Université de Genève
Student: Fredrik Lundström
Professor: Giovanna Di Marzo
Supervisor: Alexandre Dupuis

ESG Methodologies, Investing and Trends: A state of the art

Fredrik Lundström

2019-08-26

Abstract:

A detailed description of RobecoSAMs, MSCIs, Thomson Reuters and Inrates ESG information collection, processing and weighting is conducted. Regionality, relative importance of ESG, E, S and G, ESG as a risk measure and risk assessment tool, and how ESG can be used to increase return is discussed in-depth. The collected evidence shows that ESG can provide better risk-adjusted returns and that the journey towards sustainable development is not guaranteed just because the assets under managemend using ESG is increasing.

Keywords:

ESG, ESG-Integration, ESG-CFP, Environment, Social, Governance, Socially Responsible Investing, SRI, Sustainable Investing, Portfolio Management, Asset Management, Wealth Management, Corporate Social Responsibility

Acknowledgement:

I would like to express my deepest gratitude to my supervisor, Alexandre Dupuis, for proofreading the work but more importantly providing me with ideas and perspectives that improved this article substantially.

Fredrik Lundström
Geneva, August 2019

Table of Content

1. Introduction

Sustainability is a modern expression defining if something, such as a household, a company or a nation, is consuming more resources than it is producing. The term is most famously defined in the so-called Brundtland Report (Brundtland, 1987).

> *"Sustainable development is development that meet the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987)*

In finance, the term sustainability is used in the same manner. However, quantifying the level of sustainability is a challenge and the reason behind that is the complexity of such measures and restricted information-availability.

Climate change is already present and occurs at a non-negligible rate. Many impact-projections of climate change on this earth have been made, but few with the financial cost of that impact in mind. One attempt to quantify the costs of climate change is the Stern Review (Stern, 2007), published in 2007. The novelty of this book was its attempt to put a future cost on the ongoing climate change for the globe, resulting in an estimated price tag of 5-20 percent of cumulative GDP in climate-related costs by the year 2100 if the earth's temperature rises with 5 degrees Celsius. Interestingly, the author Nicholas Stern, also projected that if more effort is put in place early on then the cost can be much lower, estimated at one percent of cumulative GDP until then if this action is done before 2050. (Stern, 2007)

The Stern Review gained incredible attention, all over the globe, but many strongly criticized the review as making too many assumptions, pricing social cost too high and for not discounting the cost into the future. Regardless of the critique the message still stands clear – without any action the future holds uncomfortable changes that will affect us all.

1.1 Background

A branch within sustainable finance is the ESG-integration or ESG-investments. ESG stands for Environment, Social and Governance, the three main pillars of sustainability. ESG is an interpretation of the three drivers of sustainability from the Brundtland Report, namely Economic, Social and Envrionmental (Brundtland, 1987). These pillars are commonly and interchangeably called risk-dimensions. The process of ESG-scoring utilizes sub-dimensions within each of the three main risk-dimensions. Investing in accordance to sustainable development is called Socially Responsible Investing (SRI). This type of investing is not novel, the first SRI fund in Europe was Aktie Ansvar Myrberg started during the middle of the 1960s (Chaudhry, Shaikh, Hanif, Lakos-Nujas, Smith, Hlavaty & Kolanovic, 2016). Ethic investing is believed to have been used long before the 1960s. However, the way SRI has changed from then to now is vast. The field is constantly changing as is the societal perception of environment change and sustainability needs. One newer form of SRI is ESG. With the use of ESG, one can assess and integrate non-financial quality factors of assets to better understand the innate risks, to better suit a given risk appetite. The estimated Assets under Management (AUM) using any type of ESG investing by professionals, have increased substantially the in recent years. As of 2016 the global AUM reached 22,890 billion dollars (Oliwer Wyman & AVPN, 2018). The UN initiative Principles for Responsible Investment (PRI), is an organization that helps spread awareness of future problems that will happen if the UN Sustainable Development Goals (SDGs) are not met in time (UNPRI, 2019). The number of signatories for PRI in 2017 increased to more than 1,700 and arecollectively controlling over 68 trillion dollars (Heugh & Fox, 2017). By 2018, the number of signatories had increased to more than 1,900 controlling over 89 trillion dollars (UNEP Finance Initiative & UN Global Compact, 2018). Currently the PRI have 2,540 signatories (UNPRI, 2019).

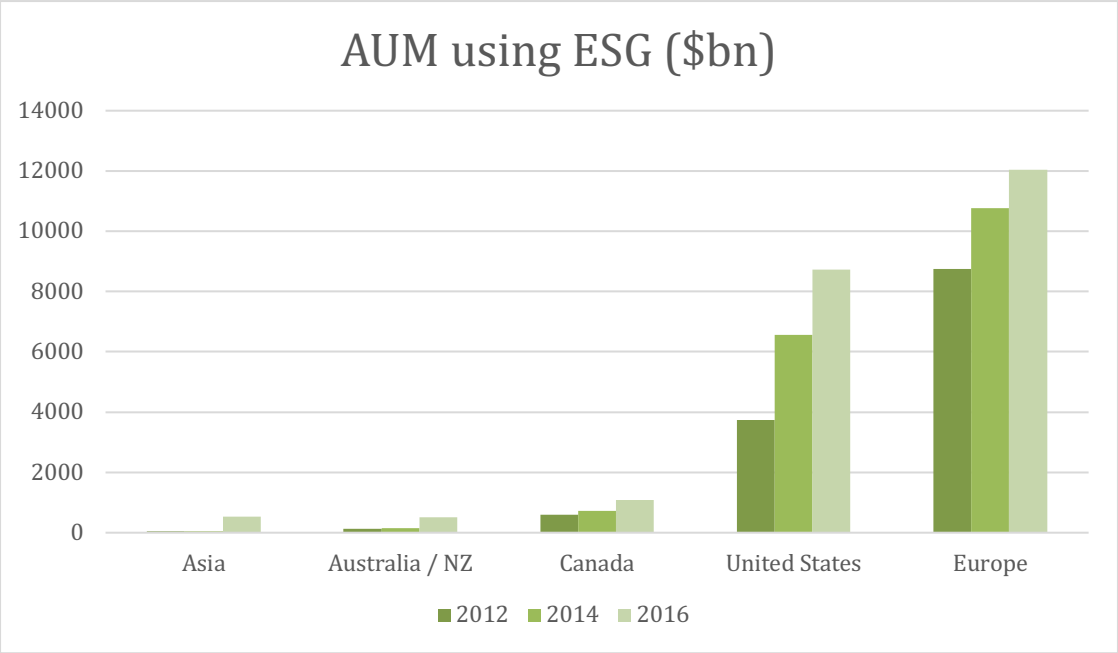

Figure 1: AUM adopting any type of ESG investing or ESG risk management divided into regions, in USD billions, measured every two years from 2012 to 2016. Data collected from Oliver Wyman & AVPN (2018)

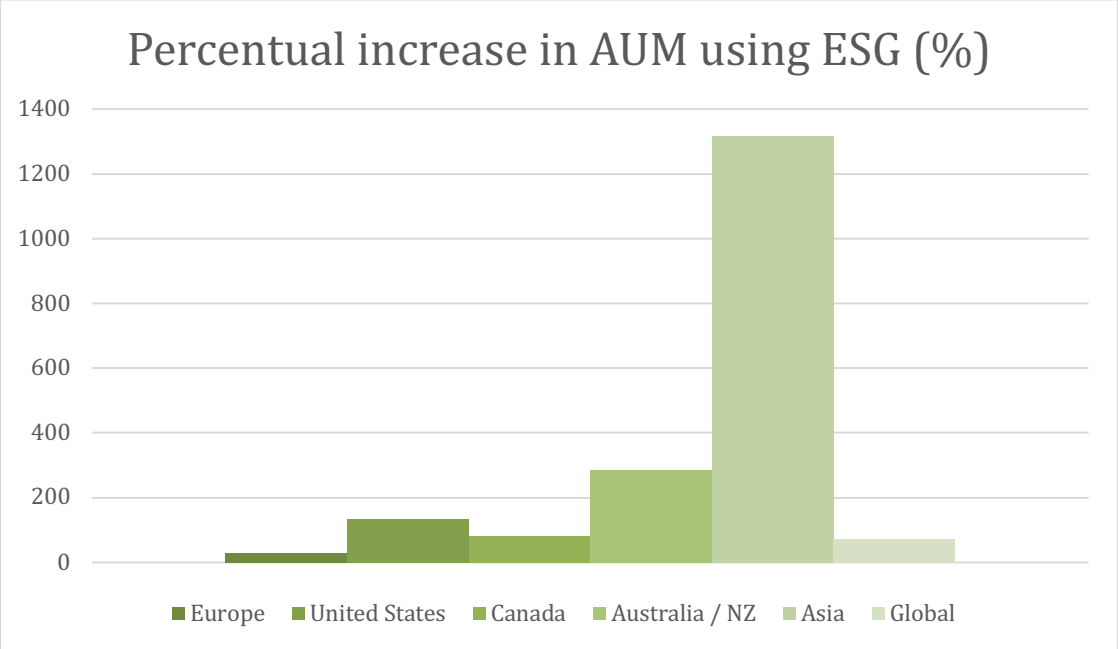

Figure 2: Percentual change in AUM adopting any type of ESG investing or ESG risk management globally and divided into regions, between 2012 and 2016. Data collected from Oliver Wyman & AVPN (2018)

Given the numbers seen in figure 1 and 2, it is easy to see that ESG has gained a lot of attention. However, it is still difficult to find a good roadmap of the available ESG metrics, how they are calculated and how the information is gathered. In this review, these questions are discussed. On top of that explanations whether it can be used to increase returns, better understand or mitigate risk, or simply make one feel better about how one leverages money towards a sustainable future are also made.

In 2015, Friede, Busch & Bassen, wrote an article on ESG investing (Friede, Busch & Bassen, 2015). This major survey divides the field of ESG in a post- and pre- era due to the comprehensiveness of the study. It analyzed and meta-analyzed more than 2,200 articles and provided substantial findings related to ESG and SRI. The main finding is showing that around 90% of the published research before 2015 found positive or neutral impact on Corporate Financial Performance (CFP) using ESG and SRI investing, clearly showcasing the potential financial upside for investors.

So, in order to make the case for ESG, it can not only provide an upside for CFP and increase returns but should provide a reduction of the negative impacts on the environment. However, it is not trivial to measure or estimate the positive impact on the environment. The root purpose of all these efforts in ESG is somehow a causality of the increasing risks of environmental change in the world and would not be as valid if it did not result in any positive change. Sustainability reporting is the action of disclosing what emission-levels of greenhouse-gas, greenhouse-gas-equivalents and toxic waste etc. a company have, among other points. One can make the argument that increased sustainability reporting and publicly available information puts an additional pressure on companies to make a change towards the better. But it does not provide a guarantee.

Fortunately, as described by the Global Reporting Initiatives (GRI), sustainability reporting is promoting companies towards meeting the SDG (Global Reporting Initiative, 2019a). If this is true then the case for ESG from a sustainability and environmental perspective might also be justified, not only the monetary perspective. One question now arises: is there further evidence in the same direction even after 2015?

1.2 Research questions

To increase understanding, and to help investors and researchers navigate and find research topics a few questions have been selected to be answered in this review:

- *What are the ESG metrics used and what asset classes are scored?*
- *How is ESG information gathered, calculated and weighted towards the different risk dimensions?*
- *Does E, S or G display different importance?*
- *How can ESG be used as a risk management tool or portfolio management tool? Does using ESG add alpha?*

1.3 Purpose

The purpose of this review is to provide an overview of an emerging and constantly changing field of finance, to understand the constituents and inner workings of ESG metrics and how they interact. This article also aims at investigating the transparency and openness of this new branch of finance.

1.4 Limitations

The method of data collection can be found described in detail in the appendix. This article is limited to published textual material in the form of articles only. No books were used as an information source, predominantly because of the restriction on state-of-the-art findings and selection of the 5-year window of relevancy. Conference Videos and Webinars were not incorporated in this data collection. This means that unless published by a company or researchers and having a direct connection to ESG it is not within scope for this project. Hence, mentioned available ESG metrics, rating methodologies and score calculations are non-exhaustive as there are many available, and a complex structure of index families, spin-off products and exchanges of information between many actors. Therefore, quality of information available have affected the included ratings.

2. Terminology and concepts

Essential to a good understanding of ESG and its different concepts is a clear view of the terminology used in the field.

2.1 Sustainable & impact investing

Sustainable investing is a wide term used to describe investment-methodologies that incorporate different levels of sustainability, and there are many terms in use that sometimes cause more confusion than clarification. The most common terms are sustainable-, impact-, green-, socially responsible- and low carbon- investing. There are indeed more specific ways of describing the different types of investments that can be done with sustainability in mind. In this article the focus is on ESG and how the further risk-dimensions can be used both for increased portfolio performance and for CFP. This is a type of investing within SRI and the impact investing field that utilizes the three dimensions E, S and G. These dimensions were traditionally seen as non-financial quality data in the investment consideration, meant to limit the investments in securities that have a poor way of managing environmental resources, labor force and regulations. This penalizes securities with bad ESG performance and drives motivation to engage in positive behavior for the environment.

The discussion among practitioners, before 2012, was that financial practitioners had to sacrifice performance to accommodate a wish of investing with sustainability in mind (Nagy, Kassam, & Lee, 2015; Porse, Fredriksson, Grapenfelt, Fält & Svensson, 2017). But as already suggested, this sentiment appears to have changed and become almost required because of public appearance and because of performance alone.

2.2 Principles of Sustainable Investing

The UN-initiative Principles of Sustainable Investing (PRI) is aiming at creating a blueprint for sustainability reporting, directly derived from the SDGs created by some of the world's largest institutional investors and many financial experts. The purpose of

PRI is to have the network of signatories act in favor of the long-term interests of their beneficiaries. With this purpose-formulation, the six main principles were created. (UNPRI, 2019):

1. We will incorporate ESG issues into investment analysis and decision-making processes.
2. We will be active owners and incorporate ESG issues into our ownership policies and practices.
3. We will seek appropriate disclosure on ESG issues by the entities in which we invest.
4. We will promote acceptance and implementation of the Principles within the investment industry.
5. We will work together to enhance our effectiveness in implementing the Principles.
6. We will each report on our activities and progress towards implementing the Principles.

As previously mentioned, the UN Principles of Sustainable Investing have gathered 2,540 signatories. These signatories are collectively controlling more than 89 trillion dollars, that now are already using ESG or working towards adopting it throughout all assets. If a signatory fails to reach the requirements of ESG investing set by the PRI, then it loses its signatory status. (UNPRI, 2019)

There are some opinions on how much of the AUM from the signatories that will actually use systematic ESG integration. The majority will probably use negative screening as their only ESG integration (Kotsantonis, Pinney & Serafeim, 2016). As explained below, in section 3.5.3, there are different definitions used for ESG integration. In the stricter definition, negative screening of the investment universe with ESG scores is not considered systematic ESG integration (Eurosif, 2014, Cappucci, 2018).

2.3 Negative screening

Negative screening using ESG is common in portfolio management and investment strategies, and it is perhaps even the most commonly used ESG strategy (Kotsantonis et

al., 2016; Cappucci, 2018). This type of strategy is sometimes called ESG exclusions because it involves excluding securities that are worst in class or below a certain ESG threshold.

There are many ESG metrics with different scoring methods, some using ranking without any adjustment to industry (Thomson Reuters, 2019; Refinitiv, 2017; Inrate, 2018), and others adjuste scores per industry (MSCI Research, 2018; RobecoSAM, 2019c). With this, many different strategies can be made and with different results. Comparability is therefore widely affected by choice of ESG-metric and by choice of threshold. Evidence for negative screening is therefore inconclusive and shows that this can lead to both less and more efficient portfolios. (Chaudhry et al., 2016; Kotsantonis et al., 2016; Cappucci, 2018)

2.4 Positive screening

Much like the negative screening strategies, positive screening reduces compliant securities by only allowing certain securities out of that investment universe. This is sometimes called best in class because it only allows investments in the highest ESG-rated securities in a given class, region or industry (Porse et al., 2017). As for negative screening, the evidence on performance impact is inconclusive because it lacks comparability. So many different screens can be used in different investment universes with different thresholds of inclusion (Chaudhry et al., 2016). Securities that are included after the ositive screening are sometimes referred to as sustainability leaders. This is the case for the Dow Jones Sustainability Indices (DJSI) World Index, only companies with scores in the top 10% out of all rated companies become part of the index (RobecoSAM 2019c).

2.5 Thematic investing

Thematic investing is a type of investment approach where certain themes of investments are used to control what is invested in and where investments are going. ESG investing can be a type of thematic investing, such as negative and positive ESG

screening or as following other themes important to the stakeholder. Some examples of themes can be Halal, Green Energy, Artificial Intelligence, Luxury Brands or Marijuana Production. Thematic investing is sometimes mistaken for a sustainable way of investing, because it can be used to foster sustainable investing, such as investing in green energy production. This is merely one way of performing thematic investing, but it can be done many other ways.

2.6 Sustainability reporting, Corporate Social Responsibility and Corporate Sustainability Assessment

ESG scoring is made possible through sustainability reporting of their activities and analysis of publicly available information. Sustainability reporting and Corporate Social Responsibility (CSR) allows companies to publish data regarding carefully chosen topics that are designed to reflect companies' standpoints along the subdimensions of environment, social and governance. This is an integral part of the success of an ESG metric.

Reporting CSR and sustainability data allows for straightforward analysis of content and reduces the need for complex algorithms of information retrieval and processing to provide sufficient data. Sustainability reporting is reaching some maturity, since July 2018, GRI Standards have become a global standard format of sustainability reporting (Global Reporting Initiative, 2019b). Because sustainability reporting is not legally enforced worldwide yet, there is still the issue of missing information. How missing sustainability reports are handled when calculating an ESG-score is usually left to one’s imagination. Only Thomson Reuters ESG of the four ESG metrics, described in further detail below in section 3.2.3, disclose how they handle missing values. GRI Standards have been accepted as a CSR reporting standard by the Global Sustainability Standards Board (GSSB) which has the responsibility of setting the first global sustainability reporting standard (Global Reporting Initiative, 2019c). Even though GRI have attained this status, the adoption rate of this standard is unclear.

The EU-directive on Non-Financial Reporting (NFR) is the first step of regulation in the progress of sustainability reporting (Stefano Spinaci, 2019). In Sweden, based on this EU-directive, a legislation on NFR is already in place for large-cap corporations, enforced since 2017 (Westman, 2016).

3. Results

The market for available ESG ratings is already quite large, with many actors in the field. In this review, the methodologies from MSCI, RobecoSAM, S&P, Dow Jones, Thomson Reuters, and Inrate are described in further detail, as they are some of the most well-known ESG providers. The methodology information for these scores are of high quality and easily available online. However, there are plenty more ESG ratings available.

3.1 How ESG information is gathered

As mentioned above, sustainability reporting is an integral part of ESG and somewhat sets the limits to what can be accomplished. However, because sustainability reporting is neither globally mandatory nor legally enforced there is still the issue of missing reports for some companies. Therefore, additional mechanisms are created to progress ESG coverage where data quality is low or missing, among ESG-raters, legislative entities and corporates.

3.1.1 RobecoSAM Corporate Sustainability Assessment, DJSI and S&P ESG

One such format of sustainability reporting CSR is the Corporate Sustainability Assessment (CSA) created and organized by the company RobecoSAM. RobecoSAM was previously named Sustainable Asset Management and is a swiss company established in 1995, acquired by the dutch company Robeco (Robeco 2019a; RobecoSAM, 2019a). RobecoSAM provides data for the Standard & Poor's (S&P) DJSI and also the S&P 500® ESG index family (Robeco 2019b).

The ESG information gathering is done both by RobecoSAM analysts assessing publicly available information and using their CSA questionnaires (RobecoSAM 2016, RobecoSAM, 2019c). The CSA is industry-dependent and consists of 61 questionnaires, due to the high variability of problems facing different industries (RobecoSAM, 2016). The publicly available information is attached in the questionnaire-answers and if not available publicly, then the analyst penalizes the loss of information.

In some cases, companies chose not to answer the CSA (RobecoSAM, 2016). In that case, to ensure market coverage of their ESG scores, RobecoSAM bases their ESG rating completely on the publicly available information. This is mainly the case where the score is of importance to the rating covering a certain region, industry or market capsize.

Within the CSA there is a Media and Stakeholder Analysis (MSA), which is how RobecoSAM incorporates controversies-data into the final score (RobecoSAM, 2016). The inner parts of the MSA are criterion specific and the data for this analysis is news data to react to events negatively reflecting on the ESG risk dimensions. Newsdata is integrated into the MSA and analyzed using risk-products from the company RepRisk.

In their CSA, the Environmental subdimensions are environmental policy & management systems, environmental reporting, biodiversity, business risks and opportunities, climate strategies, electricity generation, operational eco-efficiency, transmission & distribution, and water-related risks (RobecoSAM, 2016).

The sub-dimensions of the Social dimension are addressing cost burden, controversial issues, dilemmas in lending & financing, corporate citizenship & philanthropy, financial inclusion, health outcome distribution, human capital development, labor practices indicators and human rights, social reporting, stakeholder engagement, strategy to improve access to drugs or products and talent attraction & retention (RobecoSAM, 2016).

As for Governance, the subdimensions are anti-crime policy & measures, codes of business conduct, corporate governance, customer relationship management, financial

stability and systemic risk, information security & cybersecurity, innovation management, market opportunities, marketing practices, materiality, product quality & recall management, risk & crisis management, supply chain management and tax strategy (RobecoSAM, 2016).

3.1.2 MSCI ESG, Bloomberg Barclays MSCI ESG

Morgan Stanley Capital International (MSCI) have a globally recognized ESG index family, MSCI ESG, and is also a provider for Bloomberg Barclays MSCI ESG.

The information used for the MSCI ESG index family is gathered from several sources: the immediate annual report of publicly traded companies (10-K), sustainability reports and proxy reports are the company disclosure that is gathered for each company (MSCI Research, 2018). In addition, more than 100 further datasets are collected, ranging from government data, Non-Governmental Organisations (NGOs) and models to provide basis data for the score calculation. On top of that, controversies are monitored daily through more than 1600 media sources such as local, regional and government news.

3.1.3 Refinitiv, Thomson Reuters ESG

Thomson Reuters ESG scores cover more than 7,000 public companies globally and are based on many existing indices including MSCI Emerging Markets, Russel 2000, IPC 35, IPSA 40, MERVAL, COLCAP, Peru General Index, S&P ASX 300 to name a few (Thomson Reuters, 2019). Russel 3000 is currently in the process of being added.

The ESG data collected for each company rating is sourced from annual reports, company websites, NGO websites, stock exchange filings, CSR reports and news sources by content research analysts at Thomson Reuters, standardizing the data format, in line with CSR guidelines (Thomson Reuters, 2019). The model of scoring is fully automated.

3.1.4 Inrate ESG Impact, Corporate and Country

Inrate is a swiss-based company that has delivered sustainability ratings since 1990. Inrate offers ESG-ratings on equities and corporate bonds using a dedicated corporate scoring methodology and another scoring methodology for countries and sovereign bonds.

Inrate's ESG Impact rating for corporations

Dr. Schwegler (2018a) at Inrate claims that many ESG-ratings are based on CSR and that this leads them to miss the point of ESG-investing (Schwegler, 2018a; Reutimann, Wani & Hurst, 2019; Schwegler, 2018b). Which is, examining sustainable development and environment impact – not only quality of reporting. Furthermore, Dr. Schwegler discusses the potential bias created by examining the CSR of companies, when larger companies potentially have more resources to publish high-quality reports on sustainability, without an actual lesser impact. This is the reason why Inrate attempts to measure an actual impact, with their Inrate ESG Impact scores. The Inrate ESG Impact scoring methodology is created directly from the SDGs, to ensure the validity of all parts of the rating. The score is based on information from annual reports, CSR reports, company and subsidiary websites and carbon disclosures.

Inrate's ESG Impact rating for countries

Inrate's country rating methodology is based on publicly available, official and trustworthy sources, originated from UN institutions, Bretton Woods Institutions or NGOs (Reutimann, Wani & Hurst, 2019). There is a risk that climatic, geographical and economic stages of a country might influence the rating of the country. This cannot be completely discounted for since it is a vital driver of the rating. However, the aim is not to rule out countries based on these factors. It is therefore suggested to group similar countries together and compare them intra-group, because inter-group comparability is reasonably low. This rating is completely based on secondary data. Data-quality is varying depending on the current situation of the country rated. Generally, this is not an issue, but it still affects some countries. These differences are especially prevalent between OECD and non-OECD countries, where non-OECD countries on average have lower data-quality.

3.2 ESG metric calculation and weighting

This section aims at investigating the actual formula of calculation, weights used and how controversies are incorporated to the overall score.

3.2.1 RobecoSAM, DJSI World, S&P ESG index family

RobecoSAM in collaboration with S&P Dow Jones publishes the ESG index family DSJI and S&P 500® ESG index family (RobecoSAM 2018; RobecoSAM 2016; Steadman & Perrone, 2019).

The weighting of the E, S and G dimensions is industry dependent. The full list of the 61 industry weights of the first quarter of 2019 is available on RobecoSAM's website (RobecoSAM, 2019c, RobecoSAM, 2018; RobecoSAM, 2016). However, it can also be interesting to see some key differences between industries separate from each other.

Table 1: Summarized weights per ESG dimension, from 2019 and 2016 in parenthesis, for 7 (2) out of 61 industries identified by RobecoSAM. Source: RobecoSAM 2016 & 2019a.

Industry	*Automobiles*	*Banking*	*Pharmaceuticals*	*Casino & Gaming*	*Coal & Consumable Fuels*	*Food Products*	*Tobacco*
Environment	31%	13% (23%)	9 % (9%)	17%	32%	28%	24%
Social	32%	32% (34%)	41% (43%)	37%	35%	30%	34%
Governance	37%	55% (43%)	50% (48%)	46%	33%	42%	42%

In table 1, weights from seven selected industries are shown to highlight some differences. Interestingly, banking and pharmaceuticals have considerably lower Environment weights than the other selected industry. Depending on the analysis-depth of impacts the case for banks is rather intuitive. Banks have no primary business that deforests this planet, have large amounts of chemical waste or other similar environmental drawbacks. But if the analysis-depth is increased the case would probably be highly different, attributing banks to be shareholders of businesses that have a

negative impact on the environment. Intriguing, Environment-weights for banking have changed from 23% to 13% from 2016 to now. This low Environment-weight might have a direct impact on banks attitude towards adopting ESG into their own practices, which potentially leads to less ESG emphasis. If banks felt the pressure of being penalized with a low ESG rating for not applying good enough ESG practices, more banks would probably integrate it. Naturally, banking as an industry is mainly measured on governance, since this is an integral part of their day-to-day business. How pharmaceutical ESG-scores are least weighted towards Environment is counter-intuitive. As an industry, they produce chemically active and toxic waste that changes the fauna of affected areas.

Each of the three ESG dimensions consists of 6-10 criteria, that are evaluated each by 2-10 questions (RobecoSAM, 2016; RobecoSAM, 2019c). Each of the criteria can total a score 100 each and is assigned with an industry-specific weight, these weights per dimension add up to the dimensional weights seen in table 1. Since each criterion is made up of 2-10 questions there is also a question-specific weight of how much it contributes to the criteria total score.

The RobecoSAM ESG-score of a company is calculated as follows:

$$Total\ Sustainability\ Score = \sum (Question\ score * Question\ weight * Criterion\ Weight)$$

As an example, the total Envrionment weight of the Banking industry is 13%, as seen in table 1, and consists of three criterions of weights 4%, 3% and 6%, for Environmental Reporting, Operational Eco-Efficiency and Climate Strategy, respectively. Each of these three criterions are answered in the CSA by 2-10 carefully phrased questions. The score of the question is used in the total score calculation seen above.

In the case of a controversy, an MSA issue is opened and the MSA points for a specific issue are multiplied by the MSA weight and the criterion weight to produce a penalty on the original question in the CSA (RobecoSAM, 2019c, RobecoSAM, 2018;

RobecoSAM, 2016). This results in a new score that will temporarily penalize the original score until the controversy is averted. In 2018, the MSA impact in the CSA was increased by removing the MSA bonus-scores previously given when a company was free of controversies, leading to a lower average score.

The top 10% scoring companies of all evaluated constitutes the DJSI World index (RobecoSAM, 2019c). The ESG scores set by this methodology also constitutes the S&P 500® ESG family of indexes.

The S&P 500® ESG index family utilizes exclusions, also referred to as negative screening, and aim at a risk- and return-profile similar to the S&P 500 (Steadman & Perrone, 2019). It screens based the total information volume based on both themes and the ESG scores. Firstly, it screens companies in or related to tobacco and controversial weapons, then screens companies in the lower 25% of their respective industry in the S&P DJSI ESG Score, based on the above-described assessment.

3.2.2 MSCI ESG, Bloomberg Barclays MSCI ESG

The score is calculated using intra-industry normalization of the score and a percentile function is added, such that scores range from AAA to CCC and are the best and worst in their industry (MSCI Research, 2018).

Table 2: MSCI ESG-Pillars, Themes, and Key Issues. Source: MSCI Research, 2018

Pillar	*Themes*	*Key Issues*
Environment	Climate change	Carbon Emissions
		Financing Environmental Impact
		Product Carbon Footprint
		Climate Change Vulnerability
	Natural Resources	Water Stress
		Raw Material Sourcing
		Biodiversity & Land Use
	Pollution & Waste	Toxic Emissions & Waste

		Electronic Waste
		Packaging Material & Waste
	Evironmental Opportunities	Opportunities in Clean Tech
		Opp's in Renewable Energy
		Opportunities in Green Building
Social	Human Capital	Labor Management
		Human Capital Development
		Health & Safety
		Supply Chain Labour Standards
	Product Liability	Product Safety & Quality
		Privacy & Data Security
		Chemical Safety
		Responsible Investment
		Financial Product Safety
		Health & Demographic Risk
	Stakeholder Opposition	Controversial Sourcing
	Social Opportunities	Access to Communications
		Access to Health Care
		Access to Finance
		Opp's in Nutrition & Health
Governance	Corporate Governance	Board
		Ownership
		Pay
		Accounting
	Corporate Behavior	Business Ethics
		Corruption & Instability
		Anti-Competitive Practices
		Financial System Instabilities
		Tax Transparency
Total	10	37

Setting the weights for the 37 key issues seen above, in table 2, is done through a framework that assigns 5-30% of the total ESG score to a key issue based on industry contribution, relative contribution compared to all other industries and the impact on the environment and society (MSCI Research, 2018). Within this framework, the timeline for the potential materialization of such a risk is estimated, the shorter the timeline the higher the weight-allocation and vice-versa. Additionally, each key issue is evaluated on two scales – risk exposure and management. Controversies are measured by two dimensions. The first dimension being the different degrees of severity, and the second dimension is the degree of widespreadness. Both of these dimensions can be expressed with values on a scale of one to four. The level of severity of the two dimensions are multiplied to get a controversies impact score. As showed with other ESG metrics in this review, controversies penalize the score of affected ESG-dimensions.

3.2.3 Refinitiv, Thomson Reuters ESG

The scoring methodology of Thomson Reuters is fully automatic and implements a percentile rank system (Thomson Reuters, 2019). It is predominantly updated once a year, but in the case of media controversy, the data is screened, and scores calculated weekly to provide updated scores even at the time of incidents. The score is calculated on the categories displayed below. One main difference seen below is the absence of industry adjustment of weights.

Table 3: Summary of categories, weighting, and categories. Source: Thomson Reuters, 2019

Pillar	*Pillar weight*	*Category*	*Indicators*	*Weights*
Environment	33%	Resource use	19	11%
		Emissions	22	12%
		Innovation	20	11%
Social	33.5%	Workforce	29	16%
		Human rights	8	4.5%
		Community	14	8%
		Product responsibility	12	7%
Governance	33.5%	Management	34	19%
		Shareholders	12	7%
		CSR strategy	8	4.5%
Total	100%	10	178	100%

Interestingly, Thomson Reuters ESG scores have near-equal weights for the three pillars, as seen in table 3. In contrast to MSCI ESG and RobecoSAM, who both have industry dependant weights and intra-industry percentile ranks, this is notably different.

The intermediate-score of a company is the sum of weighted averages of indicator scores, then a percentile rank computation is made to get the end-score (Thomson Reuters, 2019; Refinitiv, 2017). Automation is of the essence in this ESG-scoring approach, as seen in the Cabon Data & Estimate model. The Carbon Data & Estimate model uses carbon and energy data if reported by the company or performs estimations if no data is available. When data isn't reported three sub-models are used to ensure a valid answer. These models are applied in sequence and stops as soon as one returns an answer. Starting with the CO_2-model that estimates emission levels based on previously reported data if such exists, if not then it passes on to the next model. This model is the Energy3 model and performs some calculations and comparisons to all companies within the same industry, mainly performed on the latest known total energy consumption per employee and performs a percentile rank within its industry. In the case where this estimation model doesn't return an estimate the median model is called, that performs an even more coarse estimation.

3.2.4 Inrate ESG Impact, Corporate and Country

The following section is more extensive than previously described methodologies due to the fact that it contains both corporate and country methodologies and because of high information availability. Inrate's scores cover both corporations and countries and have different methods of calculation and different data sources, due to different types of reporting on country and corporate level.

Inrate's ESG Impact rating for corporations

Inrate's weighting of the ESG-dimensions are industry dependent and not fully disclosed (Schwegler, 2018a). The so-called Impact Assessment is composed of three main parts, Impact Assessment of Products and Services, Assessment of Impact Management and lastly, Controversy Assessment. The first part of the Impact Assessment, the Impact Assessment of Products and Services is meant to assess the sustainability impact on

these products and services throughout the lifecycle, through the Inrate Impact Matrix. The second part of the Impact Assessment is aimed at diagnosing how well a company is managing their related impacts on sustainability and is predominantly generated from publicly available company reports and information, evaluating how the use of resources is optimized. The third part penalizes the score based on scandals and controversies. Scoring per company is done as follows:

$$Part\ 1: Impact\ Assessment\ of\ Products\ and\ Services$$
$$Part\ 2: Assessment\ of\ impact\ management$$
$$Part\ 3: Controversy\ Assessment$$
$$Overall\ ESG\ Impact\ Score = Part\ 1 + Part\ 2 - Part\ 3$$

This scoring method does not adapt scores between industries using a percentile function or similar, allowing for a comparativeness on actual ESG impact of the company, leading to the sub-industry Coal Electricity Producers to have a score in the range of C to D and Renewable Electricity Producers in a range of A- to D+ (Schwegler, 2018a).

Impact Assessment of Products and Services is performed in by three further steps (Schwegler, 2018b). The first is Determination of the company's activities. This is to decide what products that are manufactured and how these are manufactured, and this assessment follows the Inrate Business Activities Classification (IBAC) that was built on two American classifications standards covering 350 activities and more than 100 sub-activities. Percentages of the turnover produced from each activity and sub-activities are considered. Secondly, the proprietary Impact Matrix is calculating the impact indication of climate impacts such as green-house-gas, other environmental impacts such as toxicity and waste management, direct social impact and indirect social impacts.

Table 4: Example of data from Inrate's Impact Matric. Source: Schwegler, 2018b.

Example Activities	***Generic Impact Scores***			
	GHG Impact	*Other Environment Impact*	*Direct Social Impact*	*Indirect Social Impact*
Cattle ranching & farming	0.36	0.27	0.55	0.55
Frozen food manufacturing	0.27	0.55	0.64	0.64
Vegetable and fruit farming	0.64	0.64	0.73	0.82
Wineries	0.55	0.45	0.09	0.09

As seen in table 4, Cattle ranching and farming taxes the environment substantially which is why such low scores on green-house-gas impact and other environmental impacts are awarded, while both the direct and indirect social impact is rather neutral (Schwegler, 2018b). Frozen food suffers from being part of the meat and dairy industry having a high negative environmental impact and a taxing cooling chain also subtracting points from the environmental factors yet provides some value on social scores. Less impactful on both environment and society is vegetable and fruit farming as can be seen in table 4. Contrastingly, wineries have some social implications that are deducted from its social impact scores. The third and last assessment part of impact valuation of products and services compliments the Impact Matrix with non-quantitative information such as participating in controversial business practices or taking part of controversial industries such as Alcohol, Gambling, Tobacco, etc.

The Assesment of Impact Management is sometimes called the CSR assessment and is used to measure the effectiveness of the CSR within the company, and in all three ESG-dimensions comprised of 147 general and sector-specific core issues (Schwegler, 2018b).

The Controversy Assessment penalizes the score of the affected ESG issue, if there is a management-related controversy then governance score is reduced (Schwegler, 2018b).

Addressing the controversy well and setting up systems to avoid future similar events alleviates some of the score-penalty.

Inrate's ESG Impact rating for countries

Rating countries is useful from a sovereign bonds' perspective, with the same stated purpose of quantifying the impact and not the quality of reports. Inrate assumes some common goals as a practical approach to rate countries, and described as follows (Reutimann, Wani & Hurst, 2019):

- Protect the life, liberty, and rights of the people.
- Protecting the independence and security of the country and people.
- Promote common welfare.
- Provide basic public infrastructure.
- Promote sustainable development and be committed to the long-term preservation of natural resources.
- Promote internal cohesion and cultural diversity of the country.
- Ensure the greatest possible equality of opportunity among its citizens.
- Be committed to a just and peaceful international order.

The Inrate ESG Impact Rating for countries is split into two modules, one exclusion module and one ESG module (Reutimann, Wani & Hurst, 2019). To be awarded an ESG score, the country must comply with all criteria of the exclusion module, to prohibit some criterias to be compensated by others in the final score. These criterias are what comprise the Inrate Standard. The ESG module, as seen above, utilizes the accustomed ESG dimensions and measure the sustainable development made in the area. There are 18 or more indicators per dimension, the collected publicly available data is normalized to scores between 0 and 100, the separate E, S and G scores are the weighted sum of all normalized indicator-scores of that dimension. In the case of missing data, for indicators not part of the exclusion model, these criteria are simply given a score of 0. For score summation the Environment dimension has a 25% weight, the Social dimension 25% and Governance 50%, scores are then transformed to labels as the Inrate ESG Impact score for corporations.

$$Risk\ Dimension\ Score = \sum Indicator\ Specific\ Weight * \ Indicator\ Score$$

$$Country\ ESG\ Impact\ Score = \sum Risk\ Dimension\ Weight * \ Risk\ Dimension\ Score$$

3.3 Asset classes scored with ESG

One size doesn't fit all. When it comes to ESG-investing and asset classes, it is not equally easy to find methodologies on all asset classes. Stocks and corporate bonds are commonly evaluated in the same way, because the scores are assigned to the corporations with these non-financial quality factors. Currently a corporation's stocks and bonds are given the same ESG-score.

ESG providers also have some methods of scoring countries, mainly to differentiate regional issues for thematic investing or because of sovereign bonds investing, such as the one of RobecoSAM and the one described in detail by Inrate (Reutimann, Wani & Hurst, 2019; Inrate 2018; RobecoSAM, 2018; Robeco, 2018; MSCI Research 2018, Thomson Reuters, 2019). These build upon similar methods to the ones used for corporations but is modified to fit countries sustainable development and available information. The ESG-score of a country can be used with ESG-strategies or to score sovereign bonds. For sovereign bonds, the country score is assigned as the score of the bond.

As for derivatives such as forwards, futures and options, the ESG-rating could be taken directly from the underlying – especially if that underlying is a corporation. No in-depth articles discussing the ESG-ratings of derivatives have been found in this review. However, there are some initiatives with futures contracts on indexes with low ESG impact from STOXX as underlying security, launched in February in Europe and April in the US this year, by Eurex (McDowell, 2019; Strongin Dodds, 2019).

A method of ESG-scoring for commodities, physical and through futures, have not been found as of this review. A potential method for this could be the use of an ESG industry average, from an ESG provider that uses industry absolute scores. No articles have been found in this area.

Sustainable investing in real estate have gained momentum just as most sustainable investments but an ESG score for real estate is not currently commercially available (Allianz Global Investors, 2015). However, it might be provided as a custom solution by a risk-analysis company focused on sustainable investments. Schwegler (2018a) mentions real estate investments with sustainability in mind, and maybe there is a reason to expect an ESG-service on this topic by Inrate, which allows for some further integration of ESG investing (Schwegler, 2018a). According to Baumann (2017), the whole industry of green investing in real estate follows the GRI reporting standard, and is primarily evaluated on energy consumption, source of energy, CO_2-emissions, and water and waste management.

One suggestion on a currency ESG-strategy have been found through this review (Chadler, 2018). The main idea of that suggestion is to use country ESG-ratings to rate a currency. Some critique against this method, that is stated by the writer, is that ESG currency investing pose the risk of inflating the prices of highly ESG-rated currencies, weakening their export status and actively changing the country.

3.4 Imbalances between E, S and G and region-specific outcomes

The three main risk dimensions in ESG are not necessarily equally important to produce maximum performance since different cultures value ideas differently and with differences in legislation. Chaudhry et al. (2016) examined the separate dimensions of E, S, and G using MSCI ESG and found that environmental factors are stronger in USA and Japan and that in Europe governance factors provide the best risk-adjusted return. ESG performance therefore also have a different alpha in different markets. Overall environmental factors offered the best risk-adjusted returns.

Table 5: Excess returns of ESG, E, S, & G for MSCI Developed and Emerging Markets, between 2007 and 2016. Source: J.P. Morgan (Chaudry et al., 2016)

	MSCI Developed Markets			***MSCI Emerging Markets***		
	Returns	*Sharpe*	*Max drawdown*	*Returns*	*Sharpe*	*Max drawdown*
Adjusted-ESG	-0.10%	-0.02	-13.10%	4.20%	0.78	-7.00%
Environment	2.10%	0.39	-10.20%	3.80%	0.70	-9.30%
Social	-2.10%	-0.30	-30.00%	0.70%	0.12	-19.50%
Governance	1.90%	0.30	-15.50%	0.00%	0.00	-14.40%

Table 6: Excess returns of ESG, E, S, & G for USA, Europe, and Japan, between 2007 and 2016. Source: J.P. Morgan (Chaudry et al., 2016)

	Sharpe			***Annualized returns***		
	USA	*Europe*	*Japan*	*USA*	*Europe*	*Japan*
Adjusted-ESG	0.49	0.95	0.75	2.50%	4.00%	3.70%
Environment	0.77	0.15	0.86	4.60%	0.90%	4.10%
Social	0.25	0.42	0.70	1.40%	2.30%	3.40%
Governance	0.19	0.59	0.67	1.30%	3.00%	3.40%

The results of table 5 and 6 are highly interesting. The way the excess returns were calculated were through the use of portfolios constructed with 40 securities. In each portfolio 4 securities of the same ESG-rank were used, for all 10 ranks of ESG-scores. Four portfolios were created per region, to evaluate these relationships (Chaudy et al., 2016). Even though some description of how the above results were calculated, further clarifications is still needed to determine the exact impact of their findings.

In Europe companies with high ESG rating are valued at a premium compared to their fundamental values, and most so in the Nordic countries, using MSCI ESG scoring and MSCI universe (Porse et al., 2017).

Hitchens, McCullagh & Parks (2015) showed that two of the three pillars of ESG, using Australian MSCI data, adds performance (Hitchens et al., 2015). Low Environment or

Governance score, E or G, will cost the portfolio some performance and inversely a high score of these dimesions will add performance. Contrastingly, the Social risk dimension, S, in this work was significantly different from its relatives. A low score of the social risk dimension had a cost but a high social score didn't produce any gain.

For long-term investors such as pension funds, van Duuren, Plantinga & Scholtens (2016) found that governance was most important of the ESG-dimensions. The impact of these findings would be clearer if any regionality data would have been disclosed. The questionnaire was answered by 126 international pension fund-managers, but their region of activity was not reported or discussed, leaving this part unanswered. Despite this, it still points towards two interesting areas of study, how the length of investment horizon might affect adoption-rates of ESG and importance of the three pillars.

According to Sanches Garcia, Mendes-Da-Silva & Orsato, (2017), who evaluated ESG in emerging countries using Thomson Reuters ESG, found evidence that ESG scores, and each of the separate E, S and G dimensions are scored higher in sensitive industries with larger overall impact on the dimensions. The emerging countries in this study was Brazil, Russia, India, China and South Africa. Sensitive industries were defined as those with the largest potential downside of a controversy, such as industries with substantial negative impact on sustainable development. This study focused on emerging countries, were these sensitive industries have an even higher impact than many developed countries. Sanches Garcia et al. (2017) even showed that these industries had better ESG scores that the region averages. The cause of this is attributed to be better defined CSR, sustainability reporting and efforts to mitigate their risks intrinsic to their industry.

Landi & Sciarelli (2019), in accordance with to Sanches et al. (2017), found no evidence on financial performance for highly ESG scored companies in Italy, highlighting that regional differences may exist. This contradicts the result of Porse et al. (2017), since they concluded the opposite when including Italy in their study, finding increased financial performance.

As recalled from figure 2, Asia had an incredible, more than 1,200% increase in AUM using ESG between 2012 and 2016. What is not seen in that figure is that this change was mostly fueled by Japans increased AUM using ESG, making them the country int the world with largest increase in their total AUM adopting ESG between 2012-2016 (Oliver Wyman & AVPN, 2018). Even though this increase in AUM using ESG, Xie, Nozawa, Yagi, Fujii & Managi (2019) conclude that market valuation, corporate efficiency and return on assets are affected negatively by so called high ESG activism. This ESG activism is a measure of the focus on ESG that is disclosed by the company and they suggest that there is a convergence to reach in sustainability reporting. Too much ESG focus and too little, both lead to lower performance. Interestingly, they found a positive effect on market valuation, corporate efficiency and return on assets when the company reported moderate ESG disclosure activities, with significant t-statistics (Xie et al., 2019).

As closure of this section, a study conducted on stock markets of Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden and the United Kingdom, using DJSI Europe Index from the years 2001 to 2013, showed that sustainability leadership, best-in-class ESG rated companies, rewards corporates in market valuation and that worst-in-class has the reversed effect (del Mar Miralles-Quiros, Miralles-Quiros & Guia Arraiano, 2017).

3.5 ESG in portfolio management, alpha and risk understanding

3.5.1 Risk understanding

Modeling risk in financial markets is a large field in itself and mostly rely on statistical models. Many different types of risks can be assessed, such as systemic risk, systematic risk, unsystematic risk, Sharpe ratio, etc. Using non-financial quality markers such as ESG can aid in the risk assessment of a corporation, security, portfolio, funds or indices perhaps even countries.

Using MSCI ESG data, investment universes Russell 3000, MSCI World, and MSCI Emerging and the Barra GEM2L risk model, Dunn et al., (2017) showed that higher

ESG score could potentially indicate lower future systemic risk for up to 5 years and a lower ESG score is found to have a noticeable correlation with higher statistical risk, defined below. Statistical measures of risk, in this study, is defined as three main risk measures from the risk model: the total risk of the stock, the idiosyncratic risk referred to in this paper as stock-specific and the beta compared to MSCI World index. The total risk of the stock is calculated using volatility, value-at-risk and other risk measurements not specified. Furthermore, Dunn et al. (2017) study the relationship between these risk measures and the index, to test the hypothesis that ESG adds a non-financial quality risk measure. The key findings were negative correlation between risk and ESG, meaning that a higher ESG-score in MSCI ESG correlates with lower average risk, of those risk measurements analyzed (Dunn et al., 2017). However, this does not mean perfect control over systematic risk, as it still needs to be managed (Hitchens et al., 2015).

After 2012, ESG gained more validaty as a real quantitative measure to help professionals manage risks and returns and is predicted to be further important as climate and environmental issues increase. Porse et al. (2017) claim that ESG helped mitigate the downsides of the financial crisis of 2008-2009 and that ESG showed such significant alpha by 2012 that it attained a higher validity among the research and investor community. After 2012, systematic factors showed to be the majority part of ESG risk moderation, but both before and after 2012 added lower unsystematic risk, also known as idiosyncratic risk (Nagy et al., 2015; Dunn et al. 2017).

An international survey of fund managers showed that many conventional managers implement ESG for red-flagging securities that have vulnerabilities not found by other quantitative metrics (van Duuren et al., 2016).

Halbritter & Dorfleitner (2015), criticize the exploitable relationship between ESG and CFP, and point to the fact that many studies conducted consider the same time frame, are not long enough, and with a general notion of ESG as all scoring methods are equal.

3.5.2 ESG and alpha

According to the comprehensive review by Friede et al. (2015), out of the 2.200 analyzed studies finding that approximately 90% of all studies found ESG-positive evidence. The findings are a combination of different ways of measuring so called positive findings, such as alpha, reduced unsystematic risk, reduced systematic risk or other risk and earnings measures. There is a risk that the comparability of those studies analyzed overlap or partially overlap, giving extra emphasis to some more studied areas and scewing the average results. Inspite this, the number of articles analyzed still creates robustness. In line with Friede et al. (2015) many studies finding positive alpha using ESG with respect to comparison universe have been found in this review (Nagy et al., 2015; Hitchens et al., 2015; Chaudhry et al., 2016; Porse et al., 2017).

Using five different portfolios, dividing the S&P/ASX 200 provided by MSCI, into quintiles, Hitchens et al. (2015) show that higher ESG-scores adds alpha. Adjustments were made monthly and the time-period explored was 2008-2014 on MSCI ESG. The risk-adjusted returns were higher for better ESG-scoring quintiles. Furthermore, a long-short strategy, selling the lowest quintile and buying the highest quintile, was also shown to add alpha compared to MSCI ESG.

With two model portfolios constructed, Nagy et al. (2015) managed to outperform MSCI World Index between the years of 2007-20015. One of the portfolios overweighted high ESG scoring securities, called tilt, and the other overweighted securities that made a big increase in ESG score, called momentum. The momentum model portfolio performed especially large returns, yet both outperformed comparison index (Nagy et al., 2015).

Dunn et al. (2017) show that for the investment universes Russell 3000, MSCI World, and MSCI Emerging, showed a cost of 1.8% lower returns yearly when a top 20% ESG rated security-screen was used on MSCI ESG, over the period January 2007 to December 2015. However, they also proved this to be insignificant with a t-statistic of -1.2, claiming that the risk-adjusted return is still better.

A different approach to measuring the effect of ESG is to measure the impact on stock-price when publishing news on ESG initiatives, in this case on the Hang Seng Composite Index universe and measuring the abnormal returns (Yee Lo & Lee Kwan, 2017). Abnormal returns are the difference between the expected return and the actual return. In their study, Yee Lo & Lee Kwan (2017) found significant results (for $p < 0.1$), that the variation in cumulative averaged abnormal returns was positively impacted by publishing general ESG initiatives. The purely sustainable initiatives, however, were found to have a lesser positive reaction on abnormal returns, attributed to the fact that it is not recognized as of purely financial value.

Using the Bloomberg ESG database on Malaysian public companies, negative alpha was significantly concluded, as higher ESG ratings increased the cost of capital and reduced return on equity. The study was conducted over financial data from the years 2010-2013 years, with Bloomberg ESG data for 54 companies, three years after the start of the ESG database (Atan, Alam, Said & Zamri, 2018).

3.5.3 ESG strategies

ESG Integration

ESG Integration can be loosely defined as any ESG consideration in investment management (Eurosif, 2014). More usual however is a stricter definition on what ESG Integration is. The stricter definition was previously defined by Eurosif with three categories, and where only categories two and three are considered as ESG Integration.

> *1: Non-systematic ESG Integration: ESG research and analyses made available to mainstream analysts and fund-managers*
>
> *2: Systematic consideration ESG Integration: Systematic consideration/inclusion of ESG research/analyses in financial ratings/valuations by analysts and fund managers.*
>
> *3: Mandatory investment constraints ESG Integration: Mandatory investment constraints based on financial ratings/valuations derived from ESG research/analyses (exclusions, under-weighting, etc.)*
>
> *(Eurosif, 2014)*

However, in Eurosifs latest SRI Study, they described a lack of a common standard or definition on ESG Integration strategy and that comparability still lags as a result of this term ambiguity (Eurosif, 2018). Chaudhry et al. (2016), states that on the MSCI universe using MSCI ESG for strict ESG Integration results in higher performance than ESG Exclusions.

Cappucci (2018), claim that full ESG integration has, contrary to popular belief, showed better risk-adjusted for more than 40 years, but paradoxically a majority of investment managers have not implemented an ESG integration strategy. Most interestingly what Cappucci (2018) shows is that the relationship between social and financial returns are non-linear, in fact, follow a curve. This means that a limited effort in sustainability first decreases financial performance, then plateaus after a certain threshold to become rewarding when sustainability activity passes that threshold. (Cappucci, 2018). Cappucci's definition of full ESG integration does not allow for only using exclusions, and also requires the use of raw scores provided by scoring companies such as MSCI or RobecoSAM, instead of their final aggregate label ratings (Cappucci, 2018).

Negative screening

Negative screening is a widely used term, that means the exclusion of one or many companies based on some criteria, usually a performance metric under a certain threshold or an industry that the investor is morally encompassed not to invest in. In the case of ESG and SRI many indices exclude controversial industries such as adult entertainment, alcohol, gambling, nuclear power, tobacco, weapons, but can easily be extended to fur, meat, genetically modified products, etc. where the cost of such a screen varies a lot depending on the number of companies and market capitalization that is excluded. What is to be concluded, however, is that the cost of negative screening is strongly affected by how the investment universe is reduced. The more restrictive the screen, the lesser the performance (Trinks & Scholtens, 2015; van Duuren et al., 2016).

Tilt / Positive screening (best in class, highest score)

In a study using MSCI World Index, MSCI ESG scores and Barra Global Equity Model (GEM3) for their construction of portfolios, monthly rebalancing, constructed a rather simple "Tilt"-strategy that outperformed MSCI Word Index by 12% during the years 2007-2015. Tilt in their case means mostly holding companies that are best-in-class rated (Nagy et al., 2015). Another study examining an aggressive positive screen found it to lower the three risk measures of the GEM2L risk model (Dunn et al., 2017).

Momentum

A model portfolio that actively adjust the weights of securities held, overweighting securities that have increased their ESG score the most. This portfolio outperformed the MSCI World Index with nearly 25% over the years 2008-2015 and would have been comparable with the tilt model portfolio that was evaluated from 2007-2015 but required one-year ESG score to be able to have a so-called "momentum" of ESG scores. ESG scores from MSCI are mainly updated yearly, and only securities affected by controversies get updated monthly (Nagy et al., 2015).

3.6 Other findings

Most above studies and articles show primarily positive results, finding some alpha or risk mitigation (Chaudry et al., 2016; Porse et al., 2017; Hitchens et al., 2015; van Duuren et al., 2016; Dunn & et al., 2017; Nagy et al., 2015; Friede et al., 2015; Cappucci, 2018) but during this information collection of this review some articles had less enthusiastic outcomes.

One major driver of ESG is society's desire to progress with sustainable development (UNEP Finance Initiative & UN Global Compact, 2018; UNPRI, 2019; Schwegler, 2018a; Global Reporting Initiative, 2019a; Eurosif, 2018), whether it is about reducing corruption of countries, improving governance of companies, reaching the maximum 2 degrees Celsius average earth temperature increase by 2050 or the SDGs. Despite these driving factors, when comparing the one ESG ratings of different methodologies, completely contradictory results are shown. As visualized by Allen (2018), comparing the ESG ratings of FTSE and MSCI, a high score in one methodology does not indicate

much about the score in another methodology. This is disturbing, as it may point to the fact that ESG metrics doesn't have to have the same focus. For sure, an ESG-metrics is less appealing to the investor if it fails to increase the risk reward ratio, but at the same time, if it fails to measure sustainability it also loses its appeal. Given such inconclusive result between FTSE and MSCI it is indicated that all ESG-scores aren't equal (Allen, 2018). Because of this, deepened understanding of how different scores are calculated is needed to see if cross-comparison is worthwhile, since some use a percentile rank method within each industry (MSCI Research, 2018) and other use absolute scores (Refinitiv, 2017, Schwegler, 2019b). More interestingly, the motivation behind the ESG-methodology might impact the performance. Such as Inrate, publicly emphaszes that impact is their primary motivation and not measuring quality of reports (Inrate, 2018) This clearifies why comparisons of two scores from two different providers can be vary.

Disturbingly, the Swedish Agency for Growth Policy Analysis – Growth Analysis has conducted an ESG growth analyis and proclaim that none of the ESG investing methodologies will lead to any substantial difference in the sustainable development nor reaching the SDGs (Growth Analysis, 2019). They also state that to make a substantial impact on the globe, an de facto, widely adopted, standard has to be created and commonly accepted and that this is best done through continued multinational research and funding of ESG projects.

Manita, Giuseppina Bruna, Dang & Houanti (2018), found that through an empirical study how board gender diversity correlates with higher ESG-scores and better ESG-disclosures, setting a distinct argument towards increased board gender diversity.

While some companies are reluctant to CSR and taking part in the non-financial information disclosure, others see the opportunity to work quantitatively. Baier, Berninger & Kiesel (2018) created a dedicated vocabulary of high-intensity ESG words, using textual analysis to see how companies ESG-scores can be affected by word choice in their CSR and sustainability reporting. In line with results of Sanches et al. (2017), Baier et al. (2018) show that sensitive industries, that are largely impacted by ESG

controversies, are more prone to use better ESG-language and use an above-average rate of ESG-words in their disclosures.

Described above, is something that requires research in textual analysis to discover. This type of research is not something smaller companies can afford, but large companies can. This can lead to disclosure bias, depending on the size of the company that participates in corporate sustainability reporting. MSCI explicitly takes this into account, knowing that large-cap and mega-cap can put more resources on reporting with better quality than a small-cap company. (Nagy et al., 2015). This motivates the use and development of other scoring-methods.

Drempetic, Klein & Zwergel (2019) proclaim that using Thomson Reuters ESG scores, ESG-sensitive industries perform very well on average, especially determined by firm size since large firms have greater economic resources to expend on their CSR and sustainability reporting, in spite greater greenhouse-gas density. While this subject is intricate, it overlooked that not all ESG score providers have absolute scoring as shown in previous sections, but rather that some are industry adjusted to withhold this bias, this subject will be addressed further in the discussion. Attempts, other than industry weighted scores, to incorporate green-house-gas and green-house-gas-equivalents more distinctly in indices have been made, and could counter the bias highlighted by Drempetic et al (Monasterolo, Battison, Janetos & Zheng, 2017).

4. Discussion & Analysis

Above, Environment, Social and Governance as a means of socially responsible investing (SRI) and a way for companies to lessen their burden on society and environment through corporate social responsibility (CSR) is described in detail. Showing differences between scoring methodologies, differences between regions, industries and asset classes. Below, the implications of the findings are discussed to give a more nuanced view.

The financial case of ESG as a risk assessment tool to uncover issues deeply rooted in companies and to use that to lessen risks, remains intact after this review. There is further evidence for using ESG for better risk-adjusted returns. However, one key takeaway is the void of impactful articles estimating the positive impact ESG-investing have on the environment and sustainable development. In fact, it seems forgotten compared to the amounts of literature available on financial performance. The signal this is sending to the research community and professionals is that sustainable development isn't that important. This is also inline with how disclosing reports containg to much sustainability content negatively affects abnormal returns (Yee Lo & Lee Kwan, 2017). However, following the Brundtland Report (Brundtland, 1987), the Stern Review (Stern, 2007) and the report from Growth Analysis (Growth Analysis, 2019), as a society we should feel motivated enough to research this further and stress the need for more impact on sustainability.

Another subject missing in the research is how chosing ESG-score influence performance and what that is being measured. In the case of Inrate, Thomson Reuters, MSCI and RobecoSAM, the data collection is rather similar, but the weights used are completely different. It is not clear what is actually changed when changing these weights. Thomson Reuters take a simplistic approach, where the dimensions are weighted near-equally across the three dimensions. RobecoSAM, MSCI and Inrate however have different weights for each industry. For example, when pharmaceuticals are weighted 9% towards the Environmental risk dimension, some reasoning and explanaitions is encouraged, given that the production of such products require chemicals that are toxic to the environment if handled wrong. Especially when studies can be found, stating that Environmental factors give the best risk-adjusted returns (Chaudry et al., 2016)

Clearly, using labels or numerical scores have no actual impact on performance of a rating methodology, but data collection, data processing, analyst training, score calculation and percentile or industrial adjustments do. All ESG-providers most definetily takes this into careful consideration during the establishment of score procedure and yearly revisions. Yet not many articles discuss this distinction to any

detail. The effect of fitting data to a percentile rank function, can be helpful for some comparisons of what is relatively good etc. but is nonetheless loss of information. Furthermore, dealing with eventual biases such as disclosure bias created by sensitivity of industry or company size, as mentioned by Dr. Schwegler (2018a), Drempetic et al (2019) & Monasterolo, Battison, Janetos & Zheng (2017) is important for the accuracy of ESG methodologies. If firm size becomes the ruling factor of ESG scores, then the reason to use such score is diminished.

Transparency is needed in the domain of of ESG, SRI and CSR, so that the public takes part in reviewing the company disclosure reports and creating public pressure towards improvement. Yet, the format on which ESG-providers should disclouse their rating methodology and weights data isn't standardized and – more often than not – hard to find or interpret. The comparability between rating entities is very low due to different services and market coverage to begin with. This could be improved by a standardized format of disclosing data collection, rating methodology and weights for all ESG-service providers, preserving both the intention of the company and assisting their clients in the choice of provider.

Not all financial actors are focused on the same time horizon, since ESG is attempting to assess issues deeply rooted within the structure of a security, short term actors are inclined to be less aware or cautious of long-term risks. Which is why, on the other end of the spectrum pension funds intuitively would tend towards high ESG adoption rates, as suggested by an international survey of 126 pension fund-managers on their preferences in ESG usage. This study also showed that not only do they tend towards high adoption-rates, but also that a majority of their managers followed a stricter definition of ESG Integration from Eurosif 2014 (van Duuren et al., 2016).

4.1 Summary of results

The five ESG metrics discussed in detail in this review are summarized below to show the key differences, condensing the hefty amount of information to a digestible format.

Table 7: Summary of results, MSCI & Thomson Reuters. Sources: MSCI & Thomson Reuters

Index	*MSCI*	*Thomson Reuters*
Information-gathering / Information Sources:	*Macro data at the segment or geographic level from academic, government, NGO datasets (e.g. Transparency International, US EPA, World Bank)* *Company Disclosure (10-K, CSR, proxy report, AGM results, etc)* *Government databases, 1600+ media, NGO, other stakeholder sources regarding specific companies*	*Company reports* *Company filings* *Company websites* *NGO websites* *CSR Reports* *Established and reputable media outlets*
The number of data points:	*37 ESG Key Issues* *1,000+ data points on ESG policies, programs, and performance.*	*500+ data points* *226 KPIs*
Score Adjustment	*Industry adjusted, ranking prcentiles within each industry.*	*Percentile function, independent of industry.*
Controversies	*Part of ESG combined score.*	*Two separate scores, ESG scores and ESG controversies that overlay.*
Update frequency:	*Yearly, controversies screening monthly*	*Monthly updates*
Asset classes scored:	*Stocks, corporate bonds*	
The number of securities scored:	*350,000 rated, scored, weighted securities.* *13,000 equity and fixed income issuers.* *590,000 linked equity and fixed income issuers.* *6,800 Corporations (with corresponding stocks and corporate bonds). (April 2018)*	*4,693 Securities: Stocks and Corporate Bonds (Corporations)*
Scoring Scale:	*Letter Rating (Final Industry-Adjusted Company Score):* *AAA (8.6-10.0)* *AA (7.1-8.6)* *A (5.7-7.1)* *BBB (4.3-5.7)* *BB (2.9-4.3)* *B (1.4-2.9)* *CCC (0.0-1.4)*	*Letter Rating:* *A+: 1 to 0.916* *A: 0.916 to 0.833* *A-: 0.833 to 0.750* *B+: 0.750 to 0.666* *B: 0.666 to 0.583* *B-: 0.583 to 0.500* *C+: 0.500 to 0.416* *C: 0.416 to 0.333* *C-: 0.333 to 0.250* *D+: 0.250 to 0.166* *D: 0.166 to 0.083* *D-: 0.083 to 0*

Table 8: Summary of results, DSJI/ S&P Dow Jones Indices & Inrate. Sources: Inrate, DSJI/ S&P Dow Jones Indices LLC, 2019

Index	*DJSI / S&P 500® ESG Indices*	*Inrate*
Information- gathering / Information Sources:	*RobecoSAM's Industry-specific CSA questionnaires.* *Publicly available company information.* *News data through RepRisk's risk metrics*	*Annual reports* *CSR reports* *Company and subsidiary websites* *Carbon Disclosures*
The number of data points:	*16-27 Criteria scores* *80-120 Industry-specific questions* *600-1,000 data points*	
Score adjustment	*Industry adjusted.*	*Absolute score.*
Controversies	*Part of main ESG rating.*	*Part of main ESG rating.*
Update frequency:	*The main score yearly updated.* *Controversies penalties monthly.*	*Yearly and weekly regarding controversies*
Asset classes scored:	*Stocks and coporate bonds.*	*Sovereign Bonds (Countries)* *Stocks and Corporate Bonds (Listed companies and unlisted companies with listed bonds)* *Real estate* *Supranational institutions*
The number of securities scored:	*4,600 Securities: Stocks and Corporate Bonds (Corporations)*	*3,000 companies rated* *195 countries assessed, 180 countries awarded with a score.*
Scoring Scale:	*0-100 score percentile ranked.*	*A+, A, A-: Sustainable or supports the transition towards sustainability* *B+, B, B-: On the path to sustainability* *C+, C, C-: Not sustainable, but with less negative impact* *D+, D, D-: Not sustainable*

**If yes then the year is indicated in a parenthesis*

Table 7 and 8 summarizes the methodologies studied in a comparable manner, allowing better overview of how these methodologies differ.

5. Conclusion and future studies

5.1 Conclusion

Concludingly, ESG is a quantitative tool to assess risks, risk that are perhaps undiscoverable by other quantitative measures. There is also a good probability that high ESG-scores adds alpha to investments. The case for increasing global sustainable development, despite gaining vast amounts of AUM in the last years, is less positive. It is still unclear what the environmental gain is. Working to improve sustainable development and towards reaching the SDGs is an important part incentive for having ESG in the first place. Measuring the potential improvement made by adopting ESG practices will decide whether or not ESG will have the same status in the future as it has today.

5.2 Future studies

The author suggests further studies on time series itself to identify patterns of ESG stocks to see if a classifier tool could help make an ESG score, especially for those cases where no sustainability reports of proxy reports are available for the target company. This could potentially improve ESG-scoring in the future, by lessening the disclosure bias introduced above. The same idea applies to intermediary scores within the total score calculation, such as improving green-house-gas estimate models, etc.
Most importantly, measuring the impacts and differences made of investing responsibly is key to ensure stakeholders that the impacts is tangible and not just a lost effort.

6. References

Allen K., 2018. *Lies, damned lies and ESG rating methodologies.* Financial Times.

Allianz Global Investors, 2015. *ESG in Real Estate – Research analysis on Environmental, Social and Corporate Governance factor materiality for private Real Estate portfolios.*

Amel-Zadeh A. & Serafeim G., 2018. *Why and How Investors Use ESG Information: Evidence from a Global Survey.* Financial Analysts Journal, 74:3, pages 87-103, 2018.

Atan R., Alam M., Said J. & Zamri M., 2018. *The Impacts of environmental, social, and governance factors on firm performance.* Management of Environmental Quality: An International Journal, Vol. 29, No. 2, 2018, pp. 182-194.

Baier P., Berninger M. & Kiesel F., 2018. *Environmental, social and governance reporting in annual reports: A textual analysis.* Technische Universität Darmstadt.

Baumann R., 2017. Chapter 17. *Sustainable Real Estate. Handbook of sustainable investments. Background information and practical examples for institutional asset owners. © 2017 Swiss Sustainable Finance. pp. 125-127.*

Brundtland, G., 1987. *Report of the World Commission on Environment and Development: Our Common Future*. United Nations General Assembly document A/42/427.

Cappucci M., 2018. *The ESG Integration Paradox.* Journal of Applied Corporate Finance, Volume 30, Number 2, Spring/Summer 2018.

Chadler J., 2018. *ESG currency investing.* 2019 Record Currency Management.

Chaudhry K., Shaikh V., Hanif A., Lakos-Nujas D., Smith R., Hlavaty B. & Kolanovic M., 2016. *ESG – Environmental, Social & Governance Investing. A Quantitative Perspective of how ESG can Enhance your Portfolio.* J.P. Morgan, 14th December 2016.

del Mar Miralles-Quiros M., Miralles-Quiros J. L. & Guia Arraiano I., 2017. *Sustainable Development, sustainability Leadership and Firm Valuation: Differences across Europe.* Business Strategy and the Environment 2017;26:1014-1028. John Wiley & Sons Ltd.

Drempetic S., Klein C. & Zwergel B., 2019. *The Influence of Firm Size on the ESG: Corporate Sustainability Ratings Under Review.* Journal of Business Ethics, 27th April 2019

Dunn J., Fitzgibbons S. & Pomorski L., 2017. *Assessing Risk Through Environment, Social and Governance Exposures.* AQR Capital Management, February 2017.

Eurosif, 2018. *European SRI Study 2018*.

Eurosif, 2014. *European SRI Study 2014*.

Friede G., Busch T. & Bassen A., 2015. *ESG and financial performance: aggregated evidence from more than 200 empirical studies.* Journal of Sustainable Finance & Investment (2015).

Global Reporting Initiative, 2019a. *Reporting drives corporate change to achieve SDGs.* Global Reporting Initiative, 2019a. Accessed: 2019-08-17.

Global Reporting Initiative, 2019b. *About GRI.* Visited: 2019-08-17.

Global Reporting Initiative, 2019c. *Global Sustainability Standards Board: Overview*. Accessed: 2019-08-14.

Growth Analysis, 2019. *ESG och transparens – vägen till grön omställning? (EN: ESG and transparency – the way to a green shift?)*. Growth Analysis, The Swedish Agency for Growth Policy Analysis, 2019.

Halbritter G. & Dorfleitner G., 2015. *The wages of social responsibility – where are they? A critical review of ESG investing.* Review of Financial Economics 26 (2015) 25-35. Elsevier.

Heugh K. & Fox M., 2017. *ESG and the Sustainability of Competitive Advantage.* Morgan Stanley Investment Management, 2017.

Hitchens R., McCullagh S. & Parks C., 2015. *ESG-α Series. Finding Alpha in ESG.* Credit Suisse, 19th June 2015.

Landi G. & Sciarelli M., 2019. *Towards a more ethical market: the impact of ESG rating on corporate financial performance.* Social Responsibility Journal, Vol. 15, No. 1, 2019, pp. 11-27. Emerald Publishing Limited.

Inrate, 2018. *ESG Country Rating*. Accessed: 2019-08-16.

Kotsantonis S., Pinney C. & Serafeim G., 2016. *ESG Integration in Investment Management: Myths and Realities.* Journal of Applied Corporate Finance, Volume 28, Number 2, Spring 2016.

Manita R., Giuseppina Bruna M., Dang R. & Houanti L.H., 2018. *Board gender diversity and ESG disclosure: evidence from the USA.* Journal of Applied Accounting Research, Vol. 19, No. 2, 2018, pp. 2016-224. Emerald Publishing Limited.

McDowell H., 2019. *Eurex to introduce ESG futures in the US.* The Trade News, 26th of March, 2019.

Monasterolo I., Battiston S., Janetos A. & Zheng Z., 2017. *Vulnerable yet relevant: the two dimensions of climate-related financial disclosure.* Springer 2017.

MSCI Research, 2018. *MSCI ESG Ratings Methodology.*

Nagy Z., Kassam A., and Lee L.E., 2015. *Can ESG add alpha? An analysis of ESG Tilts and Momentum Strategies*. MSCI Research Inc., June 2015.

Oliver Wyman & AVPN 2018. *Driving ESG Investing in Asia. The Imperative for Growth*.

Porse E., Fredriksson H., Grapenfelt C., Fält A. and Svensson H., 2017. *Strategy & Quant: Cracking the ESG code.* Nordea AB.

Przychodzen J., Gómez-Bezares F., Przychodzen W. & Larreina M., 2016. *ESG Issues among Fund Managers – Factors and Motives.* Sustainability, 2016, 8, 1078.

Refinitiv, 2017. *Thomson Reuters ESG Carbon Data and Estimate Models.*

Reutimann J., Wani A. & Hurst T., 2019. *Inrate's ESG Impact Rating Methodology – Countries & Sovereign Bonds.* Inrate 2019.

Robeco, 2019a. *Robeco at a glance.* Accessed: 2019-08-10.

Robeco, 2019b. *About RobecoSAM.* Accessed: 2019-08-10.

RobecoSAM, 2016. *CSA Guide – RobecoSAM's Corporate Sustainability Assessment Methodology.*

RobecoSAM, 2018. *2018 RobecoSAM Corporate Sustainability Assessment – Annual Scoring & Methodology Review.*

RobecoSAM, 2019a. *About us.* RobecoSAM, 2019a. Accessed: 2019-08-13.

RobecoSAM, 2019b. *Measuring Intangibles – RobecoSAM's corporate sustainability assessment methodology.*

RobecoSAM, 2019c. *SAM Corporate Sustainability Assessment 2019, Criterion Weights by SAM Industry.*

Sanches Garcia S. A., Mendes-Da-Silva W. & Orsato R., 2017. *Sensitive industries produce better ESG performance: Evidence from emerging markets.* Journal of Cleaner Production 150 (2017) 135-147. Elsevier.

Schwegler R., 2018a. *Benefits of the ESG Impact Assessment – Corporations (Equities & Bonds).* Inrate 2018.

Schwegler R., 2018b. *Inrate's ESG Impact Rating Methodology – Corporations (Equities & Bonds).* Inrate 2018.

Spinaci S., 2019. *Sustainable finance and disclosures – bringing clarity to investors.* EU Legislation in Progress. European Parliament, 2019.

Steadman R. & Perrone D., 2019. *The S&P 500® ESG Index: Integrating Environmental, Social, and Governance Values into the Core.* S&P Dow Jones Indices LLC, 2019.

Stern N., 2007. Summary of Conclusions. *The Economics of Climate Change: The Stern Review.* Pages xv-xx. Cambridge: Cambridge University Press. DOI:10.1017/CBO9780511817434.003

Strongin Dodds L., 2019. *ESG & Derivatives – The 'Greening' of the Listed Derivatives Markets.* DerivSource, June 20th, 2019. Accessed: 2019-08-22.

S&P Dow Jones Indices LLC, 2019. *Frequently Asked Questions – S&P DJI ESG Scores.* S&P Dow Jones Indices LLC, 2019.

Thomson Reuters 2018. *Thomson Reuters IX Global ESG Equal Weighted Index – Index Methodology.*

Thomson Reuters, 2019. *Thomson Reuters ESG Scores*. February 2019.

Trinks P. J. & Scholtens B., 2015. *The Opportunity Cost of Negative Screening in Socially Responsible Investing*. Springer, 15th May 2015.

UNEP Finance Initiative & UN Global Compact, 2018. *Principles for Responsible Investment Annual Report 2018*.

UNPRI, 2019. *Website for Annual Report 2019: Search results*. Visited: 2019-08-09.

van Duuren E., Plantinga A. & Scholtens B., 2016. *ESG Integration and the Investment Management Process: Fundamental Investing Reinvented.* J Bus Ethics (2016) 138:525-533.

Westman T., 2016. *Krav på hållbarhetsrapportering från och med 2017. (EN: Requirements on sustainability reporting starting 2017).* KPMG Sweden, 2016.

Xie J., Nozawa W., Yagi M, Fujii H. & Managi S., 2019. *Do environmental, social, and governance activities improve corporate financial performance?* Business Strategy and the Environment 2019;28:286-300. John Wiley & Sons Ltd.

Yee Lo K. & Lee Kwan C., 2017. *The Effect of Environmental, Social, Governance and Sustainability Initiatives on Stock Value – Examining Market Response to Initiatives Undertaken by Listed Companies.* Corporate Social Responsibility and Environmental Management, 24, 606-619 (2017). John Wiley & Sons Ltd.

7. Appendix

7.1 Method, structured state of the art

This state of the art uses two methods of information gathering, one method retrieving company published reports on the state of ESG today and another that is more focused on the academics view of ESG. This provides a dual perspective to study the same subject and might reveal differences between the two.

7.1.1 Corporate reporting on ESG

In the first navigational part of this work, the focus was on retrieving the reports published by companies directly involved with ESG scoring. This search was aimed at finding firsthand information on the current ESG-metrics available, without giving to much weight to the perceived opinion on ESG but rather having a focus on what way ESG information is gathered from each company and actual calculation of the score.

The method used to find corporate published reports was by first conducting an initial search on academic libraries and search engines, from there ESG papers were selected and reviewed to find the ESG indices and ESG scoring companies. These companies were listed and each of their websites was investigated for information regarding ESG information retrieval from the affected assets but also on metric calculation and weighting. If none of the information mentioned above could be found explicitly during this search, another search was made on Google, Google Scholar, Microsoft Academic, Springer, Elsevier, John Wiley, Emerald and on Swiss Sustainable Finance, with the name of the ESG index.

7.1.2 Academic published reports on ESG

In the second part, the focus was on academic articles that are peer-reviewed and not published before 2015. This search was conducted on SSRN, Google Scholar Microsoft Academic, Springer, Elsevier, John Wiley, Emerald and on Swiss Sustainable Finance. Not all articles reflect the purpose of this study and have therefore the search results have been screened to contain the intended subject.

7.1.2.1 Search-terms

The search terms used in the academic part of the information gathering were constructed of related words and terms to the subject. First relevant terms were isolated resulting in the terms in table 9.

Table 9: Terms and synonyms

Term	**Synonyms, Abbreviations**
Environment Social Governance	ESG
Socially Responsible Investing	SRI, Socially Responsible Investment
Corporate Finance Performance	CFP
Corporate Social Responsibility	CSR
Sustainable Investing	SI
ESG Integration	ESG-Integration
Negative Screening	Exclusions
Positive Screening / Best In Class	
Thematic Investing	
Impact Investing	
Portfolio Management	
Principles for Responsible Investments	PRI

Secondly, the terms were combined with ESG to restrict branching out in other fields of work. This resulted in the terms in table 10.

Table 10: Searched terms

Searchterm	**Nr:**
ESG	1
ESG SRI (ESG-SRI)	2
ESG Sustainable Investing	3
ESG CFP (ESG-CFP, ESG Corporate Finance Performance)	4
ESG CSR	5

ESG Integration (ESG-Integration)	6
ESG Negative Screening (ESG Exclusions)	7
ESG Portfolio Management	8

7.1.2.2 Selection criteria of search-results

In a field were more than 800,000 publications can be found it is essential to narrow down the search correctly. The following criteria were made to ensure the quality and reliability of this work, in a largely active field.

- Peer-reviewed
- Research paper
- Company reporting
- Published from 2015 to 10th of August 2019

The reason for filtering out results from earlier than 2015 is partially because a major survey analyzing 2,200 studies (Friede et al., 2015), mapping what has been done until then, but also because much has changed since then and the AUM using ESG is higher than ever.