Essays on
ESG disclosure, performance and assurance

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To my mother

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List of Essays

This dissertation is based on the following essays:

Essay 1. Zelalem Abay

Does the market react to mandating ESG disclosure? A regression discontinuity based evidence. *Int. J. Accounting, Auditing and Performance Evaluation. Forthcoming.*

Essay 2. Zelalem Abay

The signaling role of voluntary ESG assurance. *Int. J. Managerial and Financial Accounting. Forthcoming.*

Essay 3. Zelalem Abay

ESG and the monitoring role of assurance in credit risks

Abstract

In this dissertation, economic implications of ESG disclosure, performance and assurance are examined in three essays. It is evident in the recent developments that the need for a sustainable and responsible investments is beyond discussion and becoming inevitable. An integral element required to make such investments is ESG information. The role and importance of ESG, especially to investment decisions, is attracting regulators' interest in approaching the provision of ESG information through mandatory disclosure. Moreover, credit rating agencies are showing interest into the implications of ESG to credit risks. The purpose of this thesis is, therefore, to examine the reception of the mandatory EU ESG disclosure, and to examine the potential monitoring and signaling roles of third-party ESG assurance. The overall results of the thesis are three-fold. First, in examining the perception of investors towards EU directive on mandatory ESG disclosure, essay one shows a negative stock market reaction which indicates investors' assessment of the directive as costly. The costs may include administrative and reporting costs of complying the mandate and potential proprietary and political costs following the reporting. Second, using sample firms from EU, essay two shows a higher ESG performance for firms that assure their ESG reports than firms that do not assure ESG reports. The results confirm the signaling role of an independent third-party assurance to differentiate between ESG performances. Firms with higher ESG performance has the incentive to use third-party ESG assurance to differentiate themselves from counterparts with an inferior ESG performance, otherwise both types of firms could be pooled together. Third, in line with monitoring theory of assurance and risk mitigation role of ESG to credit risks, essay three shows a mediated role of third-party ESG assurance on credit ratings. The results shows that the third-party ESG assurance indirectly leads to a reduced credit risk transferred through an enhanced ESG performance.

Keywords: ESG, disclosure, assurance, performance, signaling, monitoring, credit risk, risk-mitigation

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Introduction

1. Introduction

This thesis examines the mandatory disclosure and voluntary assurance of non-financial information commonly termed environmental, social, and governance (ESG).[1] Currently, the growing importance of ESG-related information is attracting the interest of diverse stakeholders, including investors and regulators. Recent developments have shown that the need for sustainable and responsible investments that require ESG-integrated decisions is beyond mere discussion and something inevitable. Investments in this regard have shown tremendous fund inflows. Numerically, a record high of USD 1.652 trillion assets in sustainable funds was recorded in 2020, which accounted for approximately 65% increase from 2019 (MorningStar, 2021)[2]. However, what is still challenging and raised consistently is the concern surrounding the quality, quantity, and transparency of ESG information; hence, the subsequent consequences of information asymmetry.

In general, the importance of access to information, the various consequences of information asymmetry, and a set of alternative solutions referred to in the literature as information economics are both theoretically and empirically well-documented topics in finance. For instance, Akerlof (1970) modeled how information asymmetry between a seller and a buyer leads to adverse selection and market malfunctioning. Similarly, emphasizing the existence of differences in information levels between two parties, Spence (1973) substantiates the role that signaling plays in minimizing information asymmetry. He demonstrates that a better-informed agent has an

[1] The term ESG was first coined in the UN's Global compact report (2004) titled "who cares wins: connecting financial markets to a challenging world." In the conference, the then UN Secretary General initiated developing guidelines on how to integrate ESG. Since then, the term ESG is interchangeably used to represent CSR and sustainability related issues. The literature treats the terms ESG, CSR, sustainability, and non-financial reporting interchangeably. Likewise, the terms are sometimes used interchangeably throughout this thesis too. One obvious difference between ESG and CSR is that ESG is a more broad terminology than CSR. For instance, governance is explicitly included under ESG while it is indirectly considered under CSR (Gillan et al., 2021).

[2] https://www.morningstar.com/search?query=Global%20Sustainable%20Fund%20Flows%3A%20Q4%202020%20in%20Review

incentive to credibly signal by taking an observably costly action in revealing private information. Several studies confirm such theoretical explanations through empirical evidence. The occurrence of higher information asymmetry is positively associated with the cost of capital (He et al., 2013), higher agency costs (Jensen and Meckling, 1976), and inefficient market operation, which leads to inefficient capital flow. Hence, providing information for efficient market operations is quite important. What has been added to the literature on information asymmetry is the case for ESG (see Cho et al., 2013; Mavruk, 2017; Cui et al., 2018; Nguyen et al., 2019; Reber et al., 2021).

The two channels through which the provision of information could be enhanced and lead to higher transparency and lower information asymmetry are mandatory and voluntary disclosures (Kim, 2014). While market-wide imposed regulations could force firms to improve disclosure quality and market transparency, firms could voluntarily provide information beyond the mandate with the intention of reducing information asymmetry and lowering the cost of capital (Kim, 2014).

Noting the growing importance of ESG-related information for a diverse set of decisions, the European Union (EU) has required the mandatory disclosure of relevant and decision-useful ESG information. Previously, the disclosure of ESG information was left to firms to voluntarily decide how and what to disclose. However, it was argued by the European Commission (EC) that voluntary disclosure was ineffective and unclear, in addition to the difference in implementation among member states.[3] Furthermore, it has been reported that less than 10% of the largest European companies are disclosing such non-financial information. With the stated objective of enhancing transparency and consistency in the disclosure of non-financial information, the EU has adopted directive 2014/95/EU, which demands mandatory disclosure. This directive mandated the disclosure of non-financial

[3] http://europa.eu/rapid/press-release_IP-13-330_en.htm

information only from large undertakings and has been in effect since the fiscal year 2017.[4] Large undertakings are defined in the directive as public-interest entities with more than 500 employees and include listed companies, banks, and insurance companies. What has recently been added to this development is the introduction of the Sustainable Finance Disclosure Regulation (SFDR), which came into force on March 10, 2021.[5] The overall aim of this regulation is to increase transparency on how market participants integrate sustainability into investment decisions and reduce the concerns surrounding greenwashing. The EU boldly recognizes the importance of sustainability-related disclosure for reduced information asymmetry between principals and agents when it comes to sustainability-related risks.[6]

The challenges posed by climate change, gender and income inequality, diversity, and social inclusion continue to be the focus of discussions among various stakeholders, including policymakers, academics, and investors. One viable complementary solution to such challenges could be to use disclosure policies that empower stakeholders with information to help make informed decisions. In reaction to these decisions, disclosing agents may alter their behavior. Such strategies requiring enhanced information disclosure have been widely used as policy instruments, for instance, in environmental issues as instrumental for pollution control, by exposing firms to wider stakeholders (Tietenberg, 1998).

Considering the increasing use of ESG-related disclosure by regulatory agencies on the one hand and the steady demand for credible and useful ESG data by stakeholders on the other, this thesis examines the recently adopted EU directive on ESG disclosure and further investigates the roles of ESG performance and assurance.

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014L0095
[5] https://eur-lex.europa.eu/eli/reg/2019/2088/oj
[6] [6]https://eur-lex.europa.eu/eli/reg/2019/2088/oj

1.1. Research questions

Previously, disclosure of ESG information was voluntary. According to voluntary disclosure theory (Verrechia, 2001), firm's voluntary disclosure aims at signaling superior performance to the market and potential investors. Furthermore, under a voluntary disclosure regime, the decision to signal depends on an analysis of the benefits and costs associated with disclosure (Li et al., 1997). Firms with net benefits from disclosure would voluntarily signal more to the market than those with net costs do. Empirical findings show that firms with voluntary disclosure can gain a legitimacy advantage over non-disclosing firms. Signaling high ESG performance is also associated with lower capital constraints (Cheng et al., 2014), lower cost of equity capital (Dhaliwal et al., 2011), and higher firm value (Fatemi et al., 2017; Zuraida et al., 2018).

Contrary to the motives behind voluntary disclosure, there are situations in which the need for mandatory disclosure is rationalized. Under voluntary disclosure, firms tend to selectively disclose information (Kothari et al., 2009), which can lead to suboptimal disclosure. Mandatory disclosure to enhance transparency may be an alternative option. However, there are still undesirable effects of mandating disclosure, including the limitations of its one-size-fits-all approach, tendency to comply with minimum levels, and the possibility of crowding out useful information. Additionally, incentives for voluntary disclosure may erode under a mandatory disclosure regime.

The introduction of mandatory disclosure when firms voluntarily disclose similar types of information after conducting a cost-benefit analysis could raise questions about its importance (Luez and Wysocki, 2016). Opposers of mandatory disclosure argue that the introduction of a mandate to disclose non-financial information could bring shock to the market. Investors' reactions may differ based on their perceptions of the costs and benefits of the mandatory disclosure. While the costs of complying with mandatory disclosure may include reporting, political, and proprietary costs, the

benefits may be in terms of informational, monitoring, and operational efficiencies (Grewal et al., 2019). Therefore, the reception of mandatory ESG disclosures by investors in the market is an empirical question. Accordingly, the equity market reaction to the adoption of mandatory disclosure of ESG information could reveal investors' perception of mandatory disclosure rather than leaving the issue of disclosure to remain a voluntary practice. Hence, this thesis addresses the following research question:

RQ1. How does the equity market react to the adoption of the EU directive on mandatory non-financial information disclosure?

Voluntary ESG disclosure has been consistently criticized for its lack of credibility regarding the information presented in reports. Concerns associated with firms' greenwashing under voluntary disclosure have been the center of discussion among practitioners, academics, and policymakers. Under voluntary disclosure, where the disclosing agents claim their reported performance, stakeholders remain skeptical of the credibility, leading to information asymmetry. As in Akerlof's lemon case, disclosing agents with superior performance could be pooled with their counterparts with inferior performance if there is no mechanism that users can use to differentiate performance. One way to enhance the credibility of the information reported is to seek external assurance from an independent third party. Hence, disclosing agents with superior performance have the incentive to incur an assurance cost and differentiate themselves from those with inferior performance.

Theoretically, Bagnoli and Watts (2017) proved that disclosing agents with superior performance could push the pooling equilibrium to a separating equilibrium using voluntary third-party assurance. Similarly, Arora and Gangopadhyay (1995) built a theoretical model to explain why firms comply with environmental standards to differentiate themselves and retain a larger share of consumers. With the intention of differentiating themselves from competitors and retaining a larger market share from consumers who are willing to pay for greener products, their model proved

that firms over-comply with regulatory standards. The authors recognize the reporting of environmental performance and its advertising as the main source of a firm's public image. Interestingly, this study has made an overall conclusion and quest on the importance of assured environmental reporting with minimal enforcement costs. Empirically, the assurance of non-financial reports is found to reduce information asymmetry (Carey et al., 2000), perceived as more credible by financial analysts (Pflugrath et al., 2011) and indicating superior performance (Braam and Peeters, 2018). Since an increasing number of third-party rating agencies specialize in providing ESG performance scores (such as Thomson Reuters and Bloomberg among the many), the signaling role of assuring such reports can be examined empirically.[7] Therefore, the second research question of this thesis is stated as follows:

RQ2: What is the signaling role of voluntary ESG assurance?

With the increasing importance of ESG in different decisions, the use of third-party ESG assurance can also be motivated by its potential monitoring role. In this thesis, it is argued that assurance services from an independent third party are instrumental in influencing ESG performance through a set of channels. First, assurance services are expected to improve sustainability related information. This, in turn, helps managers make better decisions associated with sustainability investments, which are also termed sustainability investment efficiency. Second, the presence of external independent third-party assurance providers could create fear of discovering inaccuracies, malpractices, and intentional misstatements, and serve as a disciplinary mechanism. Third, inputs from the recommendations and suggestions of the assurance process could help firms improve their operations and performance. By considering all these potential channels of assurance, this thesis addresses the third research question:

[7] See Pagano et al. (2018) for a detailed review of the development in ESG rating agencies.

RQ3. What is the monitoring role of voluntary ESG assurance?

The implications of the risks and opportunities associated with ESG for credit risks are becoming a topic of theoretical and empirical research interest. This thesis argues about enhanced ESG performance due to the monitoring role of assurance to influence the overall credit risk profile of firms. There are two competing theories on the role of ESG in credit risk: risk-mitigation and overinvestment. Risk mitigation theory expects a higher ESG performance, resulting in lower credit risk. In contrast, overinvestment theory considers investments in ESG activities as a source of agency problems and is expected to be positively associated with credit risks. Hence, by considering the increasing demand from stakeholders, including investors and governments, and the tipping of high awareness on ESG and their investment strategies, the following fourth research question is addressed in this thesis.

RQ4. Does ESG lead to lower credit risk?

1.2. Thesis objective

Considering the increasing interest of stakeholders on the one hand and the role of ESG disclosure, performance, and assurance on the other, the objectives are three-fold. First, this thesis examines how the equity market reacts to the introduction of the EU directive on non-financial disclosure. This kind of information was left for voluntary disclosure where firms could make their own decisions on how, when, and what to report. However, recent developments indicate regulators' interest in approaching the provision of sustainability information through mandatory disclosure. The introduction of a mandatory disclosure approach amid voluntary disclosure is an interesting research topic that requires an empirical investigation of its reception in the market. Second, this thesis examines the signaling and monitoring role of voluntary independent third-party ESG assurance. The decision to assure ESG reports is still voluntary. An empirical investigation of the theoretical explanations of the role of voluntary ESG assurance from both signaling and

monitoring perspectives is needed. Third, this thesis examines the role of ESG performance and assurance in reducing credit risk. ESG information and its performance can potentially have a risk-mitigation role that can be transferred to better credit ratings.

2. Institutional background

The EU directive on non-financial disclosure, ESG assurance and ESG rating agencies are central to the thesis. A. This section provides a brief overview of the background to the introduction of the EU directive on non-financial disclosure, the institutional settings of ESG assurance and ESG rating agencies, and their market shares. The section presents the roles of ESG rating, ESG assurance, and the main players in these agencies.

2.1. EU directive on non-financial disclosure

Following several discussions and consultations, in April 2014, the EU adopted a directive (Directive 2014/95/EU[8]) that mandated the disclosure of non-financial information from large business undertakings with employee levels of 500 and above. The directive requires large business undertakings with major operations in Europe to disclose information regarding their policies, risks, and outcomes concerning environmental, social, human rights, anti-corruption, and bribery. Member state countries were given a two-year transposition period, and the directive has been effective since the fiscal year 2017. In mandating the directive, the EU applied a "comply or explain" approach. Eligible firms are required to either comply with the directive or explain the reason for failing to report on the topics required under the directive.

[8] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014L0095

The EU's interest in mandating non-financial disclosure dates back to the beginning of early 2010 introduced in the project called "A renewed strategy 2011–2014 for Corporate Social Responsibility".[9] The EC recalled that the issue of disclosing non-financial information was addressed by the previous directive[10] as a voluntary choice of disclosure. However, it has been argued that this voluntary choice of disclosure leads to inconsistencies between reporting from different firms. Arguing for the renewal of the disclosure approach, the EC began to discuss and seek consultations from member states, investors, and stakeholders. This led to the first public consultation held in November 2010.[11] Furthermore, to adopt a balanced proposal to improve the usefulness and transparent reporting while protecting against unnecessary cost burdens, an impact assessment was conducted in 2012.[12] In addition to inconsistency problems in reporting the non-financial information, it was assessed that smaller than 10% of the largest EU companies were involved in a voluntary disclosure. Hence, on April 16, 2013, the EC introduced a proposal to increase the transparency and consistency of the non-financial information reporting. The importance of enhancing transparency on matters related to environmental and social pillars was in the interest of the EU, as declared in the two adopted CSR-related resolutions. These two resolutions are named "corporate social responsibility: accountable, transparent and responsible business behavior and sustainable growth"[13] and "Corporate social responsibility: promoting society's interest and a rote to sustainable and inclusive recovery."[14] Following the adoption of these resolutions, on February 6, 2013, the European Parliament called upon the EC to introduce a proposal on the "disclosure of non-financial information." Experts and stakeholders were asked for comments and recommendations regarding

[9] https://ec.europa.eu/commission/presscorner/detail/en/IP_13_330
[10] EUR. Lex - l26009. En EUR-Lex (europa.eu).
[11] http://ec.europa.eu/internal_market/consultations/2010/non-financial _reporting_en.htm
[12] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52013SC0127
[13] http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A7- 2013-0017+0+DOC+PDF+V0//EN&language=EN
[14] http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A7- 2013-0023+0+DOC+PDF+V0//EN&language=EN

the proposal of mandatory non-financial disclosure. Finally, in April 2014, the EU adopted the mandatory disclosure of non-financial information from large undertakings with 500 or more employees that went into effect since the fiscal year 2017.

2.2. ESG rating agencies and their roles

ESG rating agencies (aka sustainability rating agencies, SRAs) are independent third-party agencies that provide ESG ratings and scores that are commonly used to index ESG performance. In providing such performance scores, agencies collect information from reporting, media, and filings. They also have their own research and expertise groups that deal with providing performance scores. Even though it is difficult to map the exact number of such agencies, the industry is growing and so are mergers and acquisitions. In a report by SustainAbility (2020), the number of ESG rating and ranking providers was estimated to exceed 600 as of 2018.[15] These rating agencies include Thomson Reuters, Bloomberg, Sustainalytics, and Morgan Stanley Capital International (MSCI). Appendix 1 provides a list of ESG rating agencies with brief descriptions.

ESG rating agencies, as information intermediaries, play a paramount role in reducing information asymmetry and providing a comprehensive, clear, and summarized performance indicator, which is otherwise costly for users to read and understand the reports. Furthermore, the use of sources other than firms' disclosures and their internal intelligence and experts may include incremental information. However, there are still some questions and skepticism regarding the consistency and comparability of the scores provided by the growing ESG rating agencies. One reason is the difference in the methodology for measuring and scoring the pillars of the ESG. Escrig-Olmedo et al. (2010) show the inconsistency of ratings and scores

[15] https://www.sustainability.com/globalassets/sustainability.com/thinking/pdfs/sustainability-ratetheraters2020-report.pdf

provided by different ESG rating agencies. Chatterji et al. (2016) argue that the divergence in ratings could mainly be due to the difference in defining the topic (theorization difference) and the difference in measuring the same topic (lower commensurability).

Independent third-party ESG rating agencies have two roles. The first is their informational role as information intermediaries (Slager and Chapple, 2016). Since ESG factors are difficult for externals to observe (Doh et al., 2010), intermediaries play a paramount role in providing comprehensive information in the form of ratings. Alternatively, it can be argued that users can also look at disclosed reports. However, two potential challenges can make this choice difficult for the users. The time and cost needed to read, analyze, and understand the various reports, the lack of expertise in doing so, and difficulties in understanding due to their lengthy and complex nature are among the many reasons mentioned as sources of failures in mandated disclosures (Ben-shahar and Schneider, 2011). Making the disclosure brief, simple, and easy to understand is recommended. This is exactly what independent third-party ESG rating agencies are doing with the ratings they provide. The ratings provided to users in terms of scores and grades make the interpretation of performance easy to understand. This concept is very similar to the well-established credit rates from credit rating agencies, where the overall detailed creditworthiness analyses are summarized as simple letters for easy understanding.

The second role of ESG rating agencies is their potential to influence the real behavior of disclosing agents through ratings. Rated firms, especially poorly rated ones, may alter their operating behavior to improve ESG performance. This can also be considered as the disciplinary role of the rating in bringing about a change in operating behaviors. Empirical evidence, though limited, has shown that firms react not only to ESG ratings but also to exclusion from ESG-based indices (Chatterji and Toffel, 2010; Slager and Chapple, 2016). The study by Chatterji and Toffel (2010) on US firms showed that poorly rated firms are found to improve their

environmental performance more than firms with better ratings and those that are newly rated. This is an indication that managers, to overcome the bad reputation they obtain from poor ratings, tend to work more, and improve subsequently. Moreover, the study shows that the reaction of firms to poor ratings is more substantiated for firms with higher environmental exposure. Similarly, Sharkey and Bromley (2015) show that rated firms perform better in reducing their pollution than unrated firms do. Recognizing the possibility that firms could selectively react to certain aspects, Gauthier and Wooldridge (2018) showed that firms react to low ratings by investing in less costly activities. Using sustainability-related indexes, Chelli and Gendron (2013) attempted to explain the role of inclusion or exclusion from an index as a motivation for striving to perform better. Similarly, Slager and Chapple (2016) show that exclusion from the FTSE4Good Index is followed by a higher likelihood of improving performance to capitalize on the promotional benefit of advertising as part of the index. Thus, what we can learn from this empirical evidence is that firms react to poor ratings with an actual change in their investment and operations to improve their performance. This makes the role of independent third-party ESG ratings instrumental in influencing real change.

2.3. ESG assurance: Roles, trends, and costs

Issues of reliability and credibility have consistently raised concerns regarding ESG disclosure. These concerns are associated with greenwashing, in which disclosing agents provide information that does not occur within their firms (Yu et al., 2020). Greenwashing is highly likely to occur when there are fewer mechanisms to verify what is said by disclosing agents. It is also more likely to occur if there is no consistent application of the same standard of reporting. The problem with greenwashing is followed with the issues of information asymmetry. One possible solution is to use third-party ESG assurances. Independent third-party assurance on ESG reporting could enhance investors' confidence and reduce the information gap.

The ESG assurance service has three basic features that can affect the process and perceived outcome. These include the level of assurance, type of assurance providers, and scope of the assurance process. There are two levels of assurance: limited (moderate) and reasonable (high). According to AccountAbility, assurance engagement at a high level is based on "extensive depth of evidence gathering, including corroborative evidence and sufficient sampling at lower levels in an organization" p.11.[16] In contrast, AccountAbility defined moderate level as an engagement based on "limited depth of evidence gathering including inquiry and analytical procedures and limited sampling at lower levels in the organization as necessary" p.11.[17] These differences in the level of engagement have implications for the conclusions and statements forwarded by assurance providers. Therefore, the level of confidence is expected to differ according to the level of the assurance engagement. Assurance service providers are grouped into accounting and non-accounting firms in the literature. While accounting firms are dominated by big audit firms, non-accounting firms are consultancy firms on ESG topics. Depending on the agreement, the scope of an assurance engagement could also be for a specific part of the report or the report as a whole.

Although it is difficult to exactly identify the proportion of accounting and non-accounting firms providing assurance services, some data can be learned from empirical studies. A study by Corparateregister (2008)[18] showed that non-accounting firms have slightly more shares (46%) than Big 4 firms (41%), while the remaining shares (13%) are classified as others. In a similar but relatively recent study by Maso et al. (2020), using 6,468 observations from 2002 to 2017, the proportion is almost equal, with 49.5% from non-accounting firms and the remaining 50.5% from Big 4 accounting firms. Breaking down the 50.5% share among the Big 4 firms, PwC accounts for 14.9%, and Deloitte, KPMG, and EY account for 10.24%, 13.68%, and

[16] http://www.mas-business.com/docs/AA1000AS%202008%20Final.pdf
[17] ibid
[18] https://www.corporateregister.com/pdf/AssureView.pdf

11.67%, respectively. Non-accounting assurance providers are dominated by small consulting firms and certification providers (Corporateregister 2008). In Ballou et al. (2018), the share is 62.05% for accounting firms and 37.5% for non-accounting firms. The data in this thesis show that accounting firms dominate assurance providers. Assurance service providers, such as SGS, ERM, DNV, and Bureau Veritas are examples of the non-accounting group included in the current study. Similarly, accounting firms include those considered as Big 4 firms, such as PWC, Deloitte, KPMG, and EY, and some other accounting firms such as Lloyds and BDO.

The cost of assuring non-financial information could include both direct and indirect costs. Direct costs include payments made as monetary compensation for assurance services. Indirect costs may arise if there is a possibility of revealing inappropriate operating behaviors. Thus, the potential legal and reputational costs of inappropriate behaviors can be included in the indirect costs. The direct cost paid as fees for the assurance service could vary depending on the scope, level, and type of assurance service provider. In a recently published report on the implementation of the non-financial directive by the EU, cost could also differ from firm to firm. According to a survey (EU 2020),[19] while the assurance cost is dependent on the size and complexity of the report, large companies pay close to EUR 100,000 on an annual average with a range from EUR 68,000 to 212,000. The cost of assurance for small companies ranges between EUR 28,000 and 42,000 annually, averaging around EUR 30,000. These costs are in addition to the administrative costs they incur to comply with the non-financial disclosure directive, which is close to EUR 82,000 on an annual average. The survey also indicated that, on average, the assurance cost, irrespective of the size of the companies, is close to EUR 76,000 annually. In addition, firms that comply and go for assurance incur an average EUR 160,000 on a yearly basis following the introduction of the directive to disclose non-financial

[19] https://op.europa.eu/en/publication-detail/-/publication/1ef8fe0e-98e1-11eb-b85c-01aa75ed71a1/language-en

information. Considering the huge resources that firms incur to assure ESG reports, it is reasonable to theoretically explain and empirically evidence why some firms voluntarily prefer to spend such resources and what potential roles third-party ESG assurance could play.

3. ESG and disclosure

In this thesis, a broader set of topics and concepts is used. The reasons and implications of introducing mandatory disclosure, socio-political and economic perspectives of voluntary ESG disclosure, and economic effects of ESG are important topics of this thesis. This section is therefore devoted to discussing these concepts and topics in detail. The theoretical frameworks related to disclosure in general, and the application of disclosure policies to ESG issues in particular, are discussed. Moreover, the potential role of disclosure in solving agency and informational problems and the economic effects of ESG are included in this section.

3.1. Mandatory versus voluntary disclosure

Following the increasing demand for ESG-related information on the one hand and recognizing concerns regarding consistency and comparability due to a lack of standards and guidelines on how and what to include in ESG reports on the other hand, a set of alternative approaches are applied differently in different parts of the world. For instance, while the EU chose to use a mandatory ESG disclosure approach, the issue is left for voluntary decisions in the United States. The recently introduced EU mandatory disclosure is a good example of how regulators approach the provision of ESG information. Following the adoption of this EU directive on non-financial disclosure, non-binding guidelines for the preparation of the report are further developed.[20] Alternatively, countries such as the United States prefer to leave

[20] https://ec.europa.eu/info/publications/non-financial-reporting-guidelines_en

the decision to disclose such information to the firms. This mainly expects market mechanisms to shape the information environment using market players, including sell-and buy-side analysts, ESG data, and rating providers. However, concerns associated with ESG disclosure and their information remain unalleviated in both voluntary and mandatory disclosure regimes.

Issues of greenwashing and legitimacy associated with voluntary disclosure have led to two competing theories explaining the association between performance and disclosure: economics-based and socio-political theories (Clarkson et al., 2008). According to these theory, the association between performance and voluntary disclosure can be positive or negative. The idea is that both poor-and good-performing firms could use voluntary disclosure, but the intention and incentives remain different.

Sociopolitical theories include legitimacy and stakeholder theories (Grey et al., 1995). The aim of firms' voluntary disclosure is explained by the need to legitimize themselves. When stakeholders' awareness and expectations increase, firms with lower performance face a threat to legitimacy (Clarkson et al, 2008). Accordingly, firms with lower performance are more likely to disclose more to change or manage their image or perceptions of their stakeholders (Grey et al., 1995). This is in contrast to economic theories, such as voluntary disclosure theory (Verrecchia, 1983; Dye, 1985) and signaling theory (Bagnoli and Watts, 2017), which attempt to explain the economic incentive for voluntary disclosure. Thus, firms with higher performance have an incentive to go for voluntary disclosure to credibly reveal their type, which firms with lower performance are unable to mimic (Clarkson et al., 2008; Bagnoli and Watts, 2017). In addition to greenwashing, the voluntary disclosure regime is also subject to another criticism of selective disclosure, where firms tend to disclose good news but hold unfavorable news (Verrecchia, 1983). Such selective disclosures could be with fear of subsequent stakeholders' reactions, for example, boycotts (King and Soule, 2007; Hahn and Albert, 2017). Considering the importance of information for market stability and that admitting ESG information is becoming

relevant for making investment decisions, such under-supply of information may drive regulator interventions such as EU mandatory ESG disclosure.

Theoretically, the justification for regulatory intervention is the existence of market failure. Welfare economists have identified four sources of market failure: producer monopoly, public good assumption, externalities, and the existence of information asymmetry between producers and consumers (Bainbridge, 1999). The last three are relevant to the current discussion on the need for mandatory ESG disclosure. According to the public good assumption, the need for mandatory intervention is when there is a justification that firms are not voluntarily disclosing optimally. As such, mandated disclosure is assumed to bring an efficient level of disclosure (Bainbridge, 1999). The possibility that competitors in a market can free ride information produced under mandatory disclosure could lead to underproduction (Bainbridge, 1999). Fear of their information to be disclosed under mandatory disclosure, firms could react by producing information to a minimum level. The last and most widely recognized source of market failure is the existence of information asymmetry between various parties, mainly between managers and investors. This comes with the separation of ownership and management, where there is a difference in information between them (Jensen and Meckling, 1976). Managers have more information on the firm than investors and stakeholders in general. Such differences in information could lead to market failure, and mandatory disclosure of information could help reduce the information gap and, thus, help in efficient markets.

Mandatory ESG disclosure, considered the soft form of regulation (Harper, 2020), is becoming a center of discussion among regulators, practitioners, and academicians. Mandating disclosure is considered appealing to lawmakers for three reasons (Ben-Shahar and Schneider, 2011). First, it does not require any expenditure for governments to mandate a disclosure and is thus considered cheap. The costs are imposed on disclosers who mainly hold information. Second, it looks easy to

mandate disclosure because the mandate is required for more communication between parties communicating anyway. This reasoning is valid for this thesis, where voluntarily disclosed information is now mandated. Third, mandated disclosure seems effective in that the disclosure of more information is relevant to the decision-maker. The three main players in the success of a mandated disclosure and their expectations are summarized in figure 1.

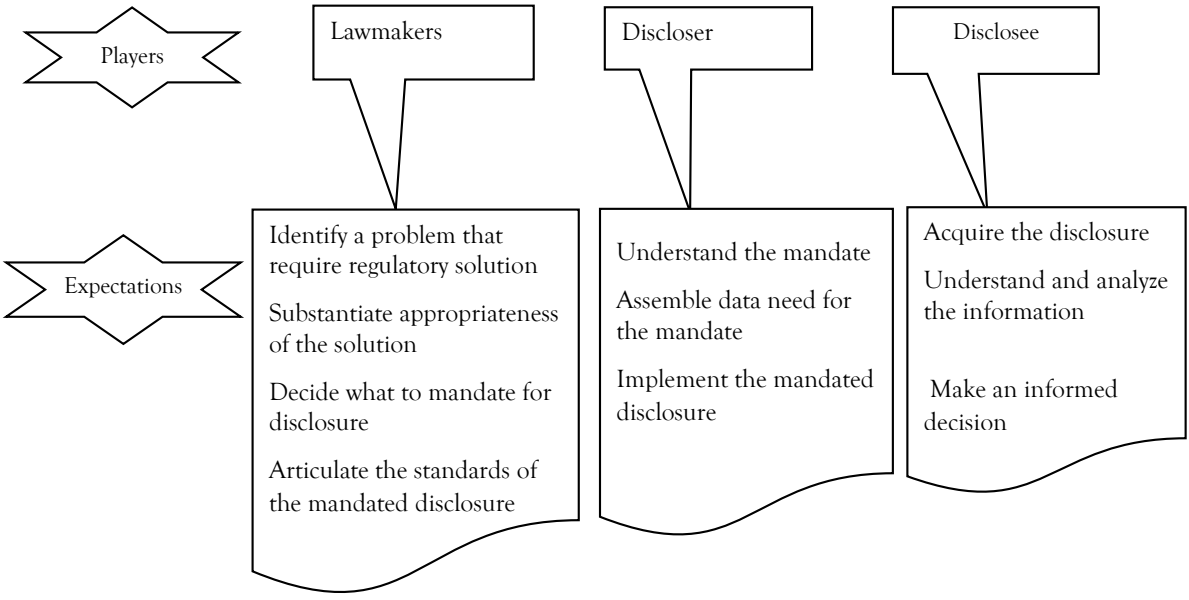

Fig 1: Key players and expectations (Source Ben-shahar and Schneider, 2011)

The general problems of mandatory disclosures could be worse when it comes to targeted transparency-based regulations (Fung et al., 2007); an example is the EU directive on non-financial disclosure. Ben-shahar and Schneider (2011) identified two possible problems associated with mandatory disclosure: the overload effect and accumulation problems. The overload effect is associated with the complexity of mandated disclosures, which may create difficulty for the discloser to handle. The accumulation effect is associated with the number of mandated disclosures that

create difficulty for disclosees to manage all. The role of market-based solutions, particularly third-party rating agencies, is therefore important in helping users reduce the burden by providing summarized information such as grades or scores, which could help them save time and cost.

A regulatory approach to disclosure may also have unintended consequences (Ben-shahar and Schneider, 2011; Edmans, 2021). Ben-shahar and Schneider (2011) identified crowding-out and anti-competitiveness as possible unintended consequences. First, mandatory disclosure has the potential to crowd out useful information by diverting the attention of disclosees to receiving only what is disclosed. The introduction of mandatory disclosure may limit users from acquiring information other than that disclosed. The crowding-out of useful information can also be linked to the concept of complying with the minimum requirement of mandatory disclosure. Second, due to the fixed nature of the costs of complying with mandated disclosure, smaller firms may be more disadvantaged than large firms and could thus be a source of anti-competitiveness. In fact, the EU directive on non-financial disclosure has boldly recognized this potential problem as a cost burden to small firms; therefore, disclosure is mandated only for large undertakings. As broadly discussed in the book by Edmans (2021) titled "Grow the Pie," regulation with the intent of altering or moderating behavior is one possible way in which policymakers can contribute. This does not mean that more disclosures are always better, as there are problems associated with mandating disclosure, including the problems of one-size-fit-all, complying with the minimum, and giving attention to specific metrics while underweighting other dimensions (Edmans, 2021). Moreover, the fact that previously voluntarily disclosed information is mandated by regulators could also send a message that the required disclosure is costly, and thus, there is a need for regulators to force disclosure. This could lead firms complying with the minimum level (Edmans, 2021). Although in a somewhat different setting, an empirical study by Bansal et al. (2021) on India's mandated 2% CSR expenditure act demonstrated

a similar crowding-out effect. The study concludes that intrinsic motivations for CSR are crowded out by extrinsic effects as a result of the new regulations.

3.2. Disclosure and its role in capital market

For a capital market to function efficiently, corporate disclosure plays a pivotal role (Healy and Palepu, 2001). Primarily, corporate disclosure plays its role by solving two problems: the information and the agency problems. An information problem arises when there is a difference in information possessions between disclosing agents and outside users of information, specifically when the disclosing agent has superior information than the outsiders. This problem is a widely known concept in economics and finance, as information asymmetry leads to problems related to adverse selection (Akerlof, 1970). Relating these concepts to the focus of this thesis, which is the disclosure of non-financial information, there are two levels associated with the adverse selection problem. While the first level is between no disclosure and voluntary disclosure, the second level is between credible and non-credible disclosures, that is, those disclosures with an attempt at greenwashing.

In a situation where agents are not disclosing any non-financial information, the stakeholders are left with a lack of any information and thus no mechanism to differentiate between good-and bad-performing firms. In the absence of any non-financial disclosure, the stakeholder's tendency to treat all non-disclosing agents similarly is higher. Thus, to avoid pooling, agents with better non-financial performance began to voluntarily signal to stakeholders. Using political spending disclosure as a setting, the recent study by Goh et al. (2020) indicates that firms that are committed to value enhancing political activities use voluntary disclosure to signal their type and to differentiate from firms that engage in opportunistic political spending. Such voluntary disclosures of non-financial performance have dramatically increased over the last few decades. However, concerns remain regarding the voluntary disclosure of non-financial information. It is characterized

by concerns regarding credibility and selective disclosure. Therefore, the issue of information asymmetry remains unresolved. To overcome this problem, an alternative market mechanism is to seek an independent third-party agency to certify the credibility of voluntarily disclosed information. By introducing assurance to the voluntary disclosure regime, it is possible to create a relatively better information environment. Thus, the provision of credible non-financial information could help solve problems of adverse selection and contribute to the functioning of efficient markets.

The second critical problem in capital markets, where disclosure has the potential to solve, at least partially, is the issue of the agency problem, commonly referred to as the moral hazard problem (Jensen and Meckling, 1976). The moral hazard problem comes from the separation of ownership and management, where conflicts of interest exist between agents and principals. While managers tend to maximize their own self-interest, shareholders invest in a company with the objective of maximizing their profits. The existence of such conflicting interests requires the search for alternative mechanisms to align the differing interests. The disclosure of private information, in addition to contracting, corporate governance, and the use of other information intermediaries (Healy and Palepu, 2001) is at the heart of the solutions applied in the capital market. Relating this problem to the objective of this thesis, an integral part of the non-financial information disclosure is information related to corporate governance. Thus, the provision of such non-financial information to the public, either voluntary or mandatory, could substantially improve transparency and the information environment, in turn reducing agency problems.

Taken together, both theoretical (e.g., Diamond and Verrecchia, 1991; Easley and O'Hara, 2004) and empirical evidence (He et al., 2013; Goh et al., 2020) on disclosure show a positive association between disclosure of private information and reduction in cost of capital due to reduced information asymmetry. Specific to non-financial

information, Dhaliwal et al. (2011) show that higher disclosure is associated with a reduced cost of equity capital.

3.3. Economic effects of ESG

The last 25 years have witnessed an enormous increase worldwide in measuring and reporting information related to ESG (Amel-Zadeh and Serafeim, 2018). For example, Amel-Zadeh and Serafeim (2018) show that the number of firms disclosing such information increased from only 20 companies in 1990 to over 9,000 in 2016. Similarly, the proportion of S&P 500 companies that disclose ESG information increased from 20% in 2011 to 86% in 2018. [21] Starting in 2005 with less than 100 signatories, the Principle for Responsible Investment (PRI) has close to 4,000 signatories with $121.3 trillion in assets under management committed to integrating ESG into investment decisions.[22] This increasing trend in disclosure and interest in the integration of ESG could be due to a diverse motive ranging from legitimizing, ethical, and responsible motives to considering ESG as investment value relevance.

ESGs have become a fundamental element of the inputs used for investment decisions among different funds. A recent research finding indicates that not only socially responsible funds but also conventional asset funds began to consider ESG performance dimensions in making investment decisions (Van Duuren et al., 2016). As evidenced by around 43% of the global institutional assets under management, Amel-Zadeh and Serafeim (2018) indicated why ESG information is becoming important. Thus, the major reason is that ESG is financially material for investment performance, and it is further relevant for assessing risks associated with reputation, legal, or regulatory. Dhaliwal et al. (2012) indicate that large firms with higher environmental disclosures are further evidenced by an increase in analysts' forecast accuracy. Ioannou and Serafeim (2010) show how analysts consider environmental

[21] https://www.sustainability.com/globalassets/sustainability.com/thinking/pdfs/sustainability-ratetheraters2020-report.pdf
[22] https://www.unpri.org/pri/about-the-pri

performance in research. Furthermore, Dhaliwal et al. (2012) indicate that firms with higher environmental disclosure have a lower cost of capital. The study also shows that investors react differently to bad and good ESG disclosure. Crifo et al. (2015) indicate that investors react more to bad ESG disclosures than to good ones. Another stream of research on the value relevance of ESG focuses on the economic consequences of ESG performance. Some studies indicate the value relevance of higher ESG performance in terms of lower cost of finance (El Ghoul et al., 2011; Ng and Razaee, 2015).

ESG disclosures have the potential to create a positive feedback loop. By increasing the transparency of ESG issues around the firm, ESG disclosure further increases the incentives of the manager to improve internal control mechanisms to comply with regulations and serve the firm's stakeholders' interests (Cheng et al., 2014). This could even be more when the independent rating agencies are providing ESG-related performance scores. Chatterji and Toffel (2010) show that the ratings given by independent third-party agencies have the potential to influence rated firms, in addition to customers and investors. Their study showed that firms with poor ratings are found to substantially improve subsequently compared to newly rated and previously highly rated firms. Similarly, using the recently introduced and published Morningstar sustainability ratings, studies have shown the effect of sustainability ratings in terms of changing capital flow from low-performing to high-performing mutual funds. To illustrate, Ammann et al. (2019) indicate that retail investors' interest in investment decisions flows disproportionally from low-rated mutual funds to high-rated mutual funds. Economically, on average, the retail funds rated as the top 10% according to the Morningstar sustainability rating published for the first time in 2016 receive net flows ranging from $4.1 to $10 million higher than the average retail funds. In contrast, low-rated retail funds are associated with $1 million to $5 million lower net flows than average retail funds.

Hartzmark and Sussman (2019) use Morningstar sustainability ratings to show the extent to which investors' value sustainability. Thus, using evidence from the U.S. mutual fund market, a high sustainability rate leads to a net inflow of more than $24 billion, whereas a low sustainability rate leads to a net outflow of more than $12 billion. However, Lins et al. (2017) examine whether social capital has value relevance during a financial crisis. Thus, using CSR intensity as a measure of social capital, firms with higher social capital were found to have four to seven points higher stock returns than firms with lower social capital during the 2008/09 financial crisis. Furthermore, the study showed that firms with higher CSR had higher profitability, growth, and sales per employee than firms with lower CSR did. However, event studies indicate no difference in performance between high-and low-rated corporate social performance. For instance, using UK firms, Humphrey et al. (2012) indicate a non-significant difference between portfolios of high and low corporate social performance firms in terms of their risk-adjusted performance. Furthermore, country factors also explain the differences in corporate social performance. Using sample firms from 36 countries, Cai et al. (2016) reveal a significant difference in the corporate social performance of firms explained by differences in countries. Hence, they conclude that country characteristics are much more important than firm characteristics in explaining the differences in corporate social performances.

4. Theories applied

To understand and explain the empirical evidence, this thesis applies several theories. From examining the market reaction in essay one to examining the roles of ESG and third party assurance in essays two and three, this thesis applies a set of alternative concepts and theoretical frameworks to help understand the phenomena. A summary of why these theories are selected is presented in this section.

4.1. Efficient market hypothesis

The first essay, which examines the market reaction to adopting the EU directive on mandatory non-financial disclosure is based on an event study methodology. The study applies the efficient market hypothesis to explain and understand the phenomena. Efficient market theory assumes that a security price at any time fully reflects all available information (Fama, 1970; Malkiel, 2003). The effect of new information, such as the EU directive, is assumed to be reflected in the stock prices of firms affected by or surrounding the event dates. The use of financial market data to examine the effects of events on firm value is widely applied in financial economics (MacKinlay 1997). Depending on the form of information to which the security price adjustment considers, the efficiency of the markets can be categorized as weak, semi-strong, and strong. While under weak-form, security prices adjust for past price information, the semi-strong form is when security prices adjust to all available public information announcements. The strong form occurs when there is monopolistic access to information, which is relevant for security prices.

4.2. Signaling theory

Signaling theory is among the repetitively applied theories to explain why firms incur the costs of voluntary disclosure and voluntary assurance. Firms with higher ESG performance have an incentive to voluntarily disclose their ESG reports to signal their superior performance. However, firms with poor performance can also use voluntary disclosure for legitimacy and/or greenwashing purposes. This may create difficulties for users of information in differentiating between good and bad performing firms. Hence, both types of firms can be pooled together. Firms with higher ESG performance can use third-party ESG assurance as a costly signal to credibly reveal and differentiate their performance from counterparts with inferior performance. This role of voluntary assurance was theoretically modeled by Bagnoli and Watts (2017).

This thesis applies signaling theory to examine the role of third-party ESG assurance. The potential existence of information asymmetry between the disclosing agent and the users of the reports is recognized. Issues of greenwashing and selective reporting are largely raised with regard to ESG reports. Accordingly, acknowledging the seminal works on information asymmetry by Akerlof, Spence, and Stiglitz, the role of third-party ESG assurance in credibly revealing and differentiating ESG performance is examined. In line with signaling theory, voluntary assurance of ESG aims to signal the credibility of superior performance by incurring an assurance cost. Accordingly, the assurance of EGS reports can serve as an instrument to separate the performance of reporting agents. Theoretically, Bagnoli and Watts (2017) show that firms with higher ESG performance have an incentive to use ESG assurance as a costly signal to credibly differentiate their performance from their counterparts with inferior ESG performance.

4.3. Monitoring theory

Agency theory is among the most widely referenced financial theories. This theory explains the potential problems that occur following separation of ownership and management (Jensen and Meckling, 1976). Knowing potential agency problems, outsiders are forced to design a mechanism to monitor how managers make operations and investment decisions. An integral part of this mechanism is the disclosure of information. Because there is a possibility of reporting distorted information, further effort is required to use an external independent third party to verify the accuracy of the information. In addition to verifying the accuracy and credibility of the reported information, the assurance process is also expected to play a role in improving the quality of information. Firms with higher governance and monitoring mechanisms are associated with lower overinvestment in ESG activities (Jo & Harjoto, 2012). As investments associated with ESG activities are subject to potential managerial entrenchment, firms need an effective monitoring mechanism to prevent this (Jo and Harjoto, 2012). The literature treats managerial entrenchment associated with ESG investments as value-destroying and a source of agency problems.

External assurance, as an element of monitoring mechanisms, is expected to play its role in improving the quality of information for efficient investment decisions. If not monitored, managers are more inclined to maximize their own interests at the expense of shareholders. Empirical evidence has proven that high-quality financial reporting leads to more efficient investments (Jung et al., 2014). This is because of the potential to empower outsiders with the information needed for monitoring and the reduced information asymmetry between managers and outsiders. High-quality reporting facilitates efficient contracting and monitoring mechanisms that can mitigate the moral hazard problem (Jung et al., 2014). This thesis argues that independent third-party ESG assurance has a potential monitoring role in influencing ESG performance.

4.4. Risk mitigation versus over-investment view

The two competing theories regarding investment in ESG factors are the risk mitigation and over-investment theories. The risk mitigation theory of investment in ESG assumes that firms that invest in ESG have a higher potential for managing ESG-related risks and, thus, a better risk profile. This theory assumes that investment in ESG activities can serve as an insurance insurance-like protection against risk (Attig et al., 2013). ESG-linked risks include legal, regulatory, and reputational ones. Unmanaged ESG risks can lead to volatility in cash flows and higher default risk (Bauer and Hann, 2010). Hence, risk mitigation theory predicts that ESG performance is negatively associated with credit risk. In contrast, over-investment theory assumes that investment in ESG is a result of conflicts of interest between management and shareholders. Investment in ESG is considered as a waste of scarce resources (Goss and Roberts, 2011). A higher waste of resources in the form of ESG investment may lead to lower cash flow and lower repayment capabilities (Barnea and Rubin, 2010; Goss and Roberts, 2011). Thus, following this theory, we expect a positive association between ESG performance and firm credit risk.

5. Data and research design

To empirically examine and answer the research questions proposed in each essay, this thesis applied three different research designs and utilized extensive data from alternative providers. Considering the differences in motivations and assumptions of each research design applied in this thesis, a more detailed and clearer discussion on the suitability of each research question is presented. Moreover, the type and source of the data used with a detailed motivation for choice are presented in this section.

5.1. Data and sources

5.1.1. ESG score

Data on ESG and some firm-level controls are collected from Refinitiv (Thomson Reuters). Refinitiv has good coverage of ESG factors and the scores are based on 450+ standardized data points. Currently, Refinitiv's ESG coverage has increased to approximately 9,000 firms, globally.[23] The database is rich and convenient for obtaining either a combined ESG score or specific scores on the environmental, social, and governance pillars. The ESG scores are made up of 10 themes with their own weights in the overall scores, as shown in Table 1. The environmental pillar comprises three categories: resource use, emission, and innovation. The social pillar comprises scores regarding the workforce, human rights, community, and product responsibility. The governance pillar includes scores from management, shareholders, and CSR strategy. ESG performance measures are provided as ESG scores (0–100) and ESG ratings (A–D). The database is updated continuously, and the data are refreshed every week. The updates included recalculations, addition of new companies to the database, updates of the latest fiscal years, and inclusion of new controversial events.[24]

[23] https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf

[24] https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf

Table 1: ESG categories, indicators and definitions

Pillars	Categories	Definition	Indicators	Weight (%)
Environmental	Resource use	Reflects a company's performance and capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management	19	11
	Emission	Measures a company's commitment and effectiveness towards reducing environmental emissions in its production and operational processes	22	12
	Innovation	Reflects a company's capacity to reduce the environmental costs and burdens for its customers, thereby creating new market opportunities through new environmental technologies and processes, or eco-designed products	20	11
Social	Workforce	Measures a company's effectiveness in terms of providing job satisfaction, a healthy and safe workplace, maintaining diversity and equal opportunities and development opportunities for its workforce.	29	16
	Human rights	Measures a company's effectiveness in terms of respecting fundamental human rights conventions.	8	4.5
	Community	Measures the company's commitment to being a good citizen, protecting public health and respecting business ethics	14	8
	Product responsibility	Reflects a company's capacity to produce quality goods and services, integrating the customer's health and safety, integrity and data privacy	12	7
Governance	Management	Measures a company's commitment and effectiveness towards following best practice corporate governance principles.	34	19
	Shareholders	Measures a company's effectiveness towards equal treatment of shareholders and the use of anti-takeover devices.	12	7
	CSR strategy	Reflects a company's practices to communicate that it integrates economic (financial), social and environmental dimensions into its day-to-day decision-making processes	8	4.5
Total			178	100

Source: Thomson Reuters (Refinitiv) 2021[25]

[25] https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf

Among the many alternative sources of ESG data, the most widely used are Morgan Stanley Capital International (MSCI) and Bloomberg. MSCI, formerly known for financial data, has entered into the ESG research and data provision since 2010 after acquiring RiskMetrics Group and MeasureRisk. RiskMetrics had previously acquired the Kinder Lydenberg Domini (KLD) Research & Analytics and Innovest Strategic Value Advisors. These two data providers are now referred to as MSCI ESG Research. Similar to Sustainalytics, ESG scores from the MSCI are timestamped (Christensen et al., 2022). Bloomberg started providing ESG disclosure scores globally in 2006. Currently, more than 11,500 companies from 80 countries are covered by Bloomberg[26]. The ESG score from Bloomberg is the score for disclosure quality. This makes the scores different from those of alternative ESG data providers.

There are two reasons why the thesis obtains ESG scores from Refinitiv. The first reason relates to access to the University of Gothenburg. The university has access to only Refinitiv and Bloomberg ESG data. This thesis requires ESG scores to measure performance but not disclosure. This is the second reason why the thesis uses Refinitiv as a source of ESG score data. Though the measures of ESG scores from Bloomberg are different than from Refinitiv, we also have compared the scores from both providers using sub-samples and we get similar scores.

5.1.2. ESG assurance data

Information regarding assurance of ESG reports are collected from Global Reporting Initiative (hereafter as GRI). GRI is rich in assurance-related data, where the details of the assurance status and provider of the assurance with the level and scope of assurance are documented. Assurance-related data used in essays two and three are collected from GRI. What makes GRI special regarding data on third-party assurance of ESG reports is the availability of detailed information, including the

[26] https://www.bloomberg.com/professional/dataset/global-environmental-social-governance-data/

level, the scope of assurance, and type of assurance provider. An attempt to obtain alternative databases that can provide information regarding assurance was made to minimize the potential selection problem. However, there is no data source that provides detailed information on assurance, at least at the time the studies were conducted.

5.1.3. EU directive and related data

Information concerning the directive on disclosure of non-financial information and the related information on the process of adopting mandatory disclosure are mainly obtained from the EU website, EUR-Lex. EUR-Lex contains a detailed and procedural set of laws, directives, and legislation. It is the official website of the EU and contains laws and other public documents. A set of extensive directive and legislation-related information used in this thesis was collected and referred to directly from the EUR-Lex. Additional information, including the filed documents on different impact assessments, documents related to public consultations, previously adopted disclosure and corporate governance directives, and legislation, are referred from EUR-Lex. Finally, the most recently published survey on implementing the directive on non-financial disclosure is also referred to in the EUR-Lex.

5.2. Research designs

5.2.1. Event study

The first essay applies an event study methodology to examine how the equity market reacts to mandatory EU non-financial disclosure. An event study is a way to examine the behavior of stock price movements surrounding an event. This method is applied to examine economics, corporate finance, accounting, and law-related topics (Kothari and Warner, 2007). One way to examine how investors value a new regulation is to study how the stock market reacts to new information. The effect of new information, such as the EU directive, is assumed to be reflected in the stock prices of firms affected by or surrounding the event dates. Thus, in examining the market reaction to the EU directive on non-financial disclosure, this thesis applies three-day cumulative abnormal return estimated using a single market model. Two-day cumulative abnormal returns are also used for the robustness tests. The basic assumption of event study rests on the efficient market hypothesis, which assumes that stock market prices quickly adjust to new information in the market.

5.2.2. Regression discontinuity design

To examine the market reaction to the EU directive on the disclosure of non-financial information, a regression discontinuity design (RDD) is employed. RDD is defined by Hahn et al. (2001) as "a quasi-experimental data design with the defining characteristic that the probability of receiving treatment changes discontinuously as a function of one or more underlying variables" (p.1). RDD is considered one of the most credible non-experimental strategies used to analyze the causal effects of treatments/interventions on the outcomes of interest. There are three basic components of RDD: treatment, cut-off, and running variable (score). To apply the RDD strategy, a known rule must be used to assign the treatment/intervention, which is beyond the capacity of the participants to manipulate, and all participants should receive a score value. Hence, participants with score values above the cutoff

received the treatment, and those with score values below the cutoff did not receive the treatment (or vice versa). Accordingly, the RDD tries to exploit the cutoff-based intervention to estimate causal effects on outcomes of interest by looking at the cutoff neighboring participants with score values that are barely below and barely above the cutoff point. Although Thistlethwait and Campbell first used this research design in 1960, it has gained popularity in various empirical studies over the past few decades.

The main feature of the RD design is the variation in treatment assignment conditional on a running variable, in which the probability of receiving the treatment jumps discontinuously at the given cutoff (Calonico et al., 2014). This makes the design to be considered as if a random assignment of treatments and is considered as a quasi-experimental approach. Basically, there are two types of regression discontinuity design: sharp and fuzzy. The main difference between these two types is the probability of assignment at the cutoff point and treatment compliance status of the groups. Under a sharp regression discontinuity, the probability of assignment to treatment jumps from 0 to 1, and the probability of the assignment under the fuzzy regression discontinuity design does not need to change from 0 to 1 at the cutoff point (Imbens and Lemieux, 2008).

The basic requirement for applying the sharp RDD is that all those above the cutoff point must perfectly comply with the treatment (Cattaneo et al., 2019). Conversely, fuzzy RDD allows for a smaller jump in the probability of assigning to the treatment. The reason for such small jumps is that there are non-compliers in the treatment. There could also be a possibility of assignment to treatment with a probability of assignment of less than one in fuzzy RDD (Roberts and Whited, 2013). Thus, in fuzzy RDD, there is a possibility of compliance with less than one probability of assignment to treatment, and there is also noncompliance, while the assignment probability is equal to 1. Such compliance status, termed imperfect compliance/non-compliance, makes the regression discontinuity design fuzzy (Cattaneo et al., 2019).

Band width selection and the choice of kernel and polynomial functions are two basic elements of RDD. Choosing a set of windows, technically termed bandwidth selection, is a trade-off between two properties: bias and variance (Cattaneo et al., 2019). The wider the bandwidth, the larger the number of observations with lower variance but higher bias. Alternatively, a narrow bandwidth is associated with a lower bias and higher variance because the number of observations will be smaller. There are a set of alternative practical approaches to bandwidth choice, including the manual choice of windows, which is subjective. Recently, however, an optimal data-driven approach to bandwidth selection proposed by Calonico et al. (2014) has been popularly applied, and the current thesis has applied this approach accordingly.

The second element of regression discontinuity design is related to the choice of kernel functions and polynomial orders. The kernel function indicates how the observations with the selected bandwidth will be non-negatively assigned weight based on the distance between the observation score and cutoff point (Cattaneo et al., 2019). Accordingly, three alternative methods are available for assigning weights. One way is to assign equal weight to those within the window and zero to observations outside the window, which is technically called a uniform kernel function. Alternatively, weights can also be given in a symmetrically and linearly declining way from the maximum weight at the cutoff, which is called the triangular kernel function. Finally, the Epanechnikov kernel function assigns weights in a quadratic decaying weight to observations within the window and zero weight to the rest (Cattaneo et al., 2019). Although the weighting functions seem to vary, the estimation results are not as sensitive to kernel functions (Cattaneo et al., 2019) and the good thing with the regression discontinuity approach is to check for robustness of the results to a set of choices. The current thesis tries the set of alternative kernel functions.

Following the selection of the bandwidth and kernel functions, the next step is to choose polynomial orders. For a given bandwidth, increasing the polynomial order

improves accuracy; however, at the cost of higher variability, a higher polynomial order tends to produce overfitting of the data and leads to unreliable results (Cattaneo et al., 2019). Thus, the most commonly used method is to apply a local linear approach. Here again, the fact that there are alternative polynomial orders provides the chance to check the robustness of the results using different polynomial orders.

Four basic assumptions of RDD should be met before applying the analysis (Smith et al., 2017; Cattaneo et al., 2019). First, there must be a discontinuity in the probability of exposure at the cutoff. The treatment probability should change from zero to one at the cutoff as a function of the forcing variable. Second, the value of the forcing variable is not manipulated. A formal test of McCrary (2008) no threshold manipulation hypothesis can be used in addition to showing graphically the density of the distribution. Third, the exposure groups are exchangeable around the cutoff. Observations close to the cut-off point are comparable (exchangeable) in terms of other characteristics, except that they are exposed to treatment differently. Fourth, the outcome probability is continuous at the cutoff in the absence of intervention. Since the basic concept in using the RDD is to evaluate the effect of the treatment at the cutoff on the outcome variable, we need to ensure that there is no discontinuity in the outcome variable for any value of the forcing variable other than at the cutoff.

5.2.3. Mediation analysis

Mediation analysis is used for the third essay of this thesis. Mediation analysis is a good fit when there is a theoretical explanation for claiming a causal inference, where one variable first transfers its effect for a mediating variable, which in turn transfers the influence to the dependent variable. Mediation analysis is commonly linked to the most widely referred causal step approach proposed by Baron and Kenny (1986). According to this approach, three conditions must be met to apply the mediation analysis. The first condition is the overall relationship between the mediated and dependent variables. Second, there must also be an association between the mediator and the dependent variable. Finally, there is an indirect association between the mediated variable on the dependent variable and the mediator variable. However, this approach has received criticism in recent developments in mediation analysis (MacKinnon & Fairchild, 2009).

According to MacKinnon and Fairchild (2009), the causal step approach for testing mediation is limited in some aspects. To begin with, simulated evidence has proven that the ability to detect mediated effects using this approach can be very low unless a significantly higher number of subjects are used. Additionally, the requirement that an overall relation between mediated and dependent variables is restrictive, as the reason behind mediation is to look at the indirect effect, not the direct association. Mediation can exist without a significant association between the mediated and dependent variables (MacKinnon and Fairchild, 2009). Following recent developments in the research approach, this thesis attempts to approach the third essay using a mediation analysis. Since the dependent variable (credit risk) is an ordinal scale and the mediated variable (assurance status) is dichotomous, the study applies a method commonly termed as Karlson, Holm, and Breen (KHB) method. KHB is a method of decomposing the total effect of a mediated variable on the dependent variable into direct and indirect effects through a mediator variable (Kohler et al., 2011; Breen et al., 2013).

5.2.4. Endogeneity concerns and remedy

In essays two and three, the main variable of interest is a voluntary decision, which is subject to an endogeneity problem due to self-selection bias. Since the decision to assure is non-randomly decided due to its voluntary nature, estimating a regression without addressing potential self-selection bias could lead to inconsistent estimates. Hence, acknowledging this potential problem, a set of remedies are applied. The first and most widely used method is the Heckman 2-stage approach, where a probit model is first estimated to predict the probability of seeking assurance. To predict the probit model, the existence of a CSR committee as an identifying variable is used. Similarly, using CSR committee as an instrumental, an instrumental variable approach is applied as a second remedy to address the endogeneity problem due to self-selection bias. The literature argues that the existence of a CSR committee is associated with the potential to seek third-party verification, but its impact on ESG-related performance remains unclear. Furthermore, statistical tests on the validity of CSR committees as instrument show a significant association in the first-stage probit model prediction. Third, to reduce the difference in observable characteristics between firms that assure and those that do not, a propensity score matching approach is applied.

A more detailed discussion of the potential concerns of endogeneity and the source of endogeneity with alternative remedies are included in each essay. Furthermore, a sensitivity and robustness analysis, including in essay one where the potential concern of how the result could be influenced if different windows are used in RDD, is addressed carefully. In essay one, the potential concern is related to window selection, where I have applied recently developed techniques of optimal data-driven window selection in addition to a number of tests under different randomly selected samples.

6. The essays: a brief summary

Essay I: Does the market react to mandating ESG disclosure? A regression discontinuity-based evidence

The purpose of this essay is to examine the stock market's reaction to the EU directive on ESG disclosure. Information voluntarily disclosed previously is now mandated for large undertakings. Large public undertakings with an employee level greater than 500 are required to disclose ESG information mandatorily. With the interest of learning investors' perceptions of mandatory ESG disclosure, this study applies an event study methodology. The stock market reactions surrounding major events that increase the likelihood of adopting the directive are examined. When examining topics like the current one, how the market reacts to an event remains an empirical question. The theories of voluntary and mandatory disclosure and the associated cost-benefit analysis of compliance with mandated disclosure help explain the motivation behind each reaction. After conducting a cost-benefit analysis, firms can use voluntary disclosure to signal to their market. Investors may perceive the introduction of mandated disclosure as a cost burden. Alternatively, under voluntary disclosure, firms may practice selective disclosure where they tend to disclose positive but not negative news, which leads to the problem of suboptimal disclosure level. This problem may motivate for a regulatory interventions to require mandatory disclosure. Hence, investors may benefit from the introduction of mandatory disclosure. The benefits may be in terms of informational, monitoring, and operational efficiencies (Grewal et al., 2019). Borrowing these theoretical frameworks from the literature to study how and why relatively small firms close to an exogenously determined threshold could react, this study approached the topic using a regression discontinuity design.

Using a sample of European firms close to the exogenously determined threshold (i.e., 500 employees), the study finds that firms on both sides of the threshold reacted negatively to the directive. The negative reaction can be interpreted as the directive,

when applied to the relatively small firms surrounding the exogenously determined threshold, is not well received. Investors may perceive the introduction of the directive as costly to comply. The costs of complying with mandated disclosure may include administrative, political, and proprietary costs. A set of alternative tests are used to check if the main findings are consistent. The basic question in regression discontinuity design is how wide or narrow the window should it be to obtain sample firms from above and below a threshold. This provides an opportunity to use different samples to check the sensitivity of the main findings. Thus, the results remain consistent when the study applies alternative samples from different windows. Furthermore, using the propensity score matching approach as a robustness test, the results remain consistent and robust when controlling for differences in observable characteristics.

This study contributes to the literature in two ways. First, documenting a negative market-wide reaction adds new evidence to the vast literature on how markets react to new regulations. Thus, this study adds to similar evidence in the field including but not limited to Armstrong et al. (2010), Li et al. (2008), and Larcker et al. (2011). Furthermore, this study also contributes to literature on the use of stock prices to examine effects of new regulation (Binder, 1985). Specific to ESG, this study contributes to a field that examines the regulatory approaches to mandating ESG disclosure (Grewal et al., 2019) and CSR spending (Manchiraju and Rajgopal, 2017). Second, by showing why relatively small firms close to the exogenously determined threshold could react similarly, this study contributes to the literature on size-based regulations.

Essay II: The signaling role of voluntary ESG assurance

This essay examines the role of independent third-party ESG assurances. Using signaling theory, this study explains the role of voluntary third-party ESG assurance. According to signaling theory, firms choose voluntary disclosure to signal their superior performance to the market in order to reduce information asymmetry and, subsequently, lower costs of capital. However, such signaling benefits depend on the verifiability and reliability of the information included in the reports. Considering the much-discussed concerns of greenwashing associated with ESG disclosure, the tendency to pool all disclosures irrespective of their reported performance is more likely under a voluntary disclosure regime.

The tendency to pool both bad and good performing firms due to the absence of verification leaves room for good performing firms to seek costly voluntary ESG assurance and to verify their superior performance. Accordingly, the main prediction of the model in this study is that firms with higher ESG performance are those that choose to voluntarily pursue third-party ESG assurance. Theoretically, Bagnoli and Watts (2017) proved that firms with higher ESG performance have an incentive to go for third-party assurance to separate themselves from their counterparts with inferior performance in a separation equilibrium.

Thus, using a sample of EU firms, the study shows higher ESG performance for firms with assured ESG reports compared to those that do not assure. This result is in line with what is hypothesized in the study and confirms signaling theory. The results are robust to a set of endogenous controls. The major econometric issue with this topic is the problem of endogeneity. Since the decision to assurance is not a random but a voluntary choice, the research design is subject to an endogeneity problem due to a self-selection bias. Hence, leaving the endogeneity problem uncontrolled would lead to an inefficient and inconsistent coefficient of estimation, and thus, an incorrect sense of implication. To address this concern and test the

robustness of the results, the Heckman 2 stage and propensity score matching approaches were used. Alternatively, the study also used the instrumental variable approach to address endogeneity concerns due to self-selection bias. The results remain consistent and robust after using the Heckman 2 stage, instrumental variable approach, and propensity score matching approach.

This study contributes to at least two broad research areas. First, the findings of this study contribute to the existing literature on the driving forces behind voluntary ESG assurance. These include, but are not limited to, Simnett et al. (2009), Steinmeier and Stich (2019), Braam and Peeters (2018), and Datt et al. (2018). Second, by proving empirically, this study contributes to the literature on signaling theory when specifically applied to non-financial information, which is mostly characterized by a mixture of soft and hard information. The findings of this study contribute to the theoretical model developed by Bagnoli and Watts (2017). Hence, this study contributes empirically to the literature that explains why firms could pursue voluntary assurance in general and voluntary ESG assurance in particular.

Essay III: ESG and the monitoring role of assurance in credit risks

This study examines the monitoring role of independent third-party ESG assurance. The implications of ESG for diverse decisions are attracting the interest of stakeholders, including regulators, academics, investors, and credit-rating agencies. In line with this growing interest, firms are allocating resources to ESG activities to satisfy the demands of both internal and external stakeholders. This essay argues that seeking independent third-party ESG assurance is instrumental in enhancing ESG performance and improving firms' credit risk profile through its monitoring role. Independent third-party assurance can play a monitoring role through three channels. First, assurance services have the potential to improve the quality of the ESG information provided to management. This, in turn, is expected to help in making informed sustainability-related investment decisions that could lead to

efficiency. Second, suggestions and recommendations that are instrumental in improving operating behaviors are expected at the end of the assurance process. Third, the presence of an independent external assurance provider could also play a disciplinary role by creating the fear of discovering inaccuracies, malpractices, and intentional misstatements.

In line with the monitoring theory of assurance and the risk mitigation theory of ESG to credit risks, this essay has two main findings. First, the study shows the significant role of ESG performance in improving credit risk, as measured using credit ratings. Second, this study shows the monitoring role of assurance in enhancing ESG performance and improving credit risks mediated through ESG performance. The findings are robust to a set of alternative tests, including instrumental variable approaches. This essay contributes to the literature in two ways. First, and most importantly, the essay shows evidence of the important but largely uncovered monitoring role of independent third-party ESG assurance. While the monitoring role of high-quality disclosure, particularly financial, to mitigate managers' value-destroying activities is quite well established, the evidence is limited when it comes to non-financial disclosure (Lu et al, 2017). By showing and explaining how third-party ESG assurance can serve its monitoring role in enhancing ESG performance, the findings of this study can be added to similar literature, including Ballou et al. (2018), De Moor and Beelde (2005), and Steinmeier and Stich (2019). Second, using recent data and a relatively broad scope, this study contributes to the literature on the role of ESG in credit ratings. Empirically, this study contributes to the literature on the risk mitigation roles of ESG, including but not limited to Attig et al. (2013), Oikonomou et al. (2014), and Jirapon et al. (2014).

7. Conclusion and implications

This thesis examines how the capital market perceives mandated ESG disclosure, the roles of voluntary ESG assurance, and the role of ESG performance in credit risks. Based on the findings from each essay, this thesis makes the following conclusions and implications. First, referring to the negative market reaction shown in essay one, this thesis concludes that the EU directive on ESG disclosure is not well received, indicating that small firm investors perceive the directive as costly to comply with. Since this study uses firms just above and just below the directive's threshold, the cost of the directive is more feasible in those firms than in larger firms. Second, this thesis concludes that third-party ESG assurance plays a role in serving as a signaling mechanism. Considering both the direct and indirect costs associated with assuring their reports, good performing firms have an incentive to use ESG assurance to separate themselves from poorly performing firms in a separating equilibrium. The direct costs, including the fees paid for assurance, can be covered by both types of firms (good and bad performing). Indirect costs, associated with the possibility of uncovering irregularities or bad information, are much more likely to follow those with inferior performance. Fear of discovery and lack of economic justification to credibly reveal bad performance could limit firms with an inferior performance from voluntarily assuring their ESG reports. Hence, policymakers can use ESG assurance as a mechanism to differentiate between high and low ESG performance.

Third, this thesis finds that voluntary ESG assurance plays a monitoring role. It is widely recognized that the separation of ownership and management is followed by conflicts of interest and agency problems. A particular interest of this thesis lies in the potential information asymmetry between managers and shareholders/boards regarding investments and operations associated with ESG. Based on the results in essay three, this thesis concludes that third-party ESG assurance can also serve as a disciplinary mechanism. Hence, the self-controlling mechanism role of third-party

ESG is an additional opportunity for policymakers to tap into. Fourth, although empirical evidence on the role of ESG in credit risk has previously remained inconclusive, the thesis uses recent data to confirm the risk mitigation implications of ESG performance on credit ratings. Considering the risks and opportunities associated with ESG factors and the increasing interest of rating agencies towards ESG information, the findings can serve as potential evidence in policy efforts questing the integration of ESG factors in different decisions.

The overall outcomes of this thesis are two-fold. First, equity market investors perceive the EU directive on ESG disclosure as costly and not well-received. Second, independent third-party ESG assurance is instrumental in signaling a higher ESG performance and serves as a disciplinary mechanism. ESG assurance plays a monitoring role in enhancing ESG performance. Enhanced ESG performance, in turn, helps to lower credit risk. The general implication of this thesis can thus be framed in its overall policy contribution in a way that directs the attention of regulatory agencies to tap into the potential signaling and monitoring roles of ESG assurance. The fact that varying regulatory agencies are, at least, starting to discuss the issues of third-party ESG assurance, including the possibility of requiring mandatory assurance (e.g., recent discussions at the EU level), makes the thesis a timely and relevant contribution.

Appendix:

1. ESG rating agencies and ESG indexes

The market for ESG rating showed a significant change over the last two decades and thus indexes based on such ratings is becoming quite common and increasing in number of provisions. A summary of the major ESG rating agencies and their indexes are presented in the following table.

Table 2: ESG rating agencies

ESG ratings (indexes) providers	Description
MSCI (MSCI Global sustainability index)	➢ Companies are rated from AAA-CCC ➢ ESG performance based on 37 Key issues
Thomson Reuters (Thomson Reuters Corporate Responsibility Index)	➢ Companies are given scores from 0 to 100 and a grades ranging from A+ to D - . ➢ Covers 400 different ESG metrics, electing 178 of the most relevant data points
FTSE Russell (FTSE4Good index)	➢ The ESG Ratings are based on over 300 individual indicator assessments that are applied to each company's unique circumstances. ➢ Agreed for strategic partnership with Sustainalytics from December 2018.
RobecoSAM (S&P Dow Jones sustainability index, DJSI)	➢ Companies rated from 0 to 100 ➢ Based on questionnaires ➢ The Corporate Sustainability Assessment of RobecoSAM uses a best-in-class approach, ➢ Companies are selected for inclusion to the DJSI
Sustainalytics	➢ Companies rated based on scale from 0 to 100 ➢ Calculate ESG risk ratings based on the unmanaged risks of each material ESG issue. ➢ Five risk levels: negligible, low, medium, high and severe. ➢ Looks at industry-specific ESG indicators, covers at least 70 indicators in each industry ➢ They based on a two-dimensional materiality framework where exposure to risk and how well managed are assessed. ➢ Agreed for Strategic partnership with FTSE Russell since December, 2018 ➢ On January 2019, Acquired GES International, Stockholm based leading global provider of engagement, screening and fiduciary voting services to institutional investors.
RepRisk	➢ Companies rated from AAA to D ➢ Based on 28 ESG issues that focus on the Ten Principles of the UN Global Compact

	➢ More than 80,000 media and stakeholders sources are screened ➢ Used an outside-in approach i.e. examine the performance of ESG than looking at the policies in regard to the ESG
Vigeo Eiris	➢ In 2015, the French based Vigeo merged with EIRIS (UK) to form Vigeo Eiris.
Institutional Shareholders Service (ISS)	➢ Acquire Ethix of Sweden in 2015 ➢ ISS QualityScore: 1-10 ➢ Climetrics Score: 1 to 5 ➢ ISS QualityScore: Covers board structure, compensation/remuneration, shareholder rights, and audit & risk oversight ➢ Updated on an ongoing basis ➢ ISS-Ethix: Provides research, screening and analysis on SRI topics.
Bloomberg ESG Data Service	➢ Provides scores from third-party rating agencies ➢ Collects ESG Data for over 9,000 companies ➢ The scores are for ESG disclosure not ESG performance
Corporate Knights Global 100	➢ Publishes an annual index of the Global 100 most sustainable corporations in the world ➢ Score are given out of 100 ➢ Based on 14 key performance indicators
Fitch Crediting Agency	➢ In 2019, the agency established for the first time an ESG relevance score for issues regarding the relevance and materiality of ESG for credit rates. ➢ The first only rating agency to examine and score ESG relevance and materiality for credit rating.

Source: Based on each rating agencies respective websites and Pagano et al. (2018)

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