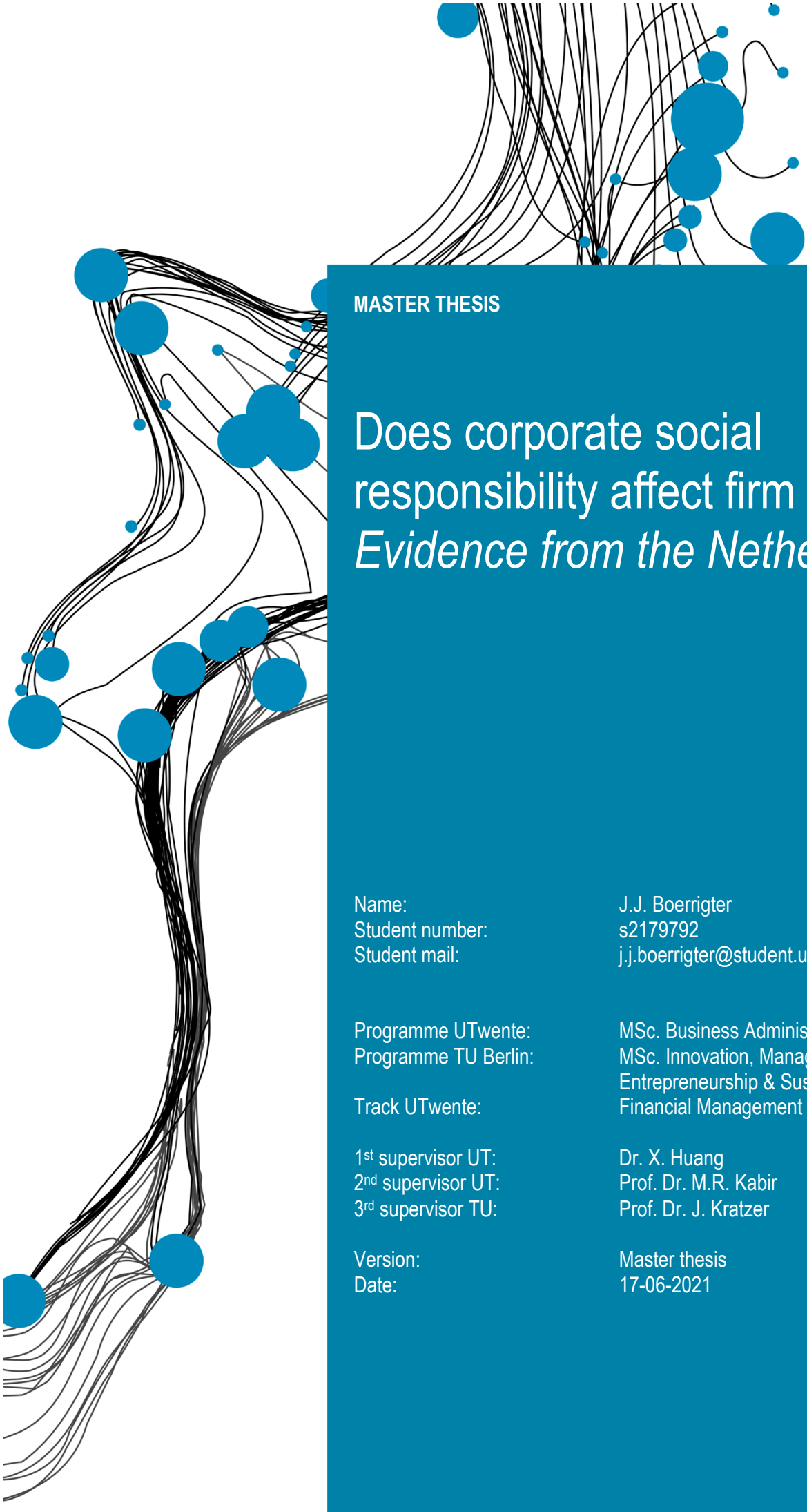

MASTER THESIS

Does corporate social responsibility affect firm risk? *Evidence from the Netherlands*

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Abstract

During the last century, Corporate Social Responsibility (CSR) received an increased attentiveness in the literature and among different kind of stakeholders. Academics try to understand the impact of CSR on organizations as well as on society. Prior studies have examined different relationships between CSR and financial performance. However, the relationship between CSR and firm risk is less well understood. Therefore, this study examines whether CSR affects the risk of Dutch listed firms or not. Based on the agency, stakeholder, legitimacy, and institutional theory as well as on empirical evidence, several hypotheses are developed. The hypotheses are tested by executing multiple OLS regressions. The data for this research is gathered from the Thomson Reuters Eikon database and from Yahoo finance. The sample consist of 53 firms with 221 firm-year observations covering the years 2015-2020. The results showed that the empirical models are mainly significant. This study found evidence that the level of CSR disclosures reduces the level of total firm risk and idiosyncratic risk. However, there is no evidence found that the level of CSR disclosures affects the level of systematic risk. Finally, this study proofs that the individual environmental disclosures also negatively influence the level of firm risk.

Keywords: *Corporate Social Responsibility, CSR, firm risk, systematic risk, idiosyncratic risk, CSR/ESG scores, agency theory, stakeholder theory, legitimacy theory, institutional theory, ordinary-least-squares regression*

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1. Introduction

Nowadays Corporate Social Responsibility (CSR) is a hot topic in the literature (Cui, Jo and Na 2018; Cai, Cui and Jo 2016). Academics find it interesting to examine the impact of CSR on organizations as well as on society. There has been an increasing attentiveness in understanding the concept 'CSR'. Several years ago, incorporating CSR was not really a priority for organizations. However, nowadays organizations have a greater incentive to pay attention and include CSR initiatives in their daily operations. According to Yuen and Lim (2016), CSR can be defined as "a concept whereby firms integrate social and environmental concerns in their business operations, and in their interaction with stakeholders on a voluntary basis" (p.49). According to Griffin and Vivari (2009), CSR represents the public position of the firm and the way they connect with their stakeholders. The firm should not only care about the financial facets in a decision-making process, but they should also consider the possible impact the decisions may have on society or on the environment.

The main reason for adopting CSR is the changing society we are currently living in. Climate change and created inequalities are still highly relevant and problematic for people's future perspectives. Thus, a positive change is needed. All over the world organizations are trying to tackle these problems. CSR became a useful and accepted tool for this. Multiple studies showed that CSR is driven by external forces. Customers, activist groups, and legislation set pressure on organizations to stimulate CSR (Vogel, 2005; Den Hond & De Bakker, 2007; Dawkins & Lewis, 2003). For example, the Dutch government expects that organizations will apply the OECD guidelines as the foundation for their CSR policy (Rijksoverheid, 2020). Although implementing a CSR policy is not obligated, it is highly recommended to do so. There has been a shift in CSR policy from a 'nice-to-have attitude' to an almost 'must-have attitude'. According to the literature, CSR is not only beneficial for society and is not only driven by external forces, but it is also beneficial for the organizations themselves (Porter & Kramer, 2002). CSR could positively influence aspects such as firm value, shareholder wealth, risk management, customer loyalty, or it could cause a reduction of information asymmetry between management and their stakeholders (Cui, et. al. 2018). Additionally, organizations which are implementing a CSR policy aim to improve their

reputation, which could strengthen the firms' competitive advantage within the operating industry (Friedman, 2007).

However, companies often face difficulties and challenges when adopting a CSR strategy (Yuen & Lim, 2016). These researchers identified several barriers, such as lack of resources, strategic vision, or high regulatory standards. They found also that organizations have a low willingness to pay for CSR implementations.

Incorporating a CSR policy within organizations is costly and raises the important question whether organizations should address social and environmental issues at the cost of investments in risky, but value-enhancing projects (Harjoto & Laksmana, 2016). To guarantee the continuity of organizations, they should take risks in order to run their business. However, both excessive risks taking and avoidance of risks could harm the firms' continuity. The total risk of listed firms is shouldered by their shareholders (Jo & Na, 2012). Hence, high volatility in the stock prices causes a higher risk for their shareholders, since it potentially suggests uncertain futural cash flows (Luo & Bhattacharya, 2009). CSR could potentially reduce these risks. Several ways to achieve this reduction, will be discussed further on in this research.

While CSR has been examined in different ways, such as the relationship between CSR and customer satisfaction (Yuen, Thai, Wong, & Wang, 2018) or the association of CSR and financial performance (Adams, Almeida, & Ferreira 2005; Saedi, Sofian, Saeidi, Saedi, & Saaeidi, 2015; Chuang & Huang, 2018), the link between CSR and firm-risk is less well understood.

1.1 Problem statement

Due to the increasing interest in CSR, both in academia and applied sciences, the impact of CSR on firm risk is valuable to examine. The first few studies regarding CSR and firm risk have been done in the '90s of the previous century (McGuire et al., 1988; Feldman et al., 1997). Even though the focus in these studies laid primarily on the relationship between CSR and financial performance, these authors were one of the first examiners who pointed out the possible association between CSR and firm risk.

Risks of the firm are inherently connected to organizations' operations. These risks are influenced by internal and external factors that could either positively or negatively affect the profitability of an organization. The firm's total risk is a combination of systematic and

unsystematic risk (Jo & Na, 2012). Systematic risk is often called market risks, referring to a great amount of assets, which are associated with the entire market. On the contrary, unsystematic risks affect mostly a smaller amount of assets and are called firm-specific or idiosyncratic risks. Sharfman and Fernando (2008) found that firms benefit from developed environmental risk management since it could reduce their cost of capital and, hence, their level of firm risk. This results in a reduction of the probability of expected financial, social, and environmental crises that could harm the firm's futural cash flow.

In July 2003, the Dutch Committee Corporate Governance presented the Code Tabaksblat which consists of several proposals to improve the corporate governance of Dutch listed firms (Graafland & Eijffinger, 2004). Proposals such as making financial statements more transparent, restriction of severance pay, manners to strengthen the influence, or control of shareholders were included in Code Tabaksblat. In the past, CSR practices played a less important role in Code Tabaksblat. In 2009 the Dutch Monitoring Committee announced an updated version of Code Tabaksblat called 'Frijns code' in which CSR takes a more central role (Frijns, 2009). In this revised code, CSR issues are sufficiently important and should be taken into consideration as part of the management strategy. Hence, the Netherlands is familiar with the concept CSR and multiple listed firms have implemented a CSR strategy. However, the impact of CSR on firm risk in Dutch firms is less well understood. Therefore, in this study the following research question is addressed:

Does corporate social responsibility affect the risk of Dutch listed firms?

1.2 Contribution of study

Although CSR is widely investigated in the literature (Frankental, 2001; Ali, Frynas, & Mahmood, 2017; Brammer& Pavelin, 2008), and although the relationship between CSR and firm risk is studied before (Jo & Na, 2012), most of the research focuses on the empirical association between CSR and firm risk and the inverse function between those variables. Prior research focuses mainly on firms in Northern America (Jo & Na, 2012). However, there is no topical research done specifically towards firms in the Netherlands. As mentioned before, the Dutch government expects that organizations disclose their CSR policies according to the OECD guidelines. Although CSR is not obligatory in the Netherlands, it can be beneficial for

organizations (Rijksoverheid, 2020). Besides theoretical implications, this research could be of value for several stakeholders for their decision-making process. Potential investors could take the results of this study into practice or managers may take another position regarding the incorporation of CSR policies within their organization.

1.3 Thesis structure

The remainder of this study is structured as follows. In chapter 2, a literature review concerning CSR, firm risk, and the relationship between these two variables is conducted. Moreover, related theories and empirical evidence regarding the relationship between CSR and firm risk are critically discussed. Based on the literature review, the hypotheses of this study are determined and can be found in section 2.5. The research method section can be found in chapter 3. The collection method of the data is discussed in chapter 4. Subsequently, the results of this study are provided in chapter 5 and lastly, in chapter 6 the conclusion, limitations, and recommendations are published.

2. Literature review

This chapter provides a comprehensive overview of the theoretical background of this study and critically discusses the literature regarding CSR and firm risk. Based on several theories and empirical evidence several hypotheses are formulated.

2.1 Corporate Social Responsibility

Started in the last century, an upcoming group of managers continually felt an increasing pressure of multiple stakeholders to devote more resources to CSR (McWilliams & Siegel, 2001). Stakeholders such as customers, employees, community groups, and governments played an important role in highlighting the urgency of CSR. Since then, academia have tried to better understand the implications of CSR and its consequences. Multiple researchers tried to define CSR and fully understand the concept (Carrol, 1979; Elkington, 1994; Yuen & Lim 2016). In the remainder of this paragraph, two important frameworks regarding CSR will be discussed.

One of the most well-known frameworks for explaining the concept is the 'CSR pyramid' developed by Carroll (1979). Carroll's point of view regarding this concept consists of four major elements. These elements are also known as the responsibilities that organizations have towards society, namely: economic, legal, ethical, and philanthropic responsibilities. In the CSR pyramid, the sequence of order is important. Economic responsibility covers the largest stake and philanthropic responsibility the smallest. According to Carroll, these four responsibilities capture, in a categorical way, the social responsibilities of organizations. However, these categories are neither mutually exclusive nor are they cumulative or additive. Economic responsibilities are the cornerstone of CSR. It relates to the profitability, competitiveness, and continuity of an organization (Carroll, 1991). Organizations cannot contribute to society without taking economic responsibility, since they will not be able to create healthy jobs or produce goods and services. This economic component is the foundation upon which all others rest. The second layer of Carroll's pyramid highlights the legal responsibilities. Organizations should operate according to ground rules, laws, and regulations established by the government. Responsible firms should produce goods or services that meet legal standards, such as consumer and employee safety. According to Carroll (2016), legal responsibilities "reflect a society's view of 'codified ethics' in that they

articulate fundamental notions of fair business practices" (p.3). Moreover, the third layer relates to corporate ethical responsibility, which refers to the existing moral and ethical standards. Even though these standards are not written by law, they are applied by default. The last layer on top relates to philanthropic responsibilities, which implies that organizations should operate as good corporate citizens. Although ethical and philanthropic responsibilities look similar to each other, the biggest difference is that a philanthropic firm operates in a way that is not necessarily expected by society in a moral sense, whereas an ethical firm does. The philanthropic manner of operating is considered more as voluntary, rather than obligatory.

Although the pyramid model of Carrol is one of the most influential models of CSR, it also received some criticisms. According to Visser (2006), the model lacks conceptual clarity; it is difficult to put into practice. Furthermore, the reviewer mentioned that the model does not include the environmental responsibility of organizations. Additionally, the model does not contribute to capturing the complexity of CSR in practice. Another criticism, according to Baden (2016), is that the sequence is outdated and should be revised in the following order: ethical, legal, economic, and philanthropic. The power of organizations has been changed in the 21st century and they play a greater role relative to governments. There is a shift in authority, in which organizations become more powerful. Due to the reluctance or inability of governments to impose more stringent regulations, it is getting easier for organizations to maximize shareholders' wealth at the expense of society. Baden (2016), therefore, proposes to recover the inequality of authority by setting the legal aspect as the most important facet in the pyramid model.

The pyramid model is praised by academia due to its multi-layered concept enclosing four crucial dimensions of CSR. These dimensions, also known as responsibilities, can be considered as wholesome rather than a hierarchy. CSR requires taking economic, legal, ethical, and philanthropic responsibilities for organizations. They should make a profit, obey the law, do business ethically and act as good corporate citizens. The pyramid model will contribute to this study because it emphasizes that organizations' operations take an important role in society. Operating according to good practices could potentially reduce the risk of a firm.

Another important and often mentioned framework regarding CSR is the Triple Bottom Line, developed by Elkington (1994). This framework presents the social, environmental, and economic aspects of the firm. It underpins the fact that organizations create value in multiple dimensions. People, planet, and profit is another often-mentioned name of the Triple Bottom Line. The framework demands from organizations that they are not only taking responsibility for their own shareholders but for stakeholders in general as well. These stakeholders refer to groups which are influenced either directly or indirectly through the actions taken by the firm.

The people/social bottom line relates to the well-being of humans throughout the supply chain. Examples are employees, consumers, and suppliers. Organizations should keep an eye on persons who are affected by the taken actions. The planet/environmental bottom line pertains to the sustainable practices of organizations. They should pursue to minimize the environmental impact as much as possible. Reflecting and improving their business model is an effective way to become more sustainable. The last bottom line is pointing out the economic aspect of a business: making a profit. This is the basic concept of doing business and guarantees the continuity of their operations.

The triple bottom line framework also faced some shortcomings according to some researchers. As a reporting tool, the triple bottom line is not well applicable, since the social and environmental impacts of a business are difficult to measure (Norman & MacDonald, 2004). Furthermore, Milne and Gray (2013) stated that it is easy to 'cherry pick' the disclosures of the organizations' operations, also called ‘window-dressing’. So, the possibility exists that the triple bottom line reports a lack of reliability compared to traditional accounting models. Greenwashing is another form of concealing or bending the real social or environmental practices of organizations. According to Frankental (2001), greenwashing relates to the dishonest act of organizations to pretend that their products or services are environmental-friendly. Companies are still mainly driven by competitive pressures and judged by financial key indicators such as profits, earnings per share, EBITDA, etc. Moreover, members of the board receive mostly their incentives based on these indicators and are not driven by social or environmental indicators. Nowadays, CSR is still not an obligatory element of the audit by third parties. Therefore, the social and environmental performance of an organization is not as important as its financial performance. According to Elkington (1998),

organizations should be judged on the triple bottom line indicators to measure the full impact of an organization on society.

As described above, the concept CSR is elaborated on in the literature quite extensively. It can be said that CSR refers to how organizations manage their business operations beyond what is legally and financially required.

2.2 Firm risk

In everyday language, 'risk' is a very broad concept which emphasizes hazardous, or threatful moments (Lupton, 1999). However, firm risk refers to a set of results arising from decisions taken in the past that can be allocated to probabilities. The outcomes could either positively or negatively affect the firm. Another term related to risk is 'uncertainty', which is often used incorrectly. Uncertainty arises when probabilities cannot be allocated to a set of results (Watson & Head, 1998). During pre-modern times, risk was associated with the occurrence of natural phenomena such as thunderstorms or hurricanes (Lupton, 1999). In modern times the introduction of probability calculations started, which in turn led to an elaboration upon the ideas of risk (Linsley & Shrives, 2006).

Sharpe (1964) defines firm risk as to what extent a firm is vulnerable to internal and external factors influencing the stock returns. A way to measure the risk or variability of a stock is to calculate the variance and standard deviation. The expected squared deviation from the expected return will give the variance of the market return (Brealey, Myres, & Allen, 2019). Moreover, by taking the square root of the variance, the standard deviation is calculated. Through these measurements, the riskiness of a stock can be determined. Shareholders should diversify their stock portfolio in order to reduce the risk of an individual stock. Diversification causes a reduction in the variability of your portfolio. Holding different, negative, or non-correlating, stocks within one portfolio is the basic principle of diversification (Markowitz, 1952). A decrease in the price of one stock will be covered by the increase in the price of another stock. As a result, the risk of price changes in a particular stock will not harm the total return.

The current view of risk relates to certain factors that will affect the organization either in a positive or negative way. As mentioned before, firm risk consists of a combination of systematic and unsystematic risk. Organizations are exposed to so-called systematic risk or

market risk and cannot be diversified away. These risks are coming from macroeconomic perils that threaten or harm all organizations (Brealey et. al, 2019). Specifically, unsystematic, or idiosyncratic risk relates to factors that have the possibility to only threaten or harm one specific organization. According to Brealey et al. (2019), these risks can be eliminated by diversifications, whereas this is not possible for systematic risks.

Diversification can be used in two directions, either from the perspective of the firm or from the perspective of the investor. On the one hand, it easier for investors to make use of diversification since they could invest in a stock for one week and pull out the other week. Investors holding a sufficient number of different stocks bear only the market risk (Campbell, Lettau, Malkiel & Xu, 2001). The specific risks are excluded through the diversified stock portfolio. On the other hand, firms can also make use of diversification to minimize their risk. However, this is much more complex for organizations since they cannot easily expand and diversify their operations.

2.3 Theories

Section 2.3 introduces relevant theories from financial and psychological literature to explain the impact of CSR on firm risk. The agency, stakeholder, legitimacy, and institutional theory will be discussed. These theories are the basis of the developmental process of the multiple hypotheses.

2.3.1 Agency theory

According to Jensen and Meckling (1976), the agency theory explains the relationship between the principals (shareholders) and their agents (managers). A problem may occur when both parties are trying to maximize their own interests; they are self-serving. Due to the separation of ownership and control, the manager will not always act in the best interest of the shareholder. Hence, this could potentially lead to a conflict of interest. There are two main types of agency conflicts, namely: the vertical agency conflict and the horizontal agency conflict. Firstly, the vertical agency conflict is the traditional principal-agent conflict (Singh & Davidson, 2003). Secondly, the horizontal agency conflict occurs among the shareholders themselves, mostly between block holders and smaller shareholders (Roe, 2008).

To reduce these agency problems and to contribute to the maximization of shareholders' wealth, organizations must face agency costs. Examples of agency costs are (1) bonding expenditures, (2) monitoring expenditures, and (3) opportunity costs (Jensen & Meckling, 1976). Bonding expenditures come into play when the agent offers to sign a contract that guarantees that the manager must face legal consequences for taking dishonest acts at the costs of the shareholder's wealth. Monitoring expenditures relates to extra auditing or other formal controls to limit the managers' ability to benefit themselves. Lastly, opportunity costs will arise from the incapacity of corporations to respond to new opportunities. They are not flexible enough to gain from sudden, profitable investment opportunities.

Another element of the agency problem is information asymmetry, which refers to an imbalance of knowledge between the managers and the shareholders. There are several manners to overcome these agency problems. According to Miller et al. (2002), a way to curb agency problems is to design outcome-based and performance-contingent plans. These types of plans should align both the preferences of the principal and the manager. Another possible way to reduce agency problems is to disclose more information regarding the firms' operations. Shareholders will benefit from a substantial and high level of qualitative corporate disclosures. They possess more information to make a correct investment decision. A traditional way to disclose corporate information is through annual reports. Annual reports provide stakeholders with audited information regarding their operations and financial condition on an annual basis (Neu, Warsame & Pedwell, 1998). Another option of disclosing corporate information is through sustainability reports. Since the '90s, a growing number of firms started to disclose not only financial but also non-financial information, which covers issues such as environmental protection or human rights preservation (Dhaliwal et al., 2014). Whenever firms disclose CSR values, they could give shareholders or investors highly valuable information to reduce information asymmetry. A reduction of information asymmetry positively contributes to the level of firm risk (Richardson & Welker, 2001; Dhaliwal et al, 2014). Moreover, disclosing CSR activities reduces evaluation and search costs for their stakeholders (Kennett, 1980). The authors state that disclosing sustainability reports could, therefore, negatively influence the level of firm risk. For example, the level of information asymmetry will decrease as well as the cost of equity capital (Sharfman & Fernando, 2008;

Chava, 2010; El Ghoul et al., 2011). As a common result, the volatilely of the stock price reduces, which directly influences the level of firm risk.

2.3.2 Stakeholder theory

According to Freeman et al. (2010), stakeholders can be described as groups or individuals who affect or are affected by the actions of an organization. These stakeholders could either be internal, such as employees and owners, or external such as suppliers, governments, shareholders, customers, and societies. The stakeholder theory is related to the relationship between the operations of the organization and its business ethics. Freeman et al. (2010) addressed that this theory expands the scope to the larger societal embeddedness of organizations and their interrelationship with their societal environment. The author proposes that businesses exist to create a shared value for all stakeholders.

Furthermore, Ullmann (1985) developed a three-dimensional model to explain the correlation between social disclosures and economic performance. The first dimension is regarding stakeholder power, which is the foundation of this framework. Organizations are likely to react to stakeholders, who have critical utterances, in a way that satisfies these criticisms. That means that stakeholder power tends to positively correlate with CSR. The second dimension is relating to the strategic posture of an organization. Strategic posture can be defined as how influential decision-makers within organizations respond to social demands. An active posture strategy is beneficial for achieving the optimal level of interdependence among the organization and its shareholders. The last dimension covers the firms' past and current economic performance. The economic performance of organizations plays an important role regarding the ability and capability to implement costly social programs. As viewed in the context of this three-dimensional, social performance and disclosures are tools to manage the relationships with stakeholders.

An important goal of organizations is to make a profit, which is accepted by stakeholders in a capitalistic world. Requirements for making profit consist of a high degree of independence, such as self-serving and self-dealing behaviors. CSR activities can serve as a tool for organizations to express non-selfish behavior, and to consider socially and environmentally impacts in order to be more altruistic (Godfrey, Merril, and Hansen, 2009). In other words, managers could also take another position towards their stakeholders. Simon

(1995) showed that whenever such other considering signals are perceived as accepted by stakeholders, organizations will gain goodwill or moral capital. The authors set two requiring features of CSR activities to create goodwill or moral capital. Firstly, the activity should be disclosed through organizations' self-reporting reports, such as through sustainability reports, and should be publicly available. Secondly, corporate disclosures must have an unselfish characteristic for the sake of credibility and reasonability. Organizations that are meeting these requirements will create noteworthy disclosures.

Creating goodwill or moral capital could bring forth 'insurance-like' protection to protect the cash flows and financial performance (Godfrey, 2005). Organizations will sometimes face, even under good circumstances, negativity among stakeholders about organizations' operations. These negative impacts could either have weak or strong consequences. Stakeholders may punish the organization by banning or boycotting its operations. Punishments are more severe when poor actions are committed by already bad actors. According to LaFave (2000), the *mens rea* of actors plays an important role in the attribution process. Moral capital provides a mitigating effect in the *mens rea* attribution process regarding CSR activities (Fombrun, Gardberg, and Barnett, 2000; Godfrey, 2005). Therefore, the created goodwill or moral capital should have a positive impact on reducing the overall severity of punishment and hence, will ultimately lead to lower firm risk.

Moreover, building a sustainable relationship with the organizations' key stakeholders could increase the level of trust and loyalty, which refers to social capital. Lins et al. (2017) argue that CSR increases the level of social capital. The authors found that a higher level of social capital positively contributes to the firms' financial performance, especially during periods of financial distress or to weather a crisis. From a perspective of shareholders, if organizations are perceived as reliable and trustworthy, and possess a higher level of social capital, organizations with a lower-level social capital will face an extra premium by investors due to a higher level of firm risk. In other words, social capital can negatively influence both the level of systematic and idiosyncratic risk of an organization. Therefore, it is important for organizations that they consider the shareholder interests since they have a direct link with the organizations' value and profitability.

2.3.3 Legitimacy theory

The legitimacy theory is also a well-known theory to explain the motivational reasons to incorporate CSR policies. The fundamentals of this theory are based on the belief in a 'social contract'. This contract keeps the operations of an organization within the existing social boundaries (Gray, Owen & Adams, 1996). Suchman (1995) defined legitimacy as “a generalized perception or assumption that actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions” (p.574). Whenever organizations continue their operations, it should be beneficial or at least not harmful for society. Hence, it will gain support from its stakeholders. In other words, the operations should be perceived as 'legitimate' by society. Even though firms are obligated to operate according to the law and legal procedures, failure to meet the social standards can threaten the organizations' legitimacy and even its continuity (DiMaggio & Powel, 1983; Oliver 1991).

The legitimacy theory considered two main approaches, namely: the strategic and institutional approach (Suchman, 1995). Strategic legitimacy implies that the top management of organizations has a high level of control over the legitimation process. Organizations represent legitimacy as an operational resource gained from their social activities. In contrast to strategic legitimacy, the institutional approach represents legitimacy not as an operational resource, but rather as constitutive beliefs. This approach argues that organizations have limited legitimacy control since it is dependent on the evaluation of the organization by external institutions. To conclude, real-world organizations face strategic challenges as well as institutional pressure. Therefore, it is important to incorporate both approaches to create a broader base of legitimacy (Swidler, 1986).

According to Sethi (1979), an unconscious creation of disparity between organizational and social values will possibly cause a legitimacy gap. Whenever such a legitimacy gap becomes wider, every organization can lose its legitimacy. However, there are different strategies to face this problem. One of these strategies is disclosing CSR information. CSR disclosures mitigate the legitimacy threat and ultimately reduce the legitimacy gap (Chen, Patten & Roberts, 2008). The board of an organization should have the ability to recognize a potential legitimacy gap and is also responsible for implementing a CSR strategy. Such a

strategy ensures the accountability and legitimacy of stakeholders and, hence, limits the risk of a firm.

2.3.4 Institutional theory

One of the most recurring themes in a CSR discussion is the question whether CSR is completely voluntary for companies or not. Definitions of CSR are often including phrases such as 'beyond legal requirements' (Vogel, 2005) or 'voluntary agreements' (Caroll, 1999). Even the European Commission (2001) defines CSR in the Green Paper as "a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis" (p. 6). These phrases are showing that regulations in business ethics were not really a priority. Although organizations have a major impact on the outcomes of consumption, environmental issues, or employment, the debate on CSR lacks the understanding to what extend organizations are socially responsible. Business and management studies merely focus on how the environment affects organizations, or on how organizations influence each other (Barley, 2007). The author argues that it became time for the organizational theorist to shift their focus on how organizations affect or can even create their environments, in particular the institutional sector, which has a broader perspective and impact on the economy. Therefore, growing attention on the relation between the institutional theory and CSR has arisen (Geppert et al., 2006; Jackson and Deeg, 2008). In the remainder of this paragraph, the institutional theory will be discussed to get a better understanding of CSR and the possible link with firm risk.

According to Scott (2004), "the institutional theory attends to the deeper and more resilient aspects of social structure. It considers the processes by which structures, including schemas, rules, norms, and routines, become established as authoritative guidelines for social behavior'' (p. 461). The theory suggests that organizational change is less driven by rational considerations, but more through external influences (Meyer & Rowan, 1977).

Institutions are often shaped during times of conflicts and compromises, and are established to deal with such future events. Institutionalization can emerge either very slowly or rapidly and provide either very broad or specific guidelines regarding certain events. The effects of institutionalization differ globally among regions and countries (Brammer, 2012). The meaning of CSR is not equal across different institutional settings. For example, the UK

and USA are historically liberal market economies, which attach value to a preserved interference of institutions. Hence, organizations treat CSR most likely as a voluntary concept. On the contrary, state-led markets such as South Korea or France keep another view regarding CSR. These countries have a more socially cohesive view on this concept and take actions with a stakeholder-oriented view rather than with a business-driven orientation. The Dutch economic market takes a more liberal position regarding CSR, in line with the Anglo-Saxon view, which means CSR is rather voluntary than obligated. This is confirmed by the Dutch government, since they do not oblige organizations to disclose CSR statements or audit their CSR disclosure programs by third parties. However, they do recommend organizations to act more socially responsible, since it could be beneficial in several ways (Rijksoverheid, 2020).

To conclude, the level of CSR is largely influenced by the present institutions of the business system or climate an organization is operating in. In the Anglo-Saxon or liberal context, CSR is mostly voluntary and still a bit of a side issue. Whereas, in other countries, CSR is formed by legal or customary defined institutions. As discussed in previous theories, CSR can negatively contribute to the risks of firms. Based on the institutional theory it can be mentioned that organizations operating in an Anglo-Saxon environment, such as Dutch firms, have a lower starting point regarding the CSR level and, hence, a higher level of firm risk compared to firms operating in countries where CSR is more regulated. In this study, the differences across countries will not be examined. However, it is important to be aware that the institutional view plays a role regarding the level of CSR in firms.

2.4 Determinants of firm risk

There are several researches conducted in order to identify determinants of firm risk. According to Ferreira and Laux (2007), firm risk is related to the following factors. The first driver is profitability since it reveals information regarding the firms' future cash flow streams. These streams are important factors for a firm's risk. Firms that are more profitable compared to their competitors are more capable of overcoming potential threats and difficult times, such as a crisis. They have more resources to deal with such events and, therefore, endure less from the potential consequences of firm risks. Commonly, the profitability of a firm is measured by the return on assets ratio (ROA). The second driver is the level of leverage carried by the firm. Highly leveraged firms are riskier to invest in since it has high-interest

obligations. Moreover, investors demand a higher return to compensate for the extra risk derived from the leverage. Furthermore, the MTB ratio is an important indicator for investors which shows the market's perception of a stock's value and indicates whether a stock is undervalued or overvalued (Brealey et al., 2019). An overvalued stock may warn or preserve potential investors since the current stock price is not accurately reflecting the underlying value of the company. Hence, the value of a firm will decrease, and the available resources will be less, which causes a weakened position to overcome potential threats or difficult times. According to Oviatt and Bauerschmidt (1991), several aspects of the industry also affect the level of firm risk. Industry type aspects such as rate and stability of industry growth, level of entry barriers, and the number of competitors are potential determinants of firm risk. Industry growth invites new competitors to join the market which increases the rivalry and, hence, reduces the profit margins. The number of competitors depends also on the level of entry barriers. If high barriers, such as the level of switching costs, government policies, or economies of scale keep competitors away, the position of the firm will be stronger and the level of risk of the firm will decrease. Moreover, the industry sector does not only influence the level of firm risk but also the level of CSR disclosures. Firms operating in sensitive industries are tending to disclose more CSR statements to present themselves in a positive manner (Jo & Na, 2012). Sensitive firms are considered as more harmful to society and are, therefore, forced to defend themselves against these considerations. Baker and Wurgler (2006) found evidence that the level of firm risk is also dependent on the life cycle of a firm. Valuations of younger firms are highly subjective, have a weak comparability level, and are more likely to be highly volatile. Hence, the level of firm risk is higher for younger firms. On the contrary, the valuation of mature firms can be based on long earning histories, accounting variables, and stable dividends. Therefore, the valuations of these firms are less susceptible to mispricing. Hence, the stock prices are less volatile and thus the securities are less risky. Lastly, the size of a firm plays a role in the level of firm risk. Reinganum (1999) argues that firms with a larger market capitalization outperform firms with a smaller market capitalization during an economic crisis. The relationship between firm size and risk-and-return is even incorporated in the Fama and French model (1992), which measures the level of risk of a security. Researchers also found evidence that firm size influences the level of CSR disclosures. Etzion (2007) argues that when firms become larger, they face more public exposure. Therefore, stakeholders held them more responsible for their actions. On the

contrary, smaller firms receive less attention from their stakeholders and are, therefore, less focused on CSR disclosures.

The above-mentioned determinants of firm risk are important and should be taken into consideration. However, some factors are difficult to measure. Therefore, the following variables will be controlled in this research, namely: firm size, profitability, market-to-book ratio, leverage, and industry type. Determinants such as, entry barriers, industry growth, and the number of competitors are not controlled in this research since these variables are difficult to measure quantitively in a routine manner.

2.5 Hypotheses development

The main objective of this study is to examine whether CSR disclosures have an impact on the level of firm risk of Dutch listed firms. For the purpose of this study, the possible relationship between the level of CSR disclosure and firm risk will be examined on three different levels. These are the total risk, the systematic risk, and the idiosyncratic risk accordingly. The remaining of this section provides arguments why such possible relationships exist, based on theories and empirical evidence.

[*H1a*] The literature review discussed several theories to understand the possible relationship between CSR and firm risk. Firstly, the agency theory is considered and explains the relationships between principals and their agents. This relationship is often unbalanced, due to the different interests between both parties. These disagreements could result in various problems and conflicts also known as the principal-agent problem. An example of such a principal-agent problem is the arising of information asymmetry between managers and stakeholders. Moreover, the agency theory also provides solutions to resolve these conflicts. Disclosure of corporate information is a manner to reduce the information asymmetry between the managers and stakeholders (Neu, Warsame & Pedwell, 1998). Traditionally listed organizations only disclose information regarding their financial performance since these firms are obligated by law to do so. Nowadays, more firms are disclosing information regarding their CSR strategy as well. According to Richardson & Welker (2001), CSR disclosures could give stakeholders highly valuable information to reduce the level of information asymmetry and, hence, the risk of the firm. Furthermore, the possible relationship between CSR and firm risk can also be supported by the stakeholder theory.

Social responsibility and the stakeholder theory are notably connected to each other (Benlemlih & Girerd-Potin, 2017). Stakeholders are groups of individuals who affect or are affected by the actions of an organization (Freeman et al., 2010). Valuable stakeholders are important for organizations since they guarantee the firms' continuity. Therefore, organizations should build sustainable relationships with their stakeholders, which can be considered as an intangible asset of the firms. These sustainable relationships cause an increase in the level of trust and loyalty which refers to the concept of social capital. Next to social capital, sustainable relationships can also create moral capital and goodwill by the firms' stakeholders. Loyal stakeholders could act more responsibly and forgiving whenever firms act outside the social boundaries. The overall severity of punishment could be less severe. Hence, 'insurance-like' protection from the generated moral capital can be established (Godfrey, 2005) and, hence, the level of firm risk could decrease. The third theory, explaining the possible relationship between CSR and firm risk, is the legitimacy theory. The fundament of this theory is based on the 'social contract' concept. Firms have a certain responsibility within society and should operate within the social boundaries (Gray, Owen & Adams, 1996). Legitimacy contributes positively to the accountability of their stakeholders and could reduce the legitimacy gap, which could ultimately lead to a lower firm risk. The last theory highlights the intuitional relevance regarding CSR and the level of risk. CSR is still not obligated by law for firms, but on a voluntary base. However, institutions have the ability to foster the implementation of CSR policies for firms by setting rules and standards. As already stated earlier, disclosing CSR statements could potentially lead to a lower firm risk.

[*H1b*] Well-diversified portfolios minimize the firms' idiosyncratic risk. Hence, the systematic risk is the only leftover. Systematic risk affects the firms' sensitivity caused by broad market changes or changes in market returns, such as inflation or an economic crisis, that influence all stocks (Luo & Bhattacharya, 2009). At the first sight, changes in systematic risk are related to changes in financial or investment practices. For example, Logue and Merville (1972) showed that profitability, debt, and the size of a company are important factors and determinants of the level of systematic risk. However, recent research by Qi et al. (2014) found evidence that not only financial-related factors determine the level of systematic risk; also other factors should be taken into consideration. Corporate governance practices, such as CSR disclosures, play an important role in business decision management. According to Albuquerque et al. (2019) firms with higher CSR/ESG scores have a lower level

of systematic risk. Firms who can gain higher profit margin benefit from a lower price elasticity of those profits to aggregate shocks. As a result, higher profit margins improve the financial position of firms which could lead to the financial ability of setting up a CSR policy. The underlying benefit of exhibiting a lower price elasticity is that it lowers the systematic risk of a firm. Furthermore, actively analyzing the consideration of all stakeholders by executing an adequate risk management strategy is beneficial for reducing the systematic risk within an organization (McGuire et al., 1988; Feldman et al., 1997; Jo and Na, 2012). Furthermore, El Ghoul et al. (2011) states that publishing sustainability reports could decrease the cost of equity capital and, hence, the organizations' systematic risk. Moreover, there is significant proof that CSR helps organizations to weather a crisis. Lins et al., (2017) found evidence that firms with a high level of social capital suffer less from the financial crisis compared to firms with a low level of social capital.

[*H1c*] Lastly, a risk management strategy could also play an important role for organizations to reduce the level of idiosyncratic risk of a firm. According to Jo and Na (2012), risk management has a positive impact on reducing the probability of economic, social, and environmental emergencies to occur. Therefore, risk management can be seen as an extension of CSR practices. Organizations should keep in mind that the costs of investing in a risk management strategy may not outweigh the benefits. Smith and Stulz (1985) found evidence that risk reduction adds value to shareholders. Value-adding through risk management is established when the strategy reduces the organizations' exposure to idiosyncratic risk. Moreover, some authors suggest that idiosyncratic risk is the single largest obstruction to market efficiency (Shleifer & Vishny, 1997; Duan, Hu, & McLean, 2010). Several authors found evidence that CSR can positively influence the level of idiosyncratic risk. Koh et al. (2014) showed that CSR helps an organization in reducing the probability of facing a lawsuit. Moreover, Strand et al. (2015) suggests that CSR is an element for building sustainable relationships with stakeholders, which ultimately leads to an increase in profitability, which lowers the idiosyncratic risk. Derived from these theories and empirical research the following three hypotheses are formulated:

H1a: The level of CSR disclosures is negatively associated with a firm's total risk

H1b: The level of CSR disclosures is negatively associated with a firm's systematic risk

H1c: The level of CSR disclosures is negatively associated with a firm's idiosyncratic risk

For the purpose of this research, it is valuable to examine the relationship between CSR and firm risk more specifically. CSR disclosure scores consist of three different disclosure types, namely, environmental, social and governance (ESG) disclosures. Some empirical research found evidence that environmental, social, and governance disclosures individually influence the level of firm risk.

[*H2a*] Firstly, a study done by Cormier and Magnan (2013, 2014) found evidence that environmental disclosures also reduce information uncertainty, which enables financial analysts to make better earnings forecasts. The authors also prove that environmental disclosures serve as an additional purpose related to the perceived legitimacy of stakeholders. Hasseldine et al. (2005) argue that reliable environmental disclosures positively influence the perceptions of stakeholders regarding the firm. Hence, these positive perceptions increase and contribute to the firms' reputation and lower the firms' risk.

[*H2b*] Secondly, Cormier et al. (2010) found a negative association between social disclosures and the level of firm risk due to the reduction of information asymmetry between the investors and the firm. Furthermore, Cormier et al. (2010) showed also that formal monitoring attributes, such as board and audit committee, and voluntary governance disclosures reduce the level of information asymmetry.

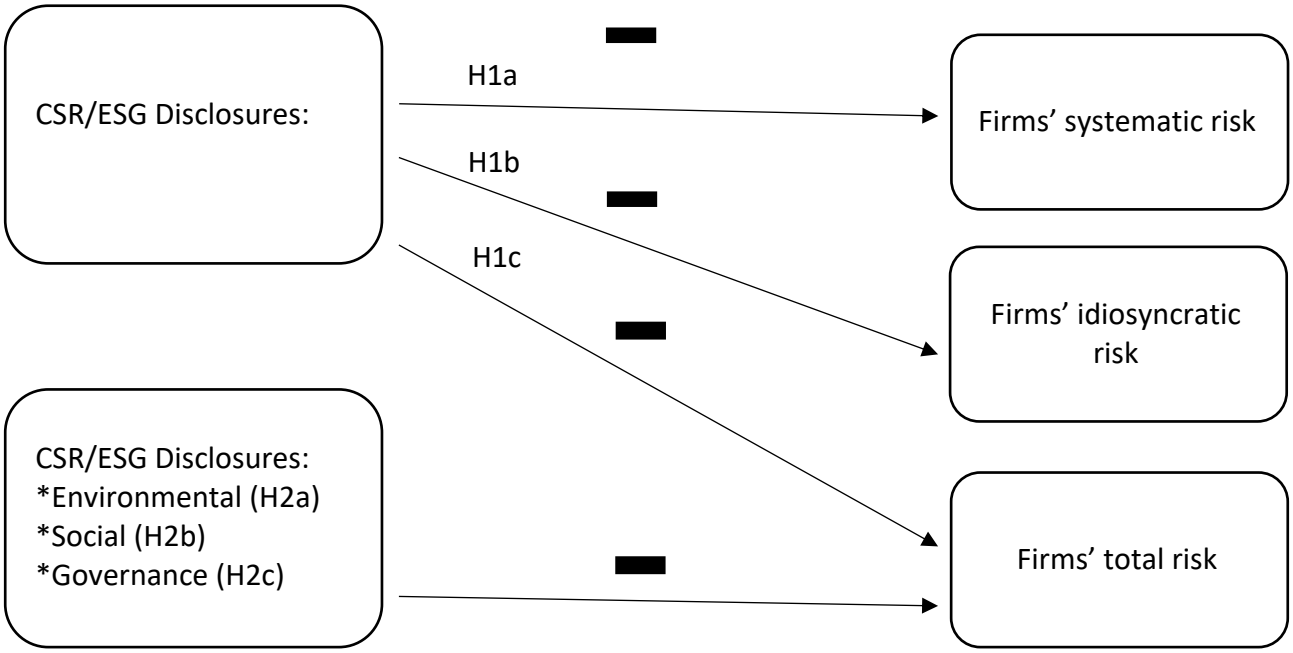
[*H2c*] According to Chen et al. (2003), firms with a higher governance score and a higher level of governance disclosures reduce the cost of equity capital of a firm. This ultimately led to a lower level of firm risk. Furthermore, Bauwhede et al. (2008) also found evidence that disclosing corporate governance information reduces the agency costs, due to the separation between control and ownership. Consequently, the confidence of investors improved regarding the reported corporate information. Derived from the above-mentioned empirical evidence the following three hypotheses are formulated:

H2a: The level of environmental disclosures is negatively associated with a firm's total risk

H2b: The level of social disclosures is negatively associated with a firm's total risk

H2c: The level of governance disclosures is negatively associated with a firm's total risk

2.5.1 Conceptual model



3. Methodology

In this section, a description of the research method is given. Firstly, methods used in related research will be discussed. Based upon a critical reflection, the method used in this research will be chosen. Furthermore, a description of the multiple variables is given. These variables are divided into dependent, independent, and control variables.

3.1 Research method

Prior studies are mainly following a quantitative research strategy and a deductive research approach (Bryman & Bell, 2011) to examine the relationship between CSR and firm risk (Jo & Na, 2012; Luo & Bhattacharya, 2009; Nguyen & Nguyen, 2015). Quantitative research is an appropriate approach for testing the developed hypotheses and is, therefore, suitable for this research. The quantitative research strategy provides three different types of analysis, namely, a univariate, a bivariate, and a multivariate analysis (Bryman & Bell, 2011). The univariate analysis is the plainest one, which analyzes a single variable at the time. The analysis shows potential patterns within the variable. These patterns can be found by looking at the mean, mode, median, variance, min/max, standard deviation, etc. Moreover, the data can be displayed in frequency distributions, histograms, or pie charts to better understand the patterns. The univariate analysis is frequently adopted in business-related studies and is often used in CSR studies (Jo & Na, 2012; Nguyen & Nguyen, 2015; Harjoto & Laksmana, 2016). The bivariate analysis examines the relationship between two variables at the same time (Kühnel & Krebs, 2010). There are several bivariate analyses to examine the relationship. One of the most well-known analyses is the Pearson correlation coefficient (Sandilands, 2014). This method can be used only when variables are measured on an interval or ratio scale. Furthermore, the Spearman's correlation coefficient can be used for ordinal or abnormally distributed data, Kendall's tau is suitable for small data sets with several tied ranks, and a chi-square analysis is appropriate to use when researchers deal with two nominal variables. A frequently used method of bivariate analysis regarding research on CSR disclosure is the t-test (Branco & Rodrigues, 2008; Reverte, 2009). The t-test calculates the difference between two sample means (Kühnel & Krebs, 2010). The third quantitative data analysis is the multivariate analysis. This analysis can analyze three or more variables at the same time

(Hair et al., 2010). The most common technique of multivariate analysis is multiple regression (Branco & Rodrigues, 2008). This model examines one dependent and two or more independent variables simultaneously. The dependent variable will be explained or predicted by the independent variables. For this study, it means that the level of firm risk is determined by the level of CSR disclosures. Examples of multiple regression analyses are Ordinary Least Squares (OLS) regression, Logistic regression, and Probit regression. The OLS regression is a frequently used method in business and management research. The relationship between the independent variable(s) (denoted by X) and the dependent variable (denoted by Y) is displayed by means of a line of best fit (Bryman & Bell, 2011). In order to determine the model fit of the regression, the actual and predicted values should be compared. However, the OLS regression technique also faces some limitations; since it is sensitive to outliers, it does not account for the reverse causation problem, and extrapolation should be considered carefully. Furthermore, researchers should be aware of endogeneity problems. Using a two-stage least squares regression could be a solution for the endogeneity problem (Harjoto & Jo, 2011). Logistic regression is another method applied in research. This regression type aims to predict the probability of a certain event existing, in which the dependent variables are always categorical (Hair et al, 2010). The logistic regression assumes a logistic function and interpreting odds ratios is possible (Smithson & Merkle, 2013). A shortcoming of this regression type is the low prediction accuracy. The last regression discussed in this section is the probit regression. In line with the logistic regression, the probit regression also examines non-metric (categorical) dependent variables. However, the standard normal distribution of error terms applies as the foundation for the probit regression (Hoffman, 2016). Another drawback of both the logistic and probit regression is that there is no appropriate substitute for the R-squared parameter, whereas in the OLS regression there is.

Multiple studies, examining the relationship between CSR and firm risk, have been executed by using multiple regression analysis. Nguyen and Nguyen (2015) have also made use of regression analysis and distinguish CSR strength and concerns to expose non-linear relationships. Moreover, Luo and Bhattacharya (2009) applied a robust regression to reduce concerns regarding heteroskedasticity and autocorrelation. Lastly, Jo and Na (2012) ran an OLS regression with year-fixed effects to examine the additional influence of CSR disclosure on firm risk.

3.1.1 Research model

For the purpose of this study, an OLS regression will be executed. The following OLS regression models are selected to test hypothesis one and two accordingly:

1.

$$FirmRisk_{it} = a + \beta 1\ CSR_{it-1} + \beta 2 Controls_{it} + \sum_j \beta_j\ firm\ year\ fixed\ effects + \varepsilon_{it}$$

$FirmRisk_{it}$ = Total risk (1a), Systematic risk (1b), and Idiosyncratic risk (1c) of firm i in year t;

CSR_{it-1} = CSR score of firm i in year t – 1;

$Control_{it}$ = Firm size, market-to-book ratio, leverage, profitability (ROA);

$\sum_j \beta_j\ Firm\ year\ fixed\ effects$ = Cumulative year fixed effects (dummy variable);

ε_{it} = Firm-specific errors.

2.

$$FirmRisk_{it} = a + \beta 1\ CSR_{it-1} + \beta 2 Controls_{it} + \sum_j \beta_j\ firm\ year\ fixed\ effects + \varepsilon_{it}$$

$FirmRisk_{it}$ = Total risk of firm i in year t;

CSR_{it-1} = Social (2a), Environmental (2b), and Governance score (2c) of firm i in year t – 1;

$Controls_{it}$ = Firm size, market-to-book ratio, leverage, profitability (ROA);

$\sum_j \beta_j\ Firm\ yearfixed\ effects$ = Cumulative year fixed effects (dummy variable);

ε_{it} = Firm-specific errors.

3.1.2 Endogeneity problem

A major issue regarding OLS regressions is that endogeneity may exist between the dependent and independent variable(s). An endogeneity problem occurs when an unobserved firm-specific variable correlates with the independent variable and the error term. In other words, the relationship between CSR and firm risk may be caused by another explanatory variable. Harjoto & Jo (2011) examined the effect of CSR engagement on firm performance. The authors have considered the endogeneity problem by lagging the independent variable by one year. The OLS regression in this study will also be performed with a one-year lag of the independent variable.

3.2 Measurement of variables

This section provides information regarding the measurements of the dependent, independent, and control variables to test the different hypotheses. Firstly, the dependent variable 'firm risk' will be discussed. Thereafter, measurement information regarding the independent variable 'CSR/ESG score' is provided. Lastly, the control variables used in this study are explained.

3.2.1 Dependent variables

The main dependent variable of this study is firm risk. In a later stage, this variable will be divided into the systematic and idiosyncratic risk of the firm to see whether one of the two individual risks is more affected by the CSR/ESG scores of a firm than the other risk.

Following prior studies, a typical way to measure the total risk of a firm is by calculating the standard deviation of daily stock returns (Schwert, 1989; Jo & Na, 2012). The daily stock prices of all the securities will be retrieved from the yahoo finance data source[1]. The daily stock return is calculated by taking the newest closing price minus the previous closing price divided by the previous closing price. Furthermore, the standard deviations of the individual securities are calculated for every book year separately. The book year starts at January 1st and ends on December 31st. The standard deviation will be calculated by taking the square root of the variance. The variance represents the stock return deviation relative to the mean.

[1]Yahoo finance (2021). Retrieved from: https://finance.yahoo.com

In other words, if a certain daily stock return deviates further from the mean, it implies a higher deviation within the data set. Hence, the more spread out the daily stock returns, the higher the standard deviation and thus the higher the firm risk. This database provides not only the daily stock prices of the security, but it also considers dividend pay-outs and stock splits. Furthermore, the standard deviation of the securities will be annualized to discuss and compare the volatility of the securities with other securities. The standard deviations of the daily returns are converted to an annual base by multiplying the standard deviation of the daily returns by the square root of the number of trading days.

According to the literature, there are two well-known measures to measure the firms' systematic risk, namely the Capital Asset Pricing Model (CAPM) (Sharpe, 1964) and the Fama French 3 factor model (Fama & French, 1992). The CAPM model is useful to understand the relationship between the systematic risk and the expected stock return (Sharpe, 1964). The CAPM formula is as follows: $R_a = R_{ft} + \beta(R_{mt} - R_{ft})$, where R_a is the expected return on a security, R_{rf} is the risk-free rate, β is the beta of the security, and R_m is the expected return of the market. The CAPM holds under several assumptions. Firstly, the asset portfolio should be diversified. As a consequence, investors require a return for the systematic risks only, since the idiosyncratic risk is diversified away. Secondly, a single-period transaction horizon is required to compare different securities with each other. Furthermore, investors can borrow and lend at a risk-free rate. Lastly, securities are existing in a perfect capital market. Although the CAPM model is widely used in the finance literature (Sharfman & Fernando, 2008; Jo & Na, 2012), these assumptions do not hold. Real-world capital markets are surely not perfect, and portfolios cannot always be fully diversified. Next to the CAPM model, the Fama French 3 factor model (FF3) is also a reliable measure for firm risk (Fama & French, 1992). The model is an extension of the CAPM model by adding value and size risk factors to the market risk factor. The reason for these adjustments is to outperform tendency. The formula of the Fama French model is as follows: $R_{it} - R_{ft} = a_{it} + \beta_1(R_{Mt} - R_{ft}) + \beta_2 SMB_t + \beta_3 HML_t + \epsilon_{it}$, where R_{it} is the total return of a stock or portfolio i at time t, SMB_t is the size premium (small minus big), and HML_t is the value premium. According to Black (1993), a major limitation of the FF3 model is that the value premium was sample-specific. The previous models do not only measure systematic risk; researchers argue that some accounting variables also measure systematic risk. For example, Hamada (1972) found empirical evidence supporting the

relationship between the capital structure of a firm and the level of systematic risk. The level of leverage of a firm positively correlates with the level of systematic risk of a firm, implying that a higher level of leverage is causing a higher level of systematic risk. Moreover, Lev (1974) showed that the operating leverage of a firm is also affecting the systematic risk. The level of operating leverage is measured by the ratio of fixed operating costs to variable operating costs. Lastly, the research of Beaver et al. (1975) proved that dividend payout, stability of earnings yield, and financial leverage have a significant impact on the level of systematic risk.

For the purpose of this study, the CAPM model will be used in order to measure the firms' systematic. The historical daily risk-free rates of Dutch treasury bill are retrieved from the Thomson Reuters Eikon database. Just like the measurement of the total risk, the daily stock prices are also retrieved from the yahoo finance data source including dividend pay-outs and stock splits. The daily stock returns are again calculated by taking the newest closing price minus the previous closing price divided by the previous closing price. The betas of the securities will be measured by computing a linear regression between the daily excess return of a security and the daily excess return of the overall market in year i. The excess return is calculated by deducting the risk-free return from the actual return of a security. The betas are calculated for each book year individually. Prior studies examining the relationship between CSR and firms, also used CAPM as their measurement instrument and showed reliable outcomes (Sharfman & Fernando, 2008; Jo & Na, 2012).

The third and last dependent variable, the idiosyncratic risk, will be measured by the standard deviation of the beta residuals (standard errors) based on the results of the linear regression of the daily excess returns of the Dutch listed firms and the daily excess returns of the overall market. Subsequently, the standard deviations of the daily idiosyncratic values are converted into an annual statistic by multiplying the standard deviations of the residuals by the square root of the number of trading days. Research done by Amit & Wernerfelt (1990) and Lee & Faff (2009) also used this instrument to measure the firms' idiosyncratic risk. The frequency of returns is gathered over a period of five years for all three dependent variables, in which each of the five years is calculated individually.

3.2.2 Independent variable

In this study, the independent variable is the level of CSR disclosures of firms. This primary explanatory variable will be measured by CSR/ESG scores gathered from the Thomson Reuters Eikon database. The purpose of this dataset is to systematically provide total CSR/ESG scores of firms. Moreover, the dataset provides also specific social, environmental, and governance scores. The dataset captures 80% of the global market cap and based their scores on 450+ ESG metrics. The input for these scores is derived from annual reports, CSR reports, organizations or NGO websites, and news sources[2]. The Thomson Reuters Eikon database includes also Dutch listed firms. The composing CSR/ESG scores of Thomson Reuters have a reputation for being one of the most trustworthy and reliable scores within the field of CSR data (Stellner et al., 2015). The scores are measured on a quantitative level of a company's CSR/ESG matters. Furthermore, the scores given to firms are standardized and scaled on a metric level from 0 to 100 to increase the comparability level. To guarantee the data quality, algorithms are used and the scores are assessed by an independent audit team.

3.2.3 Control variables

Following prior related studies, several variables are controlled that could affect the relationship between CSR and firm risk. In section 2.4, some important determinants of CSR and firm risk are explained. The first control variable is firm size (SIZE) as measured by the natural logarithm of the total assets (Kabir & Thai, 2007). According to Jo and Na (2012), larger firms are more capable of managing risk, especially in times of high volatility, and are more exposed to publicity and social pressure to engage in CSR. Secondly, the market to book (MTB) ratio is another control variable in this study. The MTB ratio measures the investment opportunities of firms. The MTB ratio is measured by the market capitalization divided by the total book value. The book value is the net value of a firm's assets minus the firm's liabilities, retrieved from its balance sheet. Several studies have shown that a low MTB ratio is the result of low growth opportunities (Lewellen, 1999; Bouslah et al., 2013). Hence, firms face low share prices and a higher market volatility. Leverage (LEV) is the third control variable considered in this study. Leverage is measured by the total debt divided by the total assets

[2] Thomson Reuters Eikon database (2021). Retrieved from: https://www.refinitiv.com/en/sustainable-finance/esg-scores#data-process

ratio. Prior evidence claims that highly leveraged firms are associated with higher firm risk (Ferreira and Laux, 2007). Profitability is also included as a control variable. Profitable firms tend to be less risky compared to non-profitable firms (Ferreira & Laux, 2007; Jo & Na, 2012). Profitability will be measured by the 'ROA' variable. The ROA is calculated as follows: income before taxes of year i divided by the average total assets for the same period. Section 4.3 provides a detailed explanation of the allocation method supported by empirical research. Table 1 summarizes the description and measures of the different variables.

Table 1 Descriptions and measures of the variables

Variable	**Name**	**Description and measurement**
Dependent variables		
Total firm risk	TOT*FirmRisk*	The total risk of firm i in year t, measured by the standard deviation of daily stock returns
Systematic firm risk	SYS*FirmRisk*	The systematic risk of firm i in year t, measured by the beta of the CAPM model
Idiosyncratic firm risk	IDIO*FirmRisk*	The idiosyncratic risk of firm i in year t, measured by the standard deviation of the residuals of the beta in the CAPM model
Independent variables		
CSR disclosure score	CSR/ESG*Score*	CSR/ESG score of firm i in year t, retrieved from the Thomson Reuters Eikon database
Social disclosure score	SOC*Score*	Social score of firm i in year t, retrieved from the Thomson Reuters Eikon database
Environmental disclosure score	ENV*Score*	Environmental score of firm i in year t, retrieved from the Thomson Reuters Eikon database
Governance disclosure score	GOV*Score*	Corporate governance score of firm i in year t, retrieved from the Thomson Reuters Eikon database
Control variables		
Firm size	SIZE	Natural logarithm of the total assets of firm i in year t
Profitability	ROA	Return on Assets of firm i in year t measured by EBIT divided the total assets
Leverage	LEV	The book value of total debt divided by the book value of total assets of firm i in year t
Market-to-book ratio	MTB	Market capitalization divided by the total book value of firm i in year t
Year fixed effects	YEAR	Year dummy variable

4. Data and sample

This section provides an overview of the data and sample size used in this study. Firstly, the data collection method will be discussed. Furthermore, a description of the sample size is given. Finally, an explanation of the several robustness checks is provided, in which also the SIC industry classifications are included to distinguish sensitive and non-sensitive firms.

4.1 Data collection

For the purpose of this study, mainly one database is used in order to collect data for the dependent, independent, and control variables. The major source in this study is the Thomson Reuters Eikon database. This database enables economic related research by retrieving data from worldwide companies and stock indices. The company provides financial services, such as company data, market data, or trading tools. The reasons for using this database are bilateral. Firstly, the database is available among the students at the Technical University of Berlin. Moreover, it provides reliable, comprehensive, and comparable information on financial data, exchange data, and company reports. Additionally, the yahoo database is used to gather the stock prices of individual stocks and the overall market index of every year individually. The chosen sample period is based on the years 2015-2020. Observations that are denoted as outliers will be removed from the dataset to decrease the skewness of the dataset.

4.2 Sample

Listed Dutch firms are the basis for this study, because of the existing research gap in the literature regarding the relationship between the level of CSR and firm risk. Therefore, the sample size consists of Dutch firms listed on the Amsterdam Exchange (AEX), the Amsterdam Midcap Index (AMX) and the Amsterdam Small Cap Index (AScX). These indexes are the three biggest stock exchanges in the Netherlands. The selected firms are obliged to publicly disclose financial and corporate information. This information is audited by third parties to check the reliability and validity. Moreover, Dutch firms are obliged to follow the rules of the Dutch Corporate Governance Code. As discussed in the introduction, the corporate governance code also considers CSR activities. Therefore, it can be assumed that Dutch listed firms already engage on an advanced CSR level. According to the AAX list of the Eikon Reuters database,

126 firms are stock listed on the Euronext Amsterdam. This study focuses on firms who are disclosing CSR statements. Therefore, firms are excluded, which do not disclose CSR statements for the entire sample period. According to Eikon Reuters database, 65 firms do not have published CSR statements. Furthermore, 4 firms that provide banking services will also be excluded since they have a different leverage structure compared to non-banking services. This requirement is considered to ensure that skewed financials data does not influence the results. Lastly, non-Dutch listed firms were excluded from the sample size, since this research focuses on Dutch listed firms. The final sample size consists of 53 firms. Table 2 provides an overview of the sample selection. The number of firm year observations is less than 318 (N=221) due to the following reason: several firms included in the sample executed an IPO later than 2015. Consequently, some firms do not have ESG scores for the complete selection period since there was no data available. However, these firms are included in the sample, to increase the number of firm year observations. A larger sample size increases the confidence and reliability of the results. A list of the included firms is attached in appendix A.

Table 2 Sample selection

Sample size	Reason for excluding	Number of excluded firms
Initial sample	Stock listing on Eurnext Amsterdam	-
126	Excluding firms with no ESG Scores	65
119	Excluding banking firms	4
57	Non-dutch listed firms	4
53	Final sample size	

4.3 Robustness tests

This study also includes several robustness tests to check whether the results hold under different circumstances or not. In the first robustness check, the firms are allocated in different subsamples, which are derived from the original sample. The allocation of firms to subsamples is based on the classifications of SIC industries, such as ‘Manufacturing', 'Agriculture', 'Forestry and Fishing', 'Finance', or 'Wholesale Trade’. The different industries are indicated by codes, where the 3-digit code indicates the industry group. Table 3 provides an overview of the number of firms of each SIC industry. As can be seen in table 3, some of

the sub-classification's samples are not large enough to be examined adequately. Therefore, the eight subsamples are merged and divided into two sub-samples, namely into sensitive and non-sensitive industries. Jo & Na (2012) focused specifically on firms in sinful industries based on sic codes. Following this prior study, a similar distribution of firms will be used. Firms operating in the industry 'Construction', 'Manufacturing', and 'Mining' are considered as sensitive, whereas the others are considered as 'non-sensitive'. Table 4 provides an overview of the number of sensitive and non- sensitive firms in the sample. It would be valuable to see whether hypotheses H1a, b, and c hold under these circumstances. According to Hong & Kacperczyk (2009), sensitive firms have higher risks and returns. They argue that the social standards and norms influence stock prices and returns more heavily for these sinful firms. To reduce the stock volatility, sensitive firms engage more actively in CSR by disclosing more CSR statements. Also, Fama and French (1997) suggest that firm risk varies per industry. To examine whether there is a difference between sensitive and non-sensitive firms, regressions of the subsamples 'sensitive firms' and 'non-sensitive firms' are executed.

In the second robustness test of this study, a different interval period of the total risk of a firm will be used. The returns will be measured by a weekly interval instead of a daily interval. The weekly intervals are converted into annual intervals by multiplying the standard deviations of the weekly returns by the square root of the number of trading weeks of a specific year. This robustness test will check whether hypotheses H2a, b, and c hold under these circumstances.

The last robustness test of this study measures the level of CSR disclosures by a different source. Instead of making use of the Thomson Reuters Eikon database, data from the 'Transparency Benchmark" of the Dutch government is retrieved to measure the level of CSR/ESG score[3]. The transparency benchmark is developed by a collaboration between the Ministry of Economics and Climate and the Koninklijke Nederlandse Beroepsorganisatie van Accountants. This database provides valuable insights regarding the level of CSR disclosures of Dutch listed firms. Stakeholders can also compare the scores between firms. The database is adequately developed by professionals in this work field. The provided scores in the transparency benchmarked are based on questionnaires, filled in by participants. These answers are audited and reviewed by analyst of Ernst & Young. In the end, the participating

[3] Transparency Benchmark (2021). https://www.transparantiebenchmark.nl

firms receive an individual score. A higher score indicates a higher level of CSR, whereas a lower score indicates a lower level of CSR. The transparency benchmark only provides total CSR/ESG scores and does not distinguish between environmental, social and governance scores. Therefore, this robustness test will only check whether hypotheses H1a, b, and c hold under these different circumstances.

Table 3 industry classification (SIC)

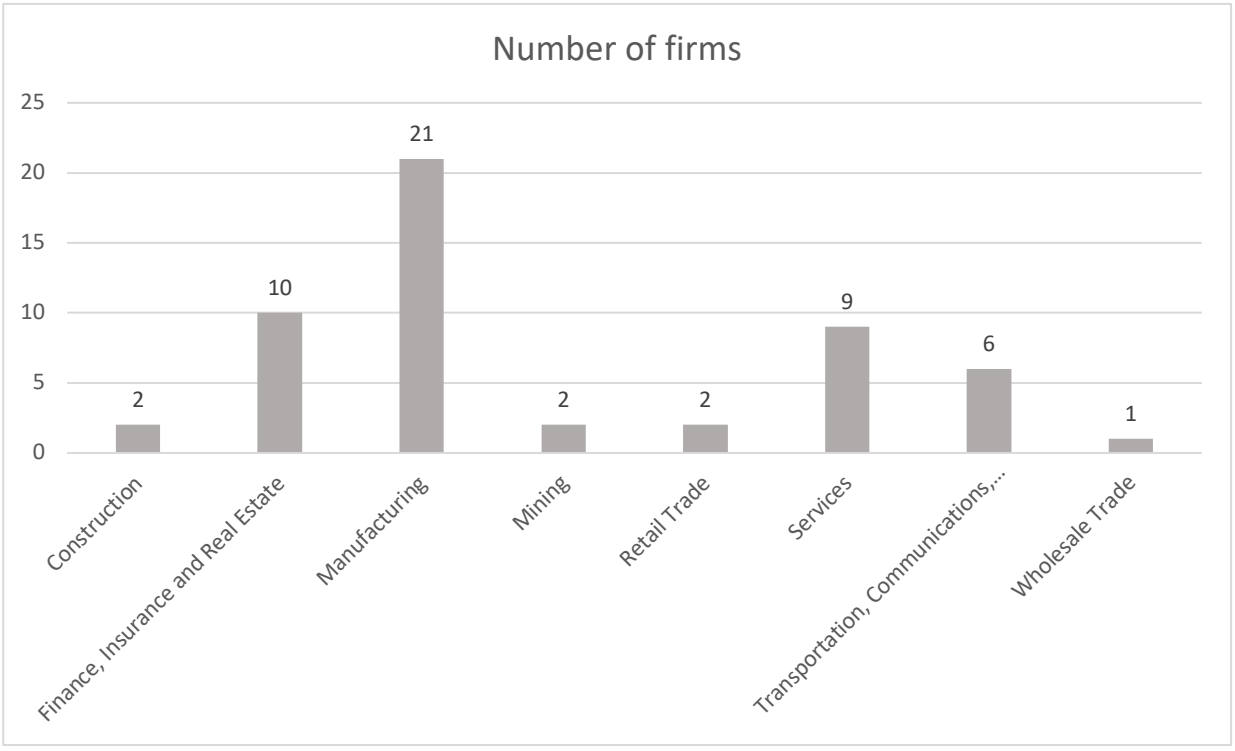
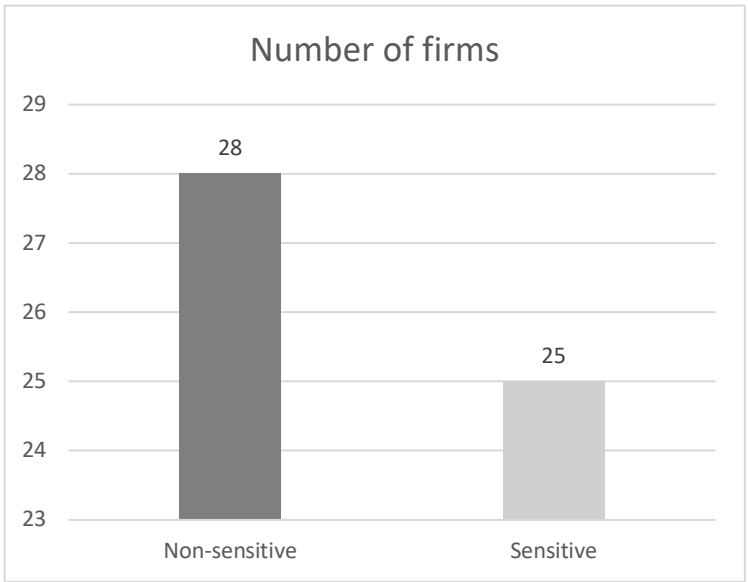


Table 4 Industries



5. Results

In this chapter the results of multiple analyses are provided and discussed. Firstly, in section 5.1, existing outliers are detected and if necessary, removed. Secondly, section 5.2 discusses the descriptive statistics of the data. Section 5.3 provides an overview of the Pearson's correlation matrix. In section 5.4, the assumptions of the OLS regression are examined and checked and the results of the regression are discussed. Lastly, section 5.5 provides an overview of the results of the multiple robustness test.

5.1 Outliers

Before discussing the descriptive statistics of the data, influential outliers will be detected and removed to decrease the skewness of the data. Appendix B provides an overview of the five highest and five lowest values in the dataset per dependent variable. Not every value in this overview will be removed since not all values heavily influence the data. However, the following 5 case numbers (..) will be removed due to their extreme characteristics:

1. UNIBAIL-RODAMCO-WESTFIELD 2020 (193)
    - Total Risk: 0.895041 (mean: 0.323590)
    - Idiosyncratic Risk: 0.045801 (mean: 0.0126312)
2. FUGRO 2020 (206)
    - Total Risk: 0.867771 (mean: 0.323590)
    - Idiosyncratic Risk: 0.038474 (mean: 0.0126312)
3. UNILEVER 2020 (194)
    - Total Risk: 0.044880 (mean: 0.323590)
4. ARCELORMITTAL 2019 (130)
    - Systematic Risk: 2.437000 (mean: 0.994671)
5. FLOWTRADERS 2020 (205)
    - Systematic Risk: -0.288557 (mean: 0.994671)

5.2 Descriptive statistics

The descriptive statistics for each variable in this study is provided in table 5, in which N is the number of firm-year observations. The descriptive statistics are based on data gathered from the years 2015-2020. The number of firm-year observations consist of firms only with an CSR/ESG score in a given year. For some firms there was no ESG score available, which means that not every firm has 6 firm-year observations in this dataset. Subsequently, after removing the outliers, mentioned in section 5.1, the final dataset consists of 221 firm-year observations gathered from 53 firms. The independent variables ESG, environmental, social, and governance scores are lagged by one year to consider the endogeneity issue. Moreover, the ESG score is the equally weighted overall score of the independent ESG scores. Furthermore, the variable firm size is converted into a natural logarithm. In the remaining of this section the descriptive statistics are compared with similar studies or data samples. Since no similar research has yet been done in the Netherlands, the descriptive statistics of the variables will be compared with studies related to firm risk or CSR disclosures.

After comparing the descriptive statistics with other empirical research, it can be concluded that some of the statistics are comparable with other studies, while other statistics are more unexpected. Firstly, the mean value of the total risk of the sample is 0.32 on an annual base, with a standard deviation of 0.13 and a median value of 0.29, which means that the data is a little skewed to the right. Jo and Na (2012) examined a similar relationship between CSR and firm risk. Their mean value in the sample regarding volatility is 0.03 on a daily base. After converting this statistic into an annual number, it gets a value of 0.52. This mean value of the total risk is larger in the study of Jo & Na (2012) compared to the mean value in this research. An explanation for this difference can be the different nature of the sample size and the country. Furthermore, a study of de Jong et al. (1992) examined the volatility of returns of 13 major Dutch stocks listed on the Amsterdam Exchange. The volatility is calculated based on the percentage change of the daily closing prices. The mean value of the total risk in their dataset is 0.03 (on a daily base). When converting this statistic into an annual value, it becomes 0.54. The mean value of the total risk is also higher in the study of de Jong et al. (1992) compared to this study. A reason for this could potentially be that the study of de Jong et al. (1992) is only focusing on the 13 largest firms in the Netherlands, and it does not examine a more complete sample of the index. Secondly, the systematic risk in

this research is measured by the beta of each individual security. The mean value of the beta in this study is 0.99, with a standard deviation of 0.36. The median statistic is 0.95, which means that the data is also a little skewed to the right. It can be said that on average the firms are slightly moving less than the overall stock market. Firms with a beta of 1.0 do not deviate from the market and have therefore the same risk as the overall market. Stock betas lower than 1.0 indicate less risks and lower returns. The mean statistic of this dependent variable could also be a potential explanation for the mean value of the total risk being lower compared to the other research. A research of Deurnes (2008) examined 90 Dutch firms, which offer securities on the Amsterdam Stock Exchange in the period 1997-2000. This study examined whether firms disclose risk-relevant information in their prospectus of securities or not. They measured the systematic risk (beta) by taking the covariance of the stock returns as well as the covariance of returns on the market, divided by the variance of the returns of the market. The calculated mean beta of Deurnes (2008) is 0.86, which is a little lower compared to the beta statistic in this study. Thirdly, the descriptive statistics of the idiosyncratic risk are as follows: the mean value is 0.26 with a standard deviation of 0.10, also indicating a centered spread of the data. Moreover, the median statistic is 0.24, which implies again that the data is a little skewed to the right. A study of Ferreira & Laux (2007) measured the idiosyncratic risk of 1248 firms in the US in the same way as in this study. The mean value in their study is 0.19 (annually), indicating a lower value compared to this study. This means that these firms have a lower exposure of idiosyncratic risk.

The descriptive statistics of the independent variables of this study will be discussed in the remaining of this section. The CSR/ESG scores are measured by data retrieved from the Thomson Reuters Eikon database. These scores have a spread from 0 to 100. The mean value of the total CSR/ESG score is 61.01, with a standard deviation of 18.65 and a median value of 64.14. The standard deviation suggests some variation in the CSR performance between different firms. The mean value indicates a weak but sufficient overall CSR/ESG score. According to this number, it can be concluded that there is still room for improvement regarding the quality and reliability of CSR disclosures. A study of Stellner et al. (2015) examined whether different EU countries' sustainability scores influence the level of credit risk. The authors used the same data from the Thomson Reuters Eikon database to measure CSR. The average ESG score in their study is 78.3 with a standard deviation of 14.5 and a median of 82.4, indicating higher scores for the firms in their dataset. However, the study of

Stellner et al. (2015) does not provide individual environmental, social, and governance scores. On the contrary, a study of Garcia et al. (2017) did make this distinction. The authors have used the same ESG ratings of the Thomson Reuters Eikon database. Their study focuses on the firms located in the five major emerging countries, also known as the BRICS countries. The average CSR performance of these firms is 45.96, with a standard deviation of 30.75 and a median of 46.32. These results indicate a poor CSR performance compared to the statistics in this study. A reason for these lower results could be that emerging markets face sustainability challenges due to their rapid growing economies. Furthermore, the individual means of the environmental (E), social (S), and governance(G) scores in this study are 56.32, 67.30, 55.35, respectively. The standard deviation statistics are 26.32 (E), 18.71 (S), 24.39 (G) and the median values are 60.91 (E), 70.67 (S), 56.33 (G). These statistics indicate that all mean values are a little lower compared to the median values and are slightly skewed to the left. Dutch listed firms perform relatively better on the social aspect compared to the environmental and governance aspects. These descriptives suggest that Dutch firms are more capable of generating loyalty and trust among their customers, workforce, and society. These results are line with the study of Garcia et al. (2017), which shows the same pattern between the different ESG scores. A few selected firms have received a 0 score for one of the three individual disclosures. These firms can be found in appendix C.

Lastly, the descriptive statistics of the control variables will be discussed. Table 5 also provides the control variable firm size measured in millions (EUR), as firm size measured by the natural logarithm is difficult to interpret. The mean value of this variable is 32.04 billion EUR, with a standard deviation of 85.90 billion EUR and a median of 6.07 billion EUR. These statistics indicate that this variable is very dispersed and highly skewed to the right. The minimum value of the total assets is 228.00 million EUR, while the maximum value is 444.87 billion EUR. According to these statistics, it can be concluded that the sample contains both some relatively small firms and some very large firms. Due to the large variance and high skewness of the variable, a natural logarithm for this variable is computed. The second control variable in this study is the MTB ratio, measured by the market capitalization divided by the total book value. The mean value in this study is 3.10 with a standard deviation of 6.74 and a median of 1.97. The average MTB value is high in this study, which indicates a possible overvaluation of the average stock. However, looking at the median value it can be said that the gross of the firms has a lower MTB value. The average MTB ratio in the study of Harjoto

& Laksmana (2016) is 2.03, with a median of 1.55. This study examined the impact of CSR on risk taking and firm value in the US. Leverage is another control variable in this study. The descriptive statistics of the variable 'Leverage' in this study are as follows: the mean value is 0.28 with a standard deviation of 0.17 and a median of 0.28. The mean and median are in line with each other, indicating no skewness. According to these descriptive statistics, the percentage of leverage in the capital structure is on average 27.76%. These results are in line with the studies of Moradi and Paulet (2019), and Berger et al. (1997), which found a mean leverage value of 26.00% for Dutch firms. The last control variable in this study is the 'ROA' variable, measured by EBIT divided by total assets. The mean value is 0.05 with a standard deviation of 0.06 and a median of 0.05. This indicates that every euro invested in an average stock generates 4.87 cents of net income. This descriptive statistic is more or less in line with a similar research conducted in the US of Jo & Na (2012), which found a mean value of 0.06.

Table 5 Descriptive statistics

DESCRIPTIVE STATISTICS	N	MEAN	ST. DEV.	MEDIAN	MIN.	25TH PERCENTILE	75TH PERCENTILE	MAX
DEPENDENT VARIABLES:								
TOT*FirmRisk*	221	0.319	0.132	0.285	0.116	0.220	0.396	0.744
SYS*FirmRisk*	221	0.987	0.359	0.951	0.071	0.765	1.219	2.000
IDIO*FirmRisk*	221	0.257	0.102	0.236	0.104	0.174	0.324	0.578
INDEPENDENT VARIABLES:								
CSR/ESG*Score*	221	61.006	18.657	64.140	12.260	48.570	73.615	91.890
ENV*Score*	221	56.329	26.322	60.910	0.000	39.785	79.370	93.320
SOC*Score*	221	67.302	18.713	70.670	0.000	56.035	82.015	96.150
GOV*Score*	221	55.357	24.394	56.330	0.000	34.240	75.610	97.980
CONTROL VARIABLES:								
SIZE **MILLIONS*	221	32.043	85.940	6.069	228	2.231	16.253	444.868
LN_*SIZE*	221	9.856	0.682	9.783	8.358	9.348	10.211	11.648
MTB	221	3.100	6.838	1.971	-47.325	1.238	3.704	54.370
LEV	221	0.278	0.169	0.276	0.000	0.148	0.393	0.789
ROA	221	0.049	0.065	0.054	-0.258	0.015	0.086	0.212

5.3 Pearson's correlation matrix

Table 6 provides an overview of the Pearson's correlation coefficients of the variables included in this study. The most important correlations from this study will be discussed in the remaining of this section. The correlation coefficient scale varies from -1 to +1, which indicates the level of strength of the association. Significant negative correlation coefficients indicate a negative association between the variables. On the contrary, significant positive coefficients indicate a positive association between the variables. The different levels in strength are as follows; correlations above 0.500 are most often considered as strong associations, correlations between 0.300 and 0.500 are considered as moderate, whereas correlations below 0.300 are considered as weak.

As can be seen in the table, the dependent variables are highly correlating with each other on a 0.01 significant level, which is a logical outcome since all the three variables are measured by the excess returns of the security and the market. These correlation coefficients are in line with the study of Jo & Na (2012), also indicating a significant correlation between the total risk and systematic risk of a firm (r=0.5415**).

Furthermore, the total CSR score is significantly correlating with the variable total risk and the variable idiosyncratic risk (r= -.158* and r= -.274**). This indicates a negative association between CSR disclosures and the total risk as well as between CSR disclosures and the idiosyncratic risk, which is in line with the hypotheses H1a and H1c. However, the correlation coefficient of CSR disclosures and the systematic risk is neither significant nor negative. These outcomes are partially in line with the study of Jo & Na (2012). They found both a significant negative coefficient between CSR disclosures and total risk as well as between CSR disclosures and systematic risk, whereas this study did not have a significant coefficient between CSR disclosures and systematic risk. Moreover, some of the individual CSR scores are also indicating negative associations between the different types of firm risk. The correlation coefficient between the environmental score and the total risk as well as between the environmental score and the idiosyncratic risk show a significant negative association (r= -.180** and r=-.263**). Furthermore, the social score negatively correlates with the idiosyncratic risk (r= -.166*). Notably, the government score positively correlates with the systematic risk (r= 0.166*), but negatively correlates with the idiosyncratic risk (r= -

.229**). Although this study only examined the relationship between the total risk and the individual CSR scores, it is noteworthy to point out these results.

Next to the correlation coefficients of the independent variables, the most important coefficients of the control variables will be discussed. Firstly, the variable firm size is negatively correlating with the dependent variables 'total risk' and 'systematic risk' (r= -0.189** and r=-.300**), which could imply that larger firms are associated with less risk. Again, this association is in line with the study of Jo & Na (2012), which also indicates a significant negative association between firm size, measured by log of the assets, and total risk. The correlation coefficient between firm size and CSR/ESG score showed a strong significant association (r=.607**). This correlation could indicate possible multicollinearity among the two variables, which means that one independent variable is explained by another variable. Subsequently, the other independent variables can predict the dependent variables less accurately. Multicollinearity heavily influences the outcomes in the OLS regression and should therefore be solved (Hair et al., 2010). The first manner to solve this problem is to measure firm size in another way. The literature describes mostly two ways to measure firm size. Firstly by calculating the total assets (Kabir & Thai, 2017) and secondly by calculating the total sales (Reverte, 2009). For this study, firm size is also measured by the natural logarithm of the total sales. It turns out that this measurement also gives a high correlation coefficient between the two independent variables (r=0.583**). The SPSS outcome of this association can be found in appendix D. Therefore, the variable firm size will be removed from the regression analyses. Lastly, the variable 'ROA' showed a significant association with all three dependent variables (r= -.355**, r=-.171**, and r=-.382**). These results are again in line with the correlation coefficients of Jo & Na (2012).

Table 6 Pearson correlation matrix

Nr	Variables	1	2	3	4	5	6	7	8	9	10	11
1	TOT*FirmRisk*	1										
2	SYS*FirmRisk*	.605**	1									
3	IDIO*FirmRisk*	.943**	.490**	1								
4	CSR/ESG*Score*	-.158*	0.123	-.274**	1							
5	ENV*Score*	-.180**	0.055	-.263**	.841**	1						
6	SOC*Score*	-0.077	0.078	-.166*	.827**	.668**	1					
7	GOV*Score*	-0.126	.166*	-.229**	.770**	.517**	.493**	1				
8	LN_SIZE	-.189**	0.091	-.300**	.607**	.492**	.426**	.449**	1			
9	MTB	-0.066	-0.127	-0.0545	-0.067	-0.099	-0.078	-0.002	-0.054	1		
10	LEV	-.038	-.280**	-0.007	-0.097	0.026	-0.075	-0.062	-0.051	0.012	1	
11	ROA	-.355**	-.171*	-.382**	0.079	0.037	0.093	0.079	-0.105	.191**	-0.051	1

Notes: The matrix above represents the Pearson's correlation coefficients with their statistical significance. The variables are named according to the description in table 1.

*** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).*

5.4 Regression results

In this section, the regression results of this study are given. Before running the OLS regressions, it is necessary to verify whether the assumptions of the OLS regression are violated or not. Therefore, in section 5.4.1 the assumptions are checked. Subsequently, in section 5.4.2 the results of the OLS are discussed.

5.4.1 Assumptions OLS regression

The first main assumption applies for regression models in general, which commands that the sample size is large enough. According to Schmidt (1971), the observation of the independent variable ratio should be in between 15 and 20. The sample size in this study exists of 221 firm-year observations and it has 9 different independent variables, which means that the sample size issues are non-existent. The second assumption of the OLS regression is to check whether the residuals of the models (1-6) in this study are normally distributed. According to the Central Limit Theorem, this assumption can be ignored when the sample size N is large enough, where N should be larger than 200. Hence, normality can be assumed in this study since the number of firm-year observations is larger than 200. Moreover, linearity of the different models is checked by P-P plots of the regression standardized residuals of each model. As can be observed in appendix E, each model does not deviate too much from the regression line, which implies that linearity can be assumed. Furthermore, homoscedasticity is tested to check whether the residuals contain equal levels of variance among the predictor variables (Hair et al., 2010). This assumption can be checked by a scatterplot, displaying the regression standardized residuals by the regression standardized predictor values. All the scatterplots of the individual models showed dispersed variance, which is necessary for meeting this assumption. It can be assumed that homoscedasticity issues are not violated. The scatterplots can also be found in appendix E. The last assumption regarding the OLS regressions is the multicollinearity assumption. Multicollinearity is already checked in section 5.3, which indicates multicollinearity between the natural logarithm of firm size and the CSR score. Firm size is even measured by two measurements, which both showed multicollinearity. Therefore, the independent variable will not be included in the regression analysis. Finally, there are no other variables showing multicollinearity between each other, causing non-existent issues regarding this assumption.

5.4.2 Regression results (sub)hypotheses H1a, b, c

This section discusses the OLS regression results of the six models, created in section 3.1.1. These models are derived from the hypotheses' development in section 2.5. The results are displayed in table 7 and 8, in which the outcome of each hypothesis is explained in an individual model. Table 7 provides the results of hypotheses H1a, H1b, and H1c. Table 8 displays the outcomes of the regressions of hypotheses H2a, H2b, and H2c. The different tables include statistics such as the expected sign of the relationship, the unstandardized and standardized coefficient, and the standard error term.

The first hypothesis (H1a, table 7, model 1) in this study states a negative relationship between CSR disclosures and firm risk, controlled by several variables. According to the regression outcomes in table 7, CSR disclosures do have a statistically negative impact on the level of total firm risk. The result indicates a negative relationship between these two variables at a significant level of 5% (a=0.024). The economic impact of this result is measured by the standardized coefficients. The standardized coefficient is -0.112, which implies that the total risk variable changes 11.20% given a one-unit shift in the CSR/ESG variable when all other variables in the model remain constant. The requirement of holding other variables constant is important since it enables assessment of the impact of every variable in isolation from the other variables. Based on the significant outcomes, the null hypothesis can be rejected, and it can be assumed that the CSR disclosures help to reduce firm risk for Dutch listed firms. This is in line with the different theories and empirical research discussed in the literature review and in the hypotheses-development section. There are several reasons for the significant outcome that CSR disclosures reduce firm risk. For example, CSR could reduce the level of information asymmetry between the managers and their stakeholders. Consequently, the cost of equity capital will be lower and, therefore, the level of total firm risk decreases. Moreover, insurance-like protection of stakeholders gained through CSR disclosure is another possible explanation for this outcome. Looking at empirical research, this result is in line with the outcomes of the study of Jo & Na (2012), who found a similar significant negative relationship between CSR and firm risk. Lastly, the adjusted R-square of model A is 0.484, which implies that 48.4% of the variation of the dependent variable is explained by the predictor variables. The change in R-square, caused by adding the CSR variable in the model, is +1%.

The second sub hypothesis (H1b, model 2) is not significant at a level lower than 10% (a= 0.128). This implies that there is no significant evidence that CSR disclosures reduces the level of systematic risk in this study. Additionally, the adjusted R-square also indicates that CSR disclosures do not contribute to the explanation of the variation of the dependent variable by the independent variables, since the difference is +0.6%. Although no significant relationship is found in this study, the study of Jo & Na (2012) did find significant evidence that CSR disclosures have a negative impact on the level of systematic risk. A potential explanation for this insignificant outcome can be that it is caused by a contradicted result of the high profit margins and lower elasticity reasoning, discussed in section 2.5. Higher profit margins enable firms to adopt CSR policies, which are associated with higher adoption costs. These higher adoption costs could increase the level of systematic risk.

Lastly, the third sub hypothesis (H1c, model 3) is examined by running another regression. The results indicate a significant negative relationship between CSR disclosures and the idiosyncratic risk of Dutch listed firms at a level of 1% (a<.001). Therefore, the null hypothesis can be rejected, and it can be assumed that CSR disclosures reduce the level of idiosyncratic risk of Dutch firms. The significant standardized coefficient is -0.236, which implies that the idiosyncratic risk variable changes 23.6% given a one-unit shift in the CSR/ESG variable when all other variables in the model remain constant. The significant outcome is in line with a study of Hockerts (2015), which found evidence that CSR enables firms to build sustainable relationships with their stakeholders. These sustainable relationships could lower the firms' idiosyncratic risk. Lastly, the adjusted R-square in this model is 0.394, in which the independent variable CSR/ESG score contributes 5.2% to the explanation of the variation in the dependent variable.

5.4.3 Regression results (sub)hypotheses H2a, b, c

In this section, the results of the regression regarding (sub)hypothesis H2a, b, and c are discussed. In these (sub)hypotheses the CSR/ESG score is divided into individual scores, namely into an environmental, a social and a governance score. These individual results are presented in models 4, 5, and 6 in table 8. The relationship between the environmental score and the level of firm risk is examined by running another regression model, controlled by the same control variables. As can be found in model 4, environmental disclosures have a

significant impact on the level of firm risk at a level of 5% (a=0.011). The significant standardized coefficient is -0.126, which implies that the total risk variable changes 12.6% given a one-unit shift in the environmental variable when all other variables in the model remain constant. These outcomes are in line with the empirical research of Magnan (2013, 2014) which found evidence that environmental disclosures reduce information uncertainty to improve the quality of earnings forecasts by financial analysts. Furthermore, a reduction of the level of firm risk by environmental disclosures is possible, since it increases the legitimacy of stakeholders towards the firm (Hasseldine et al., 2005). The explained variance in the dependent variable by the model is 48.8% (adjusted R-square), indicating a high explanatory power of the model.

For hypothesis H2b, there is no significant evidence found to conclude that social disclosures have a negative impact on the level of firm risk (a=0.137). Although the standardized coefficient indicates a negative relationship, the outcome is not statistically significant. Furthermore, the additional score in the adjusted R-square (+0.3%) caused by the social disclosure variable indicates that this does not have a big impact on the explanation of the variation in the dependent variable.

The last hypothesis of this study (H2c) is presented in model 6. This hypothesis is also not statistically significant (a=0.226). Therefore, it cannot be said that governance disclosures have a negative impact regarding the level of firm risk. Although a significant outcome could be a logical consequence regarding the agency theory, the results do not provide this evidence. The agency theory assumes a reduction of information asymmetry caused by improved quality of governance statements. This way of reasoning is in line with the study of Bauwhede et al. (2008), which found evidence that governance disclosures reduce the agency costs of firms. Hence, the confidence level of stakeholders regarding the reported corporate information increased.

Table 7 Regression outcomes H1a, b, c

	Model 1				**Model 2**				**Model 3**		
Variable	**Total Risk**				**Systematic Risk**				**Idiosyncratic Risk**		
	Exp. sign	*Beta*	*Std. Error*	*Std. Beta*	*Beta*	*Std. Error*	*Std. Beta*	*Beta*	*Std. Error*	*Std. Beta*	
Constant		0.374	0.028		1.054	0.101		0.022	0.001		
CSR/ESG*Score*	-	-0.001**	0.000	-0.112	0.002	0.001	0.099	-0.000***	0.000	-0.236	
MTB	-	-0.001	0.001	-0.049	-0.004	0.003	-0.074	-0.000	0.000	-0.038	
LEV	+	-0.078**	0.038	-0.100	-0.587***	0.137	-0.276	-0.003	0.002	-0.078	
ROA	-	-0.507***	0.103	-0.249	-0.975***	0.367	-0.176	-0.029***	0.005	-0.289	
Year dummy		INCLUDED			INCLUDED			INCLUDED			
N		221			221			221			
F-statistic		23.973***			3.953***			16.923***			
Adj. R-square		0.484			0.108			0.394			

Note: the table represents the regressions results of H1a, H1b, and H1c in the models 1, 2, 3, respectively. Exp. sign means expected relationship sign derived from the literature. Furthermore, N represents the number of firm-year observations. Lastly, *, **, and *** denote the significant level at 10, 5, and 1%, respectively.

Table 8 Regression outcomes H2a, b, c

	Model 4				**Model 5**				**Model 6**			
Variable	**Total Risk**				**Total Risk**				**Total risk**			
	Exp. sign	*Beta*	*Std. Error*	*Std. Beta*		*Beta*	*Std. Error*	*Std. Beta*		*Beta*	*Std. Error*	*Std. Beta*
Constant		0.356	0.022			0.362	0.031			0.344	0.024	
Enivronmental Score	-	-0.001**	0.000	-0.126								
Social Score	-					-0.001	0.000	-0.075				
Governance Score	-									0.000	0.000	-0.060
MTB	-	-0.001	0.001	-0.054		-0.001	0.001	-0.049		-0.001	0.001	-0.041
LEV	+	-0.066*	0.038	-0.085		-0.075**	0.038	-0.097		-0.074**	0.038	-0.094
ROA	-	-0.514***	0.102	-0.253		-0.507***	0.104	-0.249		-0.516***	0.103	-0.254
Year dummy		INCLUDED				INCLUDED				INCLUDED		
N		221				221				221		
F-statistic		24.260***				23.321***				23.155***		
Adj. R-square		0.488				0.477				0.475		

Note: the table represents the regressions results of H2a, H2b, and H2c in the models 4, 5, 6, respectively. Exp. sign means expected relationship sign derived from the literature. Furthermore, N represents the number of firm-year observations. Lastly, *, **, and *** denote the significant level at 10, 5, and 1%, respectively.

5.5 Robustness tests

In this section, different robustness tests are executed to examine whether the results in section 5.4 hold under different circumstances or not.

The first robustness test of this study is executed by using two subsamples instead of the initial sample. In the first subsample, the non-sensitive firms are eliminated and, consequently, the sensitive firms remain. The main reason for examining sensitive firms separately is that sensitive firms are often more exposed to higher stock volatility, which results in a higher firm risk. As already mentioned in the literature, some firms conceal or bend their real social or environmental practices by greenwashing their practices (Frankental, 2001). Firms operating in sensitive industries face in general more difficulty with acting environmentally and socially responsible. Therefore, it is valuable to examine whether CSR disclosures also reduce the risk of sensitive firms. This subsample consists of 119 firm-year observations over the years 2015-2020. The CSR/ESG scores are gathered from the years 2014-2019 and are again lagged by one year to consider the endogeneity issues. This subsample is used to see whether the results of hypotheses H1a, b, and c in the previous section also hold under these circumstances. In table 9, the results of this robustness regression are represented (model 7, 8, 9). The different models indicate that the results are robust. Hypothesis H1a cannot be rejected since alpha is lower than 0.1 (a=0.030). This outcome is similar to the original sample size, which also gives a significant outcome (a= 0.021). This result could indicate that Dutch firms, operating in sensitive industries, also gain insurance-like protection by CSR disclosures. Moreover, stakeholders could perceive CSR disclosure statements as reliable, which contributes to the legitimacy level. Hypothesis H1b remains insignificant, similar to the results in section 5.4. Lastly, hypothesis H1c is robust and remains significant in the subsample (a= 0.002). This result indicates that CSR disclosures have a negative impact on the level of idiosyncratic risk for firms operating in sensitive industries. The second subsample consists of only non-sensitive firms. The outcomes of this robustness test are given in table 10. This subsample provides some surprising results. Model 11 does not show significant results (a=0.480), which indicates that CSR disclosures do not have a negative impact on the level of firm risk. However, model 12 indicates a positive significant relationship between the level of CSR disclosures and the level of systematic risk (a=0.087). This outcome is surprising, since most of the discussed theories expect a negative

relationship. However, as already mentioned in section 5.4.2, the additional costs for incorporating CSR policies could cause an increase in the level of systematic risk. Lastly, model 13 showed that the level of CSR disclosures lowers the level of idiosyncratic risk (a=0.019), which is similar to the outcome of the non-sensitive subsample and the initial hypothesis H1c.

The second robustness test in this study measured the total risk on a weekly interval instead of on a daily interval. The total weekly returns are again retrieved from finance.yahoo.com. These stock returns also consider dividends and stock splits, similar to the daily returns. This robustness test examines whether the results of hypotheses H2a, b, and c of section 5.4 still hold. Table 11 provides the robustness test in models 14, 15, and 16 of the hypotheses H2a, b, and c, respectively. The individual CSR/ESG scores are again lagged by one year and the sample size consists of 221 firm-year observations. The outcomes are not in line with the initial regression results in section 5.4. As can be observed in table 10, hypothesis H2a becomes insignificant (a=0.143). This result indicates that environmental disclosures do not reduce the level of firm risk measured at a weekly interval. Moreover, the impact of social disclosures remains insignificant regarding firm risk. Although the coefficient assumes a negative relationship, the null hypothesis of H2a cannot be rejected. This is in line with the outcomes of the initial regression results. Lastly, the result of the robustness test regarding hypothesis H2c is different compared to the main regression results. The governance disclosures score becomes insignificant (a= 0.450), whereas the result of the main regression indicates a significant negative relationship (a=0.068).

The last robustness test in this study measures the independent variable CSR/ESG score differently by using the transparency benchmark database as the data source. The CSR/ESG data is gathered over the years 2014-2017 with 124 firm-year observations and are lagged by one year to consider the endogeneity issue. The data for the remaining variables of the sample are gathered over the years 2015-2018. The transparency benchmark changed their operations and manners of measurement. From 2018 onwards, the transparency benchmark only provides CSR/ESG scores every other year. Moreover, the measurement scale also differs from 2018 onwards compared to earlier years. Therefore, the sample size of this robustness test is smaller because the period 2014-2017 is considered. The results of this robustness test can be found in appendix F. The results show that there is significant evidence regarding hypothesis H1a, which indicates that the level of CSR/ESG scores negatively influences the level of total firm risk (a=0.001). This result is similar to the initial hypothesis. Moreover,

hypothesis H1b becomes also significant. According to the results, the level of CSR/ESG scores has a negative impact on the level of systematic risk (a=0.016). This is not in line with the results in section 5.4. The last hypothesis of this robustness test also shows a significant result. The level of CSR/ESG scores also negatively influences the level of idiosyncratic risk (a<0.001), which is again similar to the initial results.

To conclude, the tested hypotheses of section 5.4 are partially robust according to executed robustness tests in this section. The results of hypotheses H1a (sensitive firms / transparency benchmark scores), H1c, and H2b hold under different circumstances, whereas the outcomes of hypotheses H1a (non-sensitive firms), H2a and H2c become insignificant in a different setting. Lastly, hypothesis H1b becomes significant when the CSR/ESG score is measured by the transparency benchmark database instead of the Thomson Reuters Eikon database.

Table 9 Robustness test hypotheses H1a, b, and c (subsample sensitive firms)

Sensitive	**Model 7**				**Model 8**				**Model 9**			
Variable	**Total Risk**				**Systematic Risk**				**Idiosyncratic Risk**			
	Exp. sign	*Beta*	*Std. Error*	*Std. Beta*		*Beta*	*Std. Error*	*Std. Beta*		*Beta*	*Std. Error*	*Std. Beta*
Constant		0.381	0.041			1.129	0.141			0.022	0.002	
CSR/ESG*Score*	-	-0.001**	-0.000	-0.153		0.001	0.002	0.047		-0.000***	0.000	-0.252
MTB	-	-0.007**	0.003	-0.175		-0.021*	0.012	-0.207		-0.000*	0.000	-0.183
LEV	+	0.007	0.065	0.008		-0.106	0.221	-0.051		0.000	0.004	0.009
ROA	-	-0.102	0.154	-0.052		0.135	0.523	0.028		-0.008	0.009	-0.085
Year dummy		INCLUDED				INCLUDED				INCLUDED		
N		119				119				119		
F-statistic		12.373*				0.763				6.212***		
Adj. R-square		0.464				-.018				0.284		

Note: the table represents the robustness results of the subsample consisting of sensitive firms of H1a, H1b, and H1c, in the models 7, 8, 9, respectively. Exp. sign means expected relationship sign derived from the literature. Furthermore, N represents the number of firm-year observations. Lastly, *, **, and *** denote the significant level at 10, 5, and 1%, respectively.

Table 10 Robustness test hypotheses H1a, b, and c (subsample non-sensitive firms)

Non sensitive	**Model 11**				**Model 12**				**Model 13**			
Variable	**Total Risk**				**Systematic Risk**				**Idiosyncratic Risk**			
	Exp. sign	*Beta*	*Std. Error*	*Std. Beta*		*Beta*	*Std. Error*	*Std. Beta*		*Beta*	*Std. Error*	*Std. Beta*
Constant		0.362	0.038			0.000	0.136			0.022	0.002	
CSR/ESG*Score*	-	0.000	0.001	-0.050		0.003*	0.002	0.157		-0.000**	0.000	-0.170
MTB	-	0.000	0.001	-0.024		-0.003	0.004	-0.068		-0.000	0.000	-0.005
LEV	+	-0.092*	0.051	-0.119		-0.724***	0.184	-0.340		-0.003	0.002	-0.094
ROA	-	-0.943***	0.147	-0.436		-2.504***	0.526	-0.420		-0.047***	0.007	-0.461
Year dummy		INCLUDED				INCLUDED				INCLUDED		
N		102				102				102		
F-statistic		15.480***				5.062***				14.559***		
Adj. R-square		0.563				0.266				0.547		

Note: the table represents the robustness results of the subsample consisting of non-sensitive firms of H1a, H1b, and H1c, in the models 11, 12, 13, respectively. Exp. sign means expected relationship sign derived from the literature. Furthermore, N represents the number of firm-year observations. Lastly, *, **, and *** denote the significant level at 10, 5, and 1%, respectively.

Table 11 Robustness test hypotheses H2a, b, and c (weekly intervals)

Weekly intervals	**Model 14**				**Model 15**				**Model 16**			
Variable	**Total Risk**				**Total Risk**				**Total risk**			
	Exp. sign	*Beta*	*Std. Error*	*Std. Beta*		*Beta*	*Std. Error*	*Std. Beta*		*Beta*	*Std. Error*	*Std. Beta*
Constant		0.365	0.029			0.375	0.040			0.356	0.031	
Enivronmental Score	-	0.000	0.000	-0.077								
Social Score	-					0.000	0.000	-0.056				
Governance Score	-									0.000	0.000	-0.039
MTB	-	-0.001	0.001	-0.036		-0.001	0.001	-0.034		-0.001	0.001	-0.028
LEV	-	-0.056	0.049	-0.058		-0.064	0.050	-0.066		-0.062	0.050	-0.064
ROA	+	-0.684***	0.133	-0.273		-0.676***	0.134	-0.270		-0.685***	0.133	-0.273
Year dummy		INCLUDED				INCLUDED				INCLUDED		
N		221				221				221		
F-statistic		19.170***				18.965***				18.853***		
Adj. R-square		0.426				0.424				0.422		

Note: the table represents the robustness results of H2a, H2b, and H2c in the models 14, 15, 16, respectively. Exp. sign means expected relationship sign derived from the literature. Furthermore, N represents the number of firm-year observations. Lastly, *, **, and *** denote the significant level at 10, 5, and 1%, respectively.

6. Conclusion

This final chapter provides a conclusion of this study. This chapter contains two subsections. The first subsection discusses the main findings of this study. In the second subsection, the limitations of this research are addressed and the recommendations for further research are given.

6.1 Main findings

In the last few decades, the attention towards the concept 'corporate social responsibility' (CSR) increased enormously among different kind of stakeholders. Not only shareholders, but also governments, institutions, suppliers, employees, and customers find it important that organizations operate responsibly. Society expects that organizations do not only good for themselves, but rather consider a more altruistic position towards environmental, social and governance issues (Godfrey et al., 2009). For organizations, a useful and accepted tool to communicate their CSR practices is disclosure of CSR statements in either annual or sustainability reports. Traditionally, firms are obligated to disclose their financial performance of the respective year. This information is audited by external parties to ensure the reliability of the information. However, an increasing number of firms also publishes sustainability reports. According to empirical research and theories, disclosing corporate information reduces the level of information asymmetry, increases the level of legitimacy of stakeholders, and decreases the level of firm risk. Therefore, it would also be valuable to examine whether CSR disclosures also influence the level of firm risk. To be more specific, this research focuses on whether there is a negative relationship between CSR disclosures and the risks of Dutch listed firms. Based on this, the following research question is created:

"Does corporate social responsibility affect the risk of Dutch firms?"

Derived from different theories and empirical research, several hypotheses are formulated to give an answer to this research question. The first hypothesis consists of three sub-hypotheses, which are as follows: the level of CSR has a negative impact on the level of total risk (H1a), systematic risk (H1b), and idiosyncratic risk (H1c). According to the agency theory,

stakeholder theory, legitimacy theory, and institutional theory, the level of firm risk can be reduced by CSR disclosures. Disclosing CSR statements enables stakeholders more adequately to take decisions and the firm becomes more transparent about their operations, beliefs, and standards. Furthermore, operating environmentally, socially, and corporately responsible could generate insurance-like protection and moral capital. The level of legitimacy of stakeholders increases, which ensures loyalty and trust. All these consequences may lead to a reduction of firm risk. The second hypothesis also consists of three sub-hypotheses: the level of environmental (H2a), social (H2b), and governance (H2c) disclosures are negatively related to the level of the total firm risk. According to several empirical studies, these different disclosures individually influence the level of firm risk. Therefore, it is valuable to examine whether these different disclosures also have an individual impact on the level of risk of Dutch firms.

In this study several OLS regressions are executed to examine the six different hypotheses based on a sample consisting of 221 firm-year observations over a time span of 5 years (2015-2020). The dependent variables 'total risk', 'systematic risk', and 'idiosyncratic risk' are measured by the standard deviation of the total return, betas, and residuals of these betas. Furthermore, the independent variable 'CSR/ESG scores of firms' is retrieved from the Thomson Reuters Eikon database. Lastly, this study also included several control variables and a year dummy variable.

The result of this study indicates that CSR disclosures have an impact on firm risk. Hypotheses H1a and H1c showed a significant negative relationship between CSR disclosures and the level of total firm risk as well as between CSR disclosures and the level of idiosyncratic risk. The correlation matrix already expected a negative association between the variables, the OLS regression confirmed that the relationship is significant. This outcome is in line with the study of Jo & Na (2012), which also found a negative relationship between CSR and firm risk. Possible explanations for these significant relationships are the reduction of information asymmetry between managers and stakeholders caused by CSR disclosures. Moreover, an increased level of trust and loyalty of stakeholders by CSR disclosures ensures firms to gain moral capital and insurance-like protection. On the contrary, this study did not find a significant relationship between CSR and the firms' systematic risk in the initial regression model. A potential reason for this could be that the additional costs for incorporating a CSR policy increases the level of systematic risk. Furthermore, hypothesis H2a of this study is also

significant, which implies that environmental disclosures reduce the level of firm risk. Although there is no similar empirical research examining this relationship, the results are in line with the study of Cormier and Magnan (2013, 2014). In this study, evidence is found that environmental disclosures reduce information uncertainty by making better earnings forecasts. Lastly, although the results of hypotheses H2b and H2c suggest a negative association between social disclosures and firm risk, the outcomes are not statistically significant.

To conclude and give an answer to the research question of this study, the level of CSR disclosures does have an impact on the level of risk of Dutch listed firms. Statistically significant evidence is found that CSR/ESG scores have a negative influence on the level of total firm risk as well as on the level of idiosyncratic risk. Furthermore, the environmental scores statistically influence the level of total firm risk. An important caveat of this study regarding the results of the robustness test should be addressed. This comment is explained in the discussion section.

6.2 Limitations and recommendations

This section addresses the limitations of this study and discusses several recommendations for further research. The first limitation of this study is the sample size. The sample consists of 53 Dutch firms listed from either the AEX, AMX, or AScX market index. The number of firm-year observations is 221, gathered over a period of 5 years, which is rather small. The study of Jo & Na (2012) examined a way larger sample. This sample consists of 513 firms over a period of 19 years. A larger sample size contributes to the reliability of the research and enables researchers to generalize the outcomes. The greater the sample size, the better it can be assumed that the sampling distribution is normal. However, there were no more CSR/ESG scores available for this study. Another limitation of this study is that the collection period consists of only five years. There might be a chance that in these five years there were some unusual circumstances, which could have influenced the data. Thirdly, not all hypotheses held under different circumstances. Hypotheses H1a did not hold in a setting with only non-sensitive firms, whereas hypotheses H2a and H2c were not robust when the dependent variable was measured by weekly instead of daily returns. Fourthly, the number of control variables could be larger in this study. In this study, it turned out that the control variable

‘firm size’ correlates with the independent variable ‘CSR/ESG score’. This multicollinearity problem occurred also when firm size is measured in another way. Therefore, the variable firm size is eliminated in the regression models. Hence, the degree of freedoms of this study is lower. Other researchers could include other relevant control variables such as industry growth, number of competitors, or entry barriers.

Based on the abovementioned limitations of this study, the following recommendations for future research are given. Although, the relationship between CSR and firm risk is examined before, further research is necessary to clarify the possible relationship in an empirical way. Firstly, researchers may examine this relationship in a different country across the world. Secondly, it would be an advantage for future research to retrieve more CSR/ESG data of Dutch listed firms. Hence, it allows researchers to generalize the outcomes. Another recommendation for further research is to use different analyzing approaches. Methods such as panel regressions, probit regressions, logistic regressions, and the three-stage-least-square approach are examples of methods with which the consistency of the results can be assessed. Another interesting recommendation is to examine the effect of the corona pandemic on the relationship between CSR and firm risk. Some firms have difficulty with overcoming this pandemic and are, therefore, forced to cut in costs and expenditures. Developing CSR disclosures is time consuming and costly, and it does not guarantee future cash flows or profit. Therefore, firms could lower the intensity of CSR disclosures.

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Appendix A: selected firms

NR.	Name	Index
1	ADYEN NV	AEX
2	AEGON NV	AEX
3	KONINKLIJKE AHOLD DELHAIZE NV	AEX
4	AKZO NOBEL NV	AEX
5	ARCELORMITTAL SA	AEX
6	ASM INTERNATIONAL NV	AEX
7	ASML HOLDING NV	AEX
8	KONINKLIJKE DSM NV	AEX
9	GALAPAGOS NV	AEX
10	HEINEKEN NV	AEX
11	IMCD NV	AEX
12	JUST EAT TAKEAWAY.COM NV	AEX
13	KONINKLIJKE KPN NV	AEX
14	KONINKLIJKE PHILIPS NV	AEX
15	PROSUS NV	AEX
16	RANDSTAD NV	AEX
17	RELX PLC	AEX
18	ROYAL DUTCH SHELL PLC	AEX
19	UNIBAIL-RODAMCO-WESTFIELD SE	AEX
20	UNILEVER PLC	AEX
21	WOLTERS KLUWER NV	AEX
22	AALBERTS NV	AMX
23	AIRFRANCE KLM SA	AMX
24	APERAM SA	AMX
25	ARCADIS NV	AMX
26	BASIC FIT NV	AMX
27	BE SEMICONDUCTOR INDUSTRIES NV	AMX
28	KONINKLIJKE BOSKALIS WESTMINSTER NV	AMX
29	CORBION NV	AMX
30	EUROCOMMERCIAL PROPERTIES NV	AMX
31	FAGRON NV	AMX
32	FIOW TRADERS NV	AMX
33	FUGRO NV	AMX
34	GRANDVISION NV	AMX
35	INTERTRUST NV	AMX
36	JDE PEETS NV	AMX
37	NSI NV	AMX
38	OCI NV	AMX
39	PHARMING GROUP NV	AMX
40	POSTNL NV	AMX
41	SBM OFFSHORE NV	AMX
42	SIGNIFY NV	AMX
43	TKH GROUP NV	AMX
44	KONINKLIJKE VOPAK NV	AMX
45	WAREHOUSE DE PAUW NV	AMX
46	KONINKLIJKE BAM GROEP	AScX
47	TOM TOM NV	AscX
48	B&S GROUP SA	AScX
49	BRUNEL INTERNATIONAL NV	AScX
50	KENDRION NV	AScX
51	SIF HOLDING NV	AScX
52	VASTNED RETAIL NV	AScX
53	WERELDHAVE NV	AScX

Appendix B: outliers

Extreme Values

			Case Number	Value
Total return	Highest	1	193	.895040666
		2	206	.867770963
		3	200	.744057292
		4	226	.736668939
		5	197	.692649573
	Lowest	1	194	.044879812
		2	91	.116060154
		3	72	.116843742
		4	67	.122767137
		5	81	.128170346
SYSTEMATIC RISK (BETA)	Highest	1	130	2.437000
		2	33	1.999882
		3	206	1.956424
		4	51	1.852571
		5	176	1.814025
	Lowest	1	205	-.288557
		2	155	.070605
		3	159	.144635
		4	217	.173482
		5	167	.206465
IDIOSYNCRATIC RISK (residuals)	Highest	1	193	.045800723
		2	206	.038474480
		3	200	.036057417
		4	212	.035765033
		5	226	.034539243
	Lowest	1	72	.006523978
		2	67	.006689450
		3	73	.006992537
		4	91	.007030787
		5	76	.007419124

Appendix C: firms with low CSR scores

Name	Index	Year	Environmental Score	Social Score	Governance score
AEGON NV	AEX	2015	0	0	0
GALAPAGOS NV	AEX	2017	0	45,23	75,62
GALAPAGOS NV	AEX	2018	0	46,16	66,08
ADYEN NV	AEX	2019	0	27,71	27,84
FAGRON NV	AMX	2019	0	64,49	17,62
INTERTRUST NV	AMX	2019	0	52,45	32,34
INTERTRUST NV	AMX	2020	0	50,82	34,13

Appendix D: Pearson correlation ln total sales

Correlations

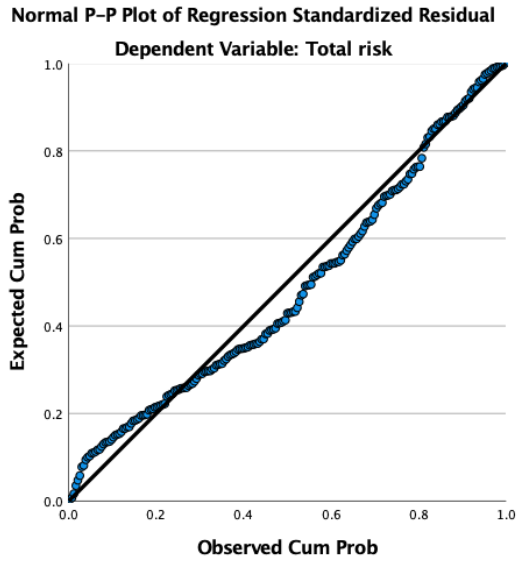
		Firm Size TS	ESG Score
Firm Size TS	Pearson Correlation	1	.583**
	Sig. (2-tailed)		<.001
	N	221	221
ESG Score	Pearson Correlation	.583**	1
	Sig. (2-tailed)	<.001	
	N	221	221

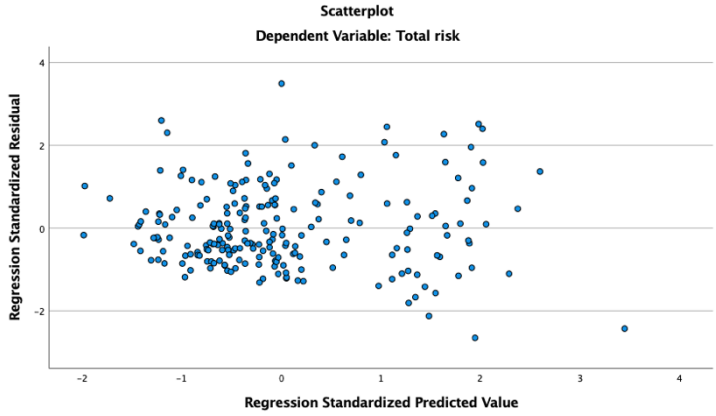
**. Correlation is significant at the 0.01 level (2-tailed).

Appendix E: linearity & homoscedasticity plots

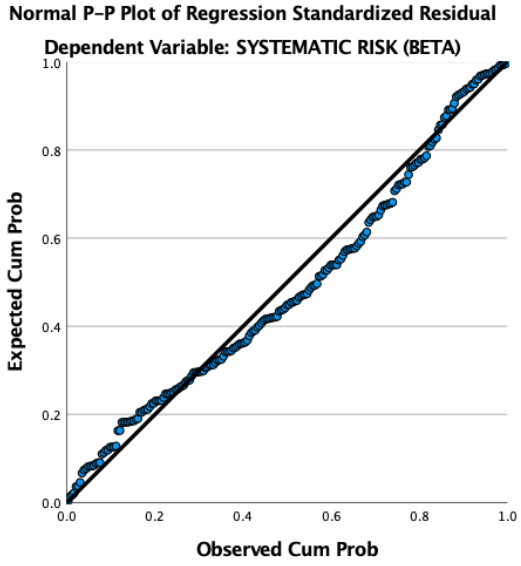
D = dependent variable, ID = independent variable

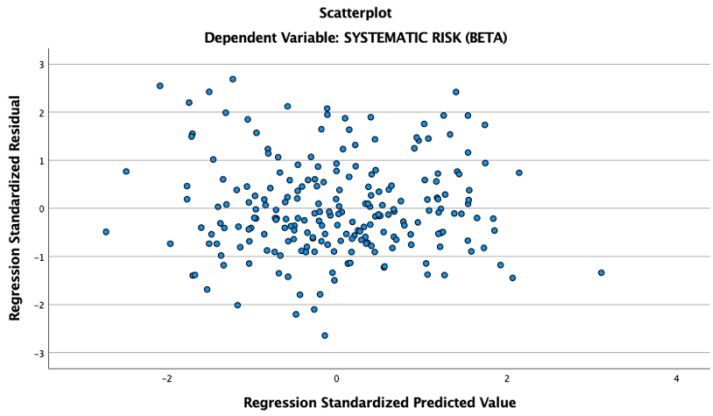
Model 1: D = Total Risk, ID = CSR/ESG score



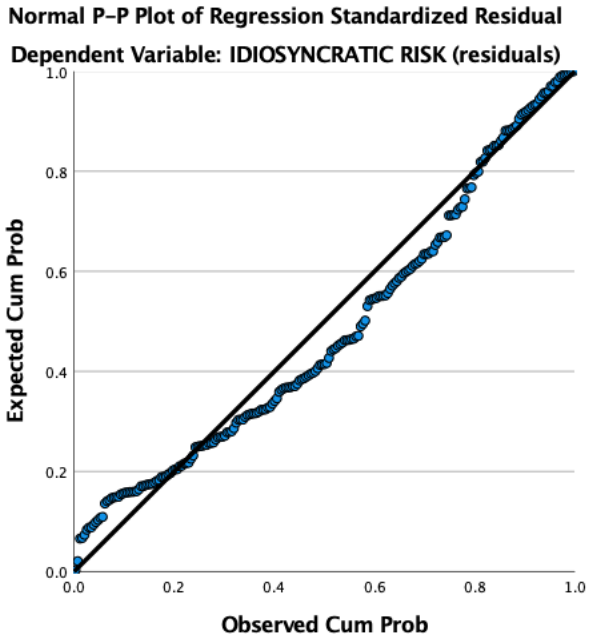


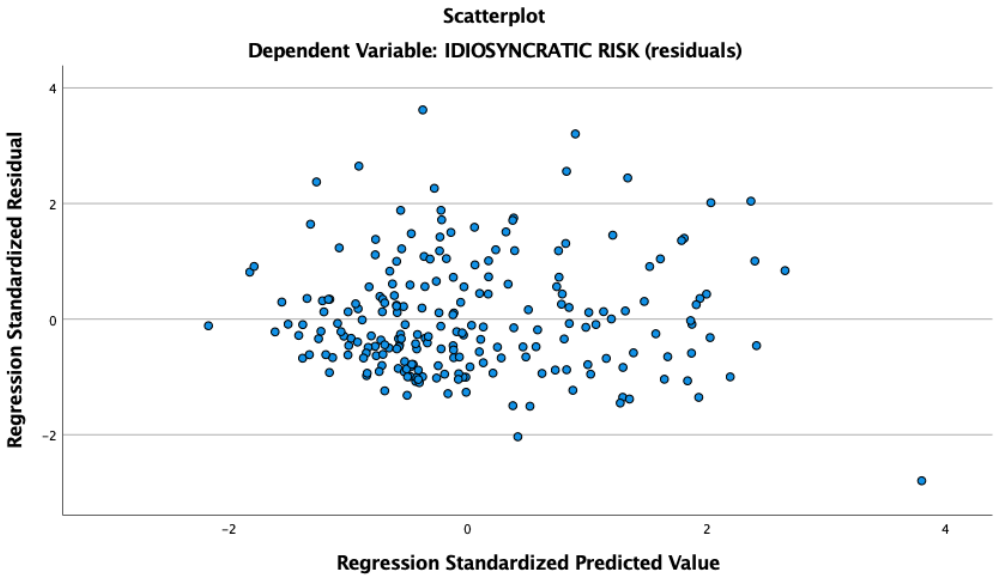
Model 2: D = Systematic Risk, ID = CSR/ESG score



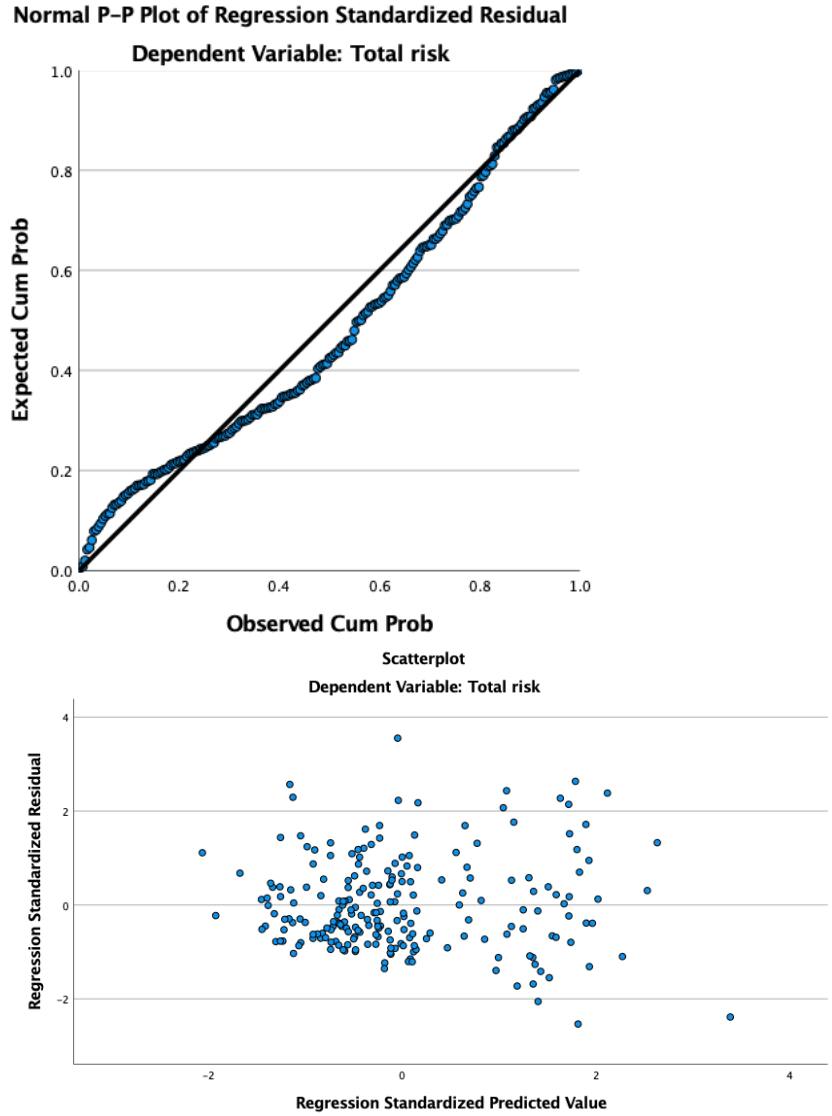


Model 3: D = Idiosyncratic Risk, ID = CSR/ESG Score

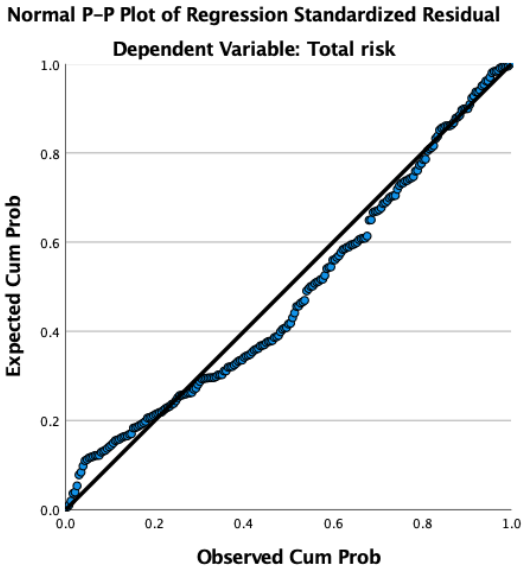


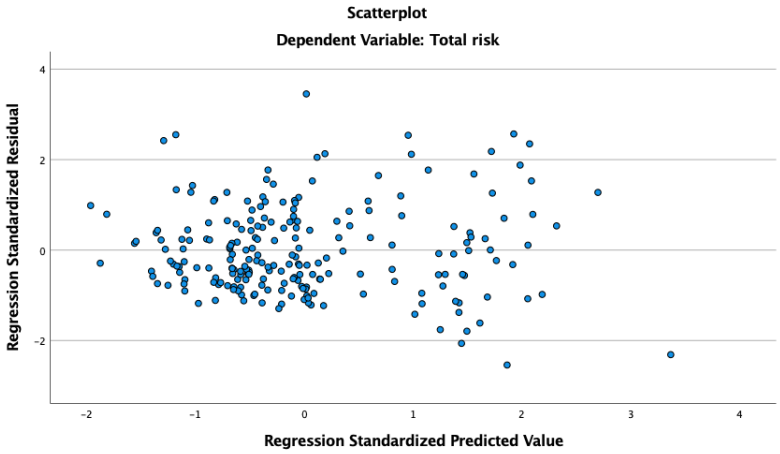


Model 4: D = Total Risk, ID = Environmental score

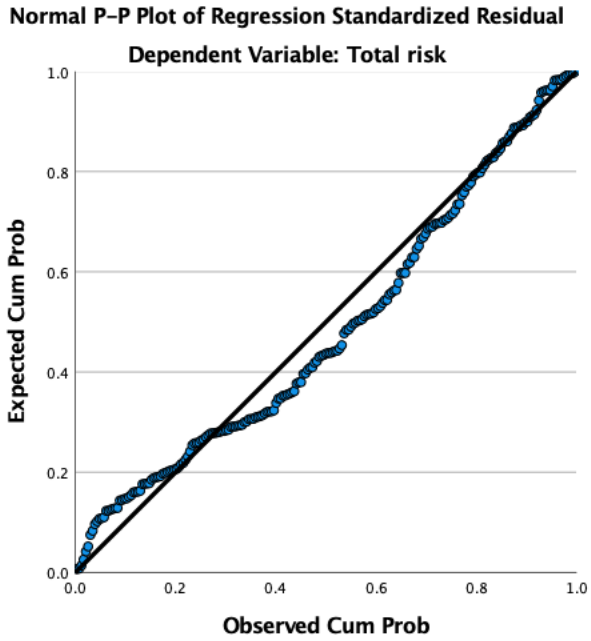


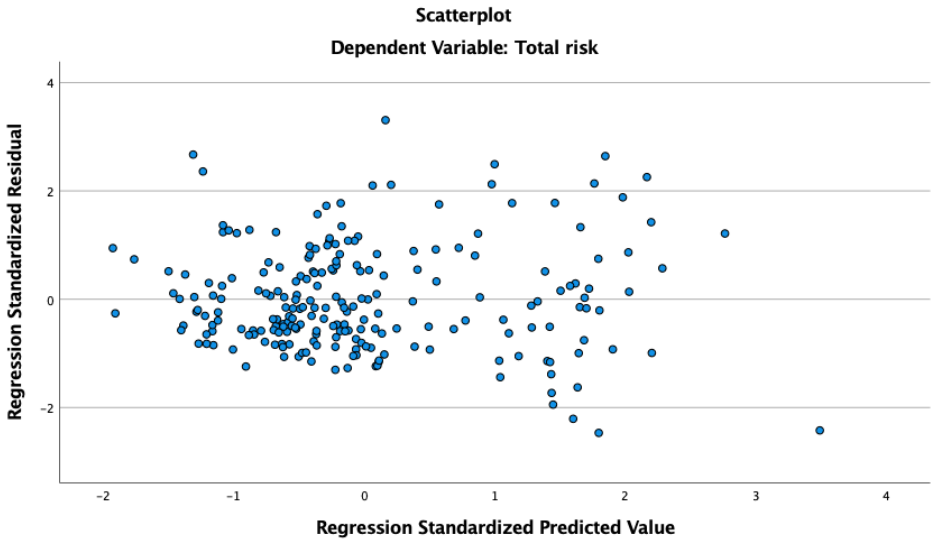
Model 5: D = Total Risk, ID = Social score





Model 6: D = Total Risk, ID = Governance score





Appendix F: robustness test transparency benchmark

	Model 17				Model 18				Model 19			
Variable	**Total Risk**				**Systematic Risk**				**Idiosyncratic Risk**			
	Exp. sign	*Beta*	*Std. Error*	*Std. Beta*		*Beta*	*Std. Error*	*Std. Beta*		*Beta*	*Std. Error*	*Std. Beta*
Constant		0.331	0.027			1.287	0.094			0.019	0.002	
CSR/ESG*Score*	-	-0.001***	0.000	-0.241		-0.002**	0.001	-0.205		-0.000***	0.000	-0.263
MTB	-	0.000	0.001	0.000		-0.001	0.004	-0.018		-0.000	0.000	-0.001
LEV	+	-0.085**	0.046	-0.133		-0.540***	0.161	-0.280		-0.003	0.003	-0.089
ROA	-	-0.653***	0.138	-0.348		-1.161**	0.481	-0.205		-0.041***	0.001	-0.399
Year dummy		INCLUDED				INCLUDED				INCLUDED		
N		124				124				124		
F-statistic		10.741***				4.123***				11.487***		
Adj. R-square		0.357				0.151				0.272		

Note: the table represents the robustness results of H1a, H1b, and H1c in the models 17, 18, 19, respectively. Exp. sign means expected relationship sign derived from the literature. Furthermore, N represents the number of firm-year observations. Lastly, *, **, and *** denote the significant level at 10, 5, and 1%, respectively.