions are left out the sample because they are subject to specific regulations. This is in accordance with the study of Velte (2017), leaving 7 firms out of the total population. Besides firm specific regulations, double-listed firms are also left out of the sample, leaving 42 firms in the sample. Lastly due do data availability certain firms are left out of the sample, this leaves the total sample to be 40 firms for the years 2018 until 2020 and 120-year specific observations. In Table 2, an overview is given of the sample size and exclusion of data.

Table 1:
Sample size and exclusion of data

	2018	2019	2020
Reason for exclusion			
All firms listed on AEX and AMX	50	50	50
Exclusion of multiple listings -/-	1	1	1
Exclusion of financial institutes -/-	7	7	7
Exclusion due to data unavailability -/-	2	2	2
Sample size for the year =	40	40	40

For data collection, the Revinitif framework is used. Revinitif comprises over 130 fintech applications gathering data for large parties such as Reuters with over 400.000 customers. Revinitif is one of the largest ESG data providers. With over 360 research analyzing publicly available data, Revinitif has created an extensive ESG database. The Revinitif framework separates the ESG categories and searches for available information; this comprises one category, namely the ESG score. For this research, the different categories are used to find a relationship. The University of Twente has been granted access to the Revinitif framework program.

The main objective of this research is to answer the research question "How do ESG scores affect firm valuation for large Dutch firms?". Firm valuation is based on investors' perception of firm valuation, market to book ratio is used for measurement. The market to book ratio gives an indication

[4] https://www.scribbr.com/statistics/statistical-tests/

of the valuation investors, or the market, is giving to the firm compared to its book value. The firm can be under- or overvalued (Bernard, 1994). The economic, social and governance pillars of ESG scores are separately researched. Bergman et al. (2021) explained that ESG discrepancies mainly exist because separate ESG scores are difficult to combine in one general ESG score. For that reason, this research has chosen to study the environmental, social and governance dimensions separately.

In addition to ESG score's impact on firm valuation, numerous variables can influence investor's valuation. Some of these variables are used as control variables in this research, such as return on assets and equity. These variables show investors how their investments provide returns and how the firm's management uses assets to generate returns. These can impact firm valuation, so investors use these variables when evaluating shares. Total assets are another control variable to show the size of the firm. And debt ratio or leverage is also used as a control variable because it can influence investor's valuation

Method of analysis

The method of analysis used in this research is following previous studies researching the impact of ESG on CFP. Velte (2017) used regression analysis to research the relationship between ESG and CFP, in this study return on assets (ROA) and growth rate had been used as dependent variables for CFP. The variable growth rate was comprised by using Tobin's Q, which is defined as the ratio of the firm's market value compared to the replacement cost of the assets (Chung & Pruitt, 1994). Tobin's Q shows the relationship between the firm's market valuation and the book value of the firm, this gives insight in the firm's fundamentals. Velte (2017) used Thompson Reuters ESG performance data and showed significant results on the relationship between ESG and CFP.

Friede, Busch and Bassen (2015) analyzed the relationship between ESG performance and financial performance. Instead of conducting regression, this study combined around 2200 studies, making it one of the most exhausting studies in the field. The results indicate that 90% of the studies show a positive relationship between ESG performance and firm performance. Velte (2017), Saygili, Arslan & Birkan (2021) used regression analyses to measure the relationship between ESG variables and firm performance measurements. This research will use multiple regression to examine the effect of ESG variables on the share valuation measurement and market to book ratio. Control variables ROA and firm size will ensure this research to be fair and unbiased (Hung, Ha, & Binh, 2018).

Table 1 is an overview of different independent, dependent and control variables used in this research. For data collection the database of Refinitiv framework has been used. Data was collected and gathered in Excel based on current AEX25 and AMX25 firms. Large firms are the main drivers of environmental damage, and pollution and damage on fresh water are the main aspects large firms are damaging over the years. For this reason, large Dutch firms have been chosen for the sample in this study (Jowit, 2010). In addition, large-, visible firms are more affected by media attention than smaller firms (Jonkman, Boukes, Vliegenthart, & Verhoeven, 2020).

For historical share prices, the yearly closing prices were gathered. Yearly ESG reports are presented on Refinitiv and audited by accountant firms such as Ernest & Young. Return on equity, assets, and total assets are gathered from historical balance sheets. The debt ratio and price to book ratio was calculated from data available on balance sheets and Revinitif.

Table 2:
List of variables

Dependent variable	**Explanation**
Market to book ratio	Market value per share / book value per share
Independent variables	
Environmental score	Environmental performance obtained via Refinitiv Eikon data. Pillar measuring firms' impact on the environment
Social score	Social performance obtained via Refinitiv Eikon data. Pillar measuring firms' social performance
Governance score	Governance performance obtained via Refinitiv Eikon data. Pillar measuring firms' governance performance
ESG-controversy score	ESG-controversy score obtained via Revinitif Eikon performance data. Pillar measuring firms' ESG-controversy performance
Control variables	
Return on assets	Income before discontinued operations & extraordinary items) / total assets
Firm size	Total current assets + Total non-current assets
Debt ratio	Total debt / Total capital)

Regression model

This study evaluates whether ESG scores and ESG controversy has a positive or negative impact on firm valuation. Firm valuation is examined by using the market to book ratio. The regression statistics are applied in SPSS, the following regression equation applies for the total ESG scores and ESG-controversy score:

$$Firm\ valuation\ (market\ to\ book\ ratio) = \alpha + \beta 1\ Environmental\ score + \beta 2\ Social\ score + \beta 3\ Governance\ score + \beta 4\ ESG\ Controversy\ score + \beta 5\ ROA + \beta 6\ Firm\ size + \beta 7\ Debt\ ratio$$

Results

Descriptive statistics

In Table 3 an overview of the descriptive statistics is presented. In the descriptive statistics an overview is given of the mean value, standard deviation, minimum value, maximum value, and the number of observations. The dependent variable has a mean value of 4.37, this indicates that firms within the sample show an average market to book ratio of 4.37. This implies that the market value of the firms within the sample is around 4 times higher than the book value of these firms. The standard deviation for this value is 5.45 indicating that there is much variety in market to book ratios. This is supported by the minimum and maximum value which are 0.29 and 35.17 respectively.

For the independent variables environmental score, social score, governance score and ESG-controversy score the table shows other values. These variables are measured on a scale from 0 to 100 with 100 being the highest possible score. Out of the independent variables the mean value of ESG-controversy score is the highest, 82.94. Out of the other variables social score is highest with 72.12. The lowest mean score for the independent variables is for the environmental score, this score is 57.43. There are multiple ways to interpret these scores. For instance, firms could focus on reducing ESG controversies, therefore having higher ESG-controversy score. Another explanation is the criteria for environmental score that could be stricter.

For the control variables ROA has a mean of 4.33% suggesting that the returns firms in the sample generate is about 4 percent of the assets of these firms. This is quite a low ROA, an explanation for this could be the debt levels. When firms are taking on additional debt, this causes the assets to increase. Assets is the denominator for ROA, meaning that ROA will shrink when debt levels increase. This is also the case in the sample, with debt levels of 44.6% the debt levels in the sample are quite high, explaining the lower ROA.

Table 3:
Descriptive statistics

	Mean	**Standard deviation**	**Min**	**Max**	**N**
Dependent variable					
Market to book ratio	**4.37**	**5.45**	**0.29**	**35.17**	113
Independent variables					
Environmental score	**57.43**	26.28	0	94.6	115
Social score	**72.12**	17.48	7.7	96.36	115
Governance score	60.46	22.61	5.57	98.4	115
ESG controversy score	**82.94**	31	1.14	100	115
Control variables					
Return on assets	**4.33%**	6.92%	-23%	46%	119
Firm size	€33.905	€86.093	€56	€444.868	120
Debt ratio	**44.6%**	22.18%	0.00%	101.9%	119

Correlation matrix

The Pearson correlation matrix for the dependent, independent and control variables are presented in Table 4. Social score is positively correlated with environmental score (.680) ** suggesting firms who are performing higher in the social dimension are also performing higher in the environmental dimension. The same can be said for the governance dimension in relation to the social dimension (.626) ** and for the environmental dimension in relation to the governance dimension (.647) **. ESG controversy score is negatively related to the other ESG dimensions, with the social dimension having a significant negative correlation – (.319) **. This does not come as a surprise because firms who perform better in the ESG dimensions should be less affected by controversies. Given the correlation of some of the independent variables this study also tested for multicollinearity, through variance inflation factors (VIF). With an VIF score over 10, severe multicollinearity problems could occur. In this sample multicollinearity should not affect the results because the highest VIF score in the data is 2.186 (Mansfield & Helms, 1982).

Table 4:
Correlation matrix

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. Market to book ratio	1							
2. Environmental score	-.099	1						
3. Social score	-.286**	.680**	1					
4. Governance score	-.087	.647**	.626**	1				
5. ESG controversy score	.159	-.319**	-.316	-.315	1			
6. Return on assets	.203*	.072	.064	-.047	.117	1		
7. Firm size	-.192*	.380**	.188*	.292**	-.374**	-.102	1	
8. Debt ratio	.327**	-.084	-.258**	-0.17	.049	-.198*	-.147	1

Notes: This table presents the result of the OLS regression of ESG scores and firm valuation. Unstandardized coefficients are reported. The figures in parentheses represent the t-statistics. * Indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level.

Regression

In this section the regression table will be addressed, and the hypotheses will be answered. The objective is to convey the test results from the different hypotheses to answer to research question. In Table 5 an overview of the relationship between the independent variables and the dependent variable is given. The table give insight in the relationship between ESG scores and ESG-controversy score on market to book ratio. All previously mentioned hypotheses are tested.

H1: A firms environmental score affects firm valuation "Failed to reject null hypothesis" The relationship between environmental score and market to book ratio is **-0.99(.299)**, suggesting there is no statistically significant relationship between environmental score and market to book value within the sample. The statistical relationship between higher environmental scores and higher firm valuation cannot be established. There is a statistically significant relationship between environmental score and firm size **.380(.000) *****, indicating larger firms respond more to environmental challenges.

H2: A firms social score affects firm valuation "Accepted" Table 5 shows that social score has a significant negative relationship with market to book ratio **-.286(.002) ** .** Suggesting that firms in the sample with higher social score show lower market to book ratios. There are multiple ways to interpret these results, one explanation could be overinvesting in social challenges by Dutch large firms. Social score is also positively related to firm size **.188(.044) ****, indicating that large firms tend to invest more resources in receiving a higher social score. Social score also shows a statistically significant relationship with debt ratio **-.258(.006) ****. Firms with higher social scores have lower debt ratios. Firms with higher debt ratios might not have the necessary resources to invest in ESG related topics.

H3: A firms governance score affects firm valuation. "Failed to reject null hypothesis" Table 5 shows that governance score has a nonsignificant negative relationship with market to book ratio **-.087(.365)**. Indicating that governance scores have no effect on firm valuation. Investors do not include governance scores when valuating firm values. One explanation for the results could be difficulties arising when trying to convert governance scores into quantitative measures. Governance score shows a significantly positive relationship with firm size **.292(.002) ****, indicating that larger firms invest more in ESG score criteria.

H4: A firms ESG controversy score affects firm valuation. "Failed to reject null hypothesis" Table 5 shows that ESG controversy score has a slightly significant positive relationship with market to book ratio **.159(.095).** This may indicate firms with lower ESG controversy scores to be higher valuated by firms, however the relationship is significant at the 10% which suggests further research needs to be done to investigate this relationship. Besides the effect on market to book ratio ESG-controversy score shows a statistically significant negative relationship with firm size **-.374(.000) *****. This is in line with the control variable firm size and the regression results with the other independent variables. Suggesting large firms invest more resources in ESG scores and mitigating ESG-controversies.

Table 5:
Regression analysis

Variables	**Environmental score**	**Social score**	**Governance score**	**ESG controversy score**
Market to book ratio	**-.099(.299)**	**-.286(.002) ** **	**-.087(.365)**	**.159(.095) ***
Return on assets	0.72(.444)	.064(.499)	-.047(.620)	.117(213)
Firm size	**.380(.000) *****	**.188(.044) ** **	**.292(.002) ** **	**-.374(.000) *****
Debt ratio	-.084(.376)	**-.258(.006) ** **	-.017(.856)	.049(.608)

Note. All variables are defined in Table 5. Standard errors of the coefficient estimates are given in parentheses. Significance of the coefficient estimates at the 90%, 95%, and 99% confidence level is denoted as *, **, and ***, respectively.

Discussion

The aim of this research is to find the impact of ESG scores and ESG controversies on firm value. The research question, "To what extent do ESG scores affect firm valuation?" can be divided in four hypotheses. These hypotheses divide ESG scores in different subcomponents of ESG scores. Separating the impact of environmental impact, social impact, and governance impact on firm valuation. In addition to the separate categories of ESG, this study has added ESG controversies to the hypotheses, investigating the impact of ESG controversies on firm valuation.

This research has established a significant negative relationship between social score and firm valuation. Suggesting firms within the sample may be overinvested in the social category, therefor negatively affecting their valuation. Besides social score this study has not established significant relationships for environmental and governance scores. There is also no significant relationship between ESG controversies and firm valuation. These scores may be embedded in the firm valuation, therefor reducing the impact of these categories. The ESG categories separately all have a significant positive relationship with firm size, suggesting large firms are more invested in ESG scores.
The social dimension has a negative impact on firm valuation. One of the explanations for this relationship could be that firms which are more engaged in socially responsible behavior, have higher monetary expenses (Neves, 2012). A key part in social responsibility is the relationship between the firm and other businesses and towards local communities. Fostering health and safety are also assessed in the social score. To all these aspects of the social score, a monetary expense is attached. Firms with higher social score can suffer from financial expenses which are considerably larger than the benefits that come with having higher social scores. The study of Chen et al (2021), states firms leading in ESG performances are lagging in financial results, due to the distribution of resources. Another explanation for social score to have a negative impact on firm valuation can be the social standards firms have to oblige in the Netherlands. This could affect the impact of social scores from an investors' perspective. Investors can ignore social scores for firms because the set of social laws and regulation in a particular country is at a high level. This contributes to the study of Ortas, Alvarez, and Garayar (2015) suggesting country-specific social obligations affect the impact of ESG on CFP.

The results of the environmental score cannot reject the null hypothesis. Within the sample no statistically significant relationship between environmental score and firm valuation is established. A reason for this result could be the fact that environmental score is embedded in the market to book ratio. Besides the results of the environmental score, also the governance score cannot reject the null hypothesis. A reason for this could be the qualitative nature of corporate governance, which is difficult to convert into quantitative measurements. Therefor not resulting in a significant relationship between the governance score and firm valuation. In addition, ESG controversy score also cannot reject the null hypothesis, the relationship is unsignificant and positive. The results are in line with Alareeni and Hamdan (2020), revealing separated ESG components will reduce the impact of ESG scores on CFP. The results reveal that all ESG variables are significantly related to firm size, suggesting larger firms are more invested in ESG criteria. An explanation for these results could be large firms being more visible and are subdue to heavier global media attention (Jonkman, Boukes, Vliegenthart, & Verhoeven, 2020).

Conclusion

The main objective of this research is to give a clear answer to the research question. “How do ESG scores affect firm valuation for large Dutch firms?” To answer the research question, we have to separate the ESG scores as has been done in the hypotheses. Social score has a significant negative impact on firm valuation, indicating firms within the Dutch market are overinvested in social criteria. Therefore, reducing the market to book ratio of the firm. Environmental score has no effect on firm valuation within the sample, because this is embedded in the firm valuation. Governance scores also have no effect on firm valuation, because corporate governance is difficult to convert in quantitative measurements. Coming back to the RQ, overinvesting in social criteria reduces the market valuation of the firm. On the other dimensions of ESG no significant relation can be established.

This study has given more insight in the ESG sustainability scores in relation to CFP. While environmental and governance factors do not influence firm valuation the social dimension affects firm valuation negatively. This could be an indication large Dutch firms are over invested in social responsibility. Firms should be aware of their investments of resources in the social dimension to ensure not being over invested in the dimension. This study adds to the existing literature and has examined a specific sample in Dutch large firms. In particular to the literature separating the ESG dimensions. The results suggest the impact of separate dimensions of ESG to have no effect on CFP, apart from the social dimension which has a negative effect. The results are in line with the study of Alareeni and Hamdan (2020), who implied that separation of ESG components results in negative effects on CFP.

The results in this research are relevant to researchers, regulators and managers of large firms. The results expand existing knowledge regarding the impact of ESG scores on firm performances. This study explains the relationship between non-financial information and the effect on financial performances. This study contributes to existing literature regarding ESG scores, in particular for large Dutch firms. The aim of the study has been to investigate the impact of ESG scores on firm valuation. Most of the existing literature use other CFP variables, for example return on assets or growth rates. By using different dependent variables this study distinguishes itself from existing literature. Furthermore, this research differs from previous literature due to the separation of ESG dimensions, therefor investigating the impact of ESG on CFP from a different perspective. This counters the statement of Bergman et al. (2021), suggesting ESG criteria are difficult to combine into a single score. Lastly this study has added ESG-controversy score to the independent variables, in order to distinguish itself from previous research.

Finally, this study must elaborate on the limitations of this research. During the data collection process, it became clear that smaller firms show less ESG data. Certain firms in the AMX index have been chosen to be left out of the sample due to data unavailability–for this reason including smaller firms would not have the desired effect. The main objective of this research is to study the impact of ESG scores on firm valuation for Dutch large firms, increasing the sample with smaller firms would impact the results. To distinguish itself from similar research, this study separately researched the ESG factors and added ESG controversies to the independent variables to increase the data. The direction which has been chosen for this research, affects the sample size. The margin of error not being at the desired level has different reasons. The main reason for the difference in margin of error is due to data availability. Out of the 50 firms in the sample, 10 firms were excluded. Without data exclusion the margin of error would be at the desired level. However, this would affect the outcome of the research.

Future research should investigate the impact of ESG scores on a wider scale, for example by including small and medium enterprises (SME’s) in the sample. This should give an accurate description of the impact of ESG scores on firm valuation for the Dutch market. Due to increasing obligated data disclosure by firms, ESG data availability should increase, making it possible to investigate the ESG impact in a quantitative manner for SME’s. Furthermore, further research can investigate the impact of ESG on an international scale. Results from different continents may show the differences in ESG impact within the geographical spread.

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