

Louvain School of Management

Impact of Environmental, Social and Governance disclosure on risk-return performance:
An empirical analysis of the STOXX Europe 600 using the Bloomberg ESG Disclosure Score

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Abstract

In the last decades the socially responsible investments market grew rapidly accompanied by a growth in environmental, social and governance (ESG) disclosure by firms. This trend was born out of investors and regulators' demand for transparency and non-financial information, which reflects a change in investors' motivations and ways of investing. Notwithstanding, literature bringing disclosure and transparency into focus remains scarce. The aim of this master thesis is therefore to investigate this new information and to examine to what extent environmental, social and governance disclosure, and hence transparency, impacts the European equity market.

Building on prior literature, we use a portfolio analysis and Carhart's extension of the CAPM to shed light on this question. Using the Bloomberg ESG Disclosure Score as a proxy for ESG transparency and as a screening tool, we built leading and lagging portfolios in order to compare their risk-adjusted performance. The empirical analysis was conducted from 2010 until 2017 and is based on a sample of 462 stocks coming from the STOXX Europe 600 index.

On the one hand, it seems that transparent firms, represented by portfolios composed of companies with high ESG disclosure score, do not perform differently than the market. On the other hand, we found that less transparent firms seem to outperform the market in some cases. Additionally, in line with previous studies, we found strong discrepancies in firms' level of disclosure, with larger companies appearing to disclose more information than smaller ones.

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List of Acronyms

CAPM	Capital Asset Pricing Model
CSR	Corporate Social Responsibility
ESG	Environmental, Social and Governance
HML	High Minus Low
SML	Small Minus Big
SRI	Socially Responsible Investments/Investing
WML	Winner Minus Loser

Chapter 1: Introduction

Socially Responsible Investments (SRI) gained increasing public attention in recent decades and are undoubtedly becoming a major trend of the 21st century. Reaching \$22,9 trillion assets under management in 2016 with Europe and the United States of America leading the path in the field (Eurosif, 2016), these new investment strategies represent a shift in investors' motivations and considerations, which is in line with the expansion of corporate social responsibility (CSR).

Usually defined as investment practices aiming at the systematic integration of Environmental, Social and Governance factors (ESG) (Eccles & Viviers, 2011), SRI and their new considerations appear to be a means to broaden the scope of the analysis by using non-financial information as a complement to traditional financial data (Galema, Plantinga, & Scholtens, 2008). These factors participate in the investment decision thanks to better-informed choices and help to determine more precisely material issues that may represent risks or opportunities for companies. As a result, the disclosure of such factors is crucial to allow the investment side to make thoughtful decisions in the investment process and to bring more transparency in markets.

With these features in mind, we have seen a plethora of ESG data emerging fueled by an increasing demand from investors and regulators. Disclosure of CSR initiatives and of ESG performance is indeed particularly important to stakeholders as it can directly affect companies and investors' perceptions (Roy & Gitman, 2012).

Notwithstanding, literature bringing disclosure and transparency into focus remains scarce. We have observed in prior literature that various sets of ESG measures have been tested in portfolio analyses in order to assess their impacts on equity markets. However, those measures were mainly ESG performance ratings (e.g. KLD scores, Sustainalytics, Robecosam) and previous studies mainly focused on the link between ESG disclosure and CSR involvement or on the impact of ESG performance on company value or stock price (Clark, Feiner, & Viehs, 2015; Friede, Busch, & Bassen, 2015; Galema, Plantinga, & Scholtens, 2008; Kempf & Osthoff, 2007; Statman & Glushkov, 2009). Moreover, to the best of our knowledge, ESG disclosure ratings, such as the Bloomberg ESG Disclosure Score, have not yet been investigated in a portfolio analysis.

In this context, our goal in this master thesis is to investigate the disclosure of this new kind of information to observe to what extent ESG disclosure has an impact on financial markets and, more precisely:

To what extent does Environmental, Social, and Governance disclosure impact the risk-adjusted performance in the European equity market?

We use the Bloomberg ESG Disclosure Score in a portfolio analysis to help us generate relevant insights in order to shed light on our research question. Our aim in this master thesis is to show whether the incorporation of an ESG disclosure factor in the investment process could be relevant by examining the impact of ESG disclosure on risk-adjusted performance. In other words, we aim at showing how, based on this score, a screened portfolio performs in comparison with an unscreened equity universe. To answer this question, we construct high and low ESG portfolios based on a positive and best-in-class screening. To investigate the impact of this screening, we use Carhart's extension of the Capital Asset Pricing Model over the 2010-2017 period in order to assess the risk-adjusted performance of leading and lagging portfolios.

Overall, we found that the market performance of portfolios composed of companies with the highest ESG disclosure score do not perform differently compared to the European market. In comparison, portfolios with the lowest level of ESG disclosure seem to outperform the market in certain circumstances. Additionally, we found strong discrepancies in the size of companies included in the leading and lagging portfolios with largest firms mainly included in transparent portfolios.

This master thesis contributes to the existing literature on Socially Responsible Investments by using the most recent data and by introducing the Bloomberg ESG Disclosure Score as a proxy for ESG transparency and as a new screening tool.

Our master thesis unfolds as follow. Chapter 2 offers an overview of socially responsible investments with a particular focus on environmental, social and governance factors integration and disclosure. Chapter 3 builds on previous literature in order to offer a relevant theoretical background. We highlight empirical works done by previous authors as well as their results and we develop hypotheses to be tested in the rest of this paper. Chapter 4 sheds light on the methodology we use and on the data that we retrieve. Finally, Chapter 5 presents our results and confronts them with previous literature afore discussing potential explanations.

Chapter 2: Socially Responsible Investments

In this chapter, we delineate the context and clearly define the specific terminology used in this thesis. The purpose is to provide the reader with all the necessary background information in order to enable a comprehensive reading of the paper. We first highlight Socially Responsible Investments notions, and thereupon focus on Environmental, Social, and Governance factors.

2.1. Overview of Socially Responsible Investments

Before going any further, we address the origins of socially responsible investments. The focus of this section is to specify the used terminology and to shed light on the current state of SRI around the world.

2.1.1. Origins and Definition

Socially Responsible Investments (SRI) recently disrupted the traditional financial industry and marked the beginning of a new era of thinking and managing investments. Such investments nonetheless are not as innovative as we might believe. Actually, this concept is rooted in early biblical times in the Jewish rules for ethical investments (von Wallis & Klein, 2015) and strengthened in the 1700s with the Methodist movement led by John Wesley (Schueth, 2003).

Gradually, the concept of “ethical investment” left the religious sphere and started reaching people’s mindset and behavior. The second half of the twentieth century, marked by the birth of the concept of Corporate Social Responsibility (CSR), appeared as a turning point in the history of financial markets. Today, more attention is paid to business impacts on society, which was definitely not the case before (Hill et al., 2007). The emergence of SRI occurred concurrently to the encounter of CSR with the investment industry (Hill et al., 2007).

Socially Responsible Investment, Ethical Investment, Social Investment, Impact Investing, Sustainable Investment are all concepts that aim to name types of investments that take “environmental, social and governance” elements into closer consideration (Eccles & Viviers, 2011). At present several academics have already debated the issue of the heterogeneity and ambiguity in SRI terminology (Sandberg et al., 2008).

Eccles and Viviers (2011) reviewed more than 190 academic papers and analyzed the terminology around SRI. The authors offered the following extensive definition of Responsible Investment which we apply in this paper: Responsible investments are “Investment practices that integrate a consideration of ESG [Environmental, Social and Governance] issues with the primary purpose of delivering higher-risk-adjusted financial returns” (Eccles & Viviers, 2011, p. 25).

As a matter of fact, this definition is an improvement on Sparkes (2001). In his work, Sparkes (2001) addressed the lack of consensus about the SRI definition and came up with the following characterization: “The key distinguishing feature of Socially Responsible Investment lies in its combination of social and environmental goals with the financial objective of achieving a return on invested capital approaching that of the market” (Sparkes, 2001, p. 201). The designation “*approaching*” was considered problematic by Eccles and Viviers. They therefore suggested the aforementioned definition of Responsible Investment.

The SRI universe encompasses a number of investing strategies and features. The European SRI study (Eurosif, 2016), in collaboration with some investment industry’s experts (e.g. Candriam, Degroof Petercam, Mirova, and Northern Trust), provides a classification of those strategies. This classification enables a distinction between the seven following SRI strategies: exclusion, norms-based screening, best-in-class screening, sustainability themed investment, ESG integration, engagement and voting, and impact investing (Eurosif, 2016). It is worth mentioning that those sub-categories are not mutually exclusive; an asset can be part of more than one sub-category. More information on the SRI strategies is provided in appendix 1.

2.1.2. Current State around the World

Even though SRI gained momentum all around the world, there are some major discrepancies between regions. In order to contextualize the current state of SRI, we will start this section by highlighting key facts and figures related to each part of the world.

The Global Sustainable Investment Alliance (GSIA), in its latest Global Sustainable Investment Review (2016), analyzed the evolution and repartition of SRI assets by region. Table 1 clearly shows Europe’s and the United States’ domination in terms of assets under management (respectively \$12,04 and \$8,72 trillion in 2016, corresponding to more than 90% of global SRI assets). However, the proportion of SRI assets compared to the total managed amount is 52,6%

in Europe opposed to only 21,6% in the United States. This predominance of Europe in the adoption of SRI strategies is confirmed by Scholtens (2014).

Table 1: SRI assets by region (GSIA, 2016, p.7)

This table highlights the amount of SRI assets under management (AuM) by region, the proportion of SRI assets in the total AuM and the repartition of SRI assets across regions.

Region	SRI Assets under management (in \$ billion)	Proportion relative to Total Managed Assets (in %)	Proportion of Global SRI Assets (in %)
Europe	12 040	52,6	52,6
United States	8 723	21,6	38,1
Canada	1 086	37,8	4,7
Australia/New Zealand	516	50,6	2,3
Asia excl. Japan	52	0,8	0,2
Japan	474	3,4	2,1
TOTAL	22 891		100

Furthermore, Puaschunder (2016) reviewed international differences between North America, Europe, the Pacific Rim and Emerging Markets and came to the same conclusions, which could be explained by a cultural difference between Anglo-Saxon and Roman countries. Indeed, the latter are striving for a meaningful social impact, whilst the others are focusing on return on investments first.

2.2. Focus on Environmental, Social and Governance Factors

After having shed light on the scope of Socially Responsible Investments, we now follow by investigating the essence of ESG factors and their added value to the financial industry and to investors. During the last decade, ESG issues gained increasing importance amongst investors, shareholders and governments because of their capacity to materialize risks faced by companies and likewise at times representing a central part of firms' competitive strategy (Galbreath, 2013). There is a countless number of ESG issues highlighted in the media that caused investors and firms substantial losses due to poor attention and risk management linked to ESG issues.

The infamous governance issues of some companies like Enron, WorldCom, Lehman Brothers, AIG, Bernard Madoff Investment Securities, Société Générale (to list only a few), are unfortunately still fresh in our minds and proved extremely costly to investors. According to Hayat and Orsagh (2015), although less visible, environmental concerns such as climate change and excessive use of fossil fuels are more and more expressed during annual meetings. In addition, they found that social concerns are believed to have both a direct impact through the workforce and an indirect one through reputation on the value of companies.

In the next sections, we investigate those ESG factors; how they can be integrated in the investment process and why the disclosure of such non-financial factors is decisive.

2.2.1. ESG Factors and Motivation

As aforementioned, responsible investments were defined by Eccles and Viviers (2011) as “Investment practices that integrate a consideration of ESG issues with the primary purpose of delivering higher-risk-adjusted financial return”. Throughout the years, ESG factors have become key indicators for environmental, social and corporate governance issues reflecting the competences of the companies’ management in these fields and its capacity to mitigate the risks associated with these factors (Boerner, 2011).

According to Kiernan (2007): “As we move deeper and deeper into the era of knowledge-value and intangibles, conventional balance sheets and profit and loss statements are capturing less and less of a company’s true value, investment risk and competitive potential.”. Hence, considering ESG factors in investment decisions appears to be a means to broaden the scope of the analysis by covering environmental-related issues (e.g. climate change and carbon emissions, air and water pollution, biodiversity, deforestation, waste management), social issues (e.g. gender equality, human rights, employee engagement, customer satisfaction) and corporate governance issues (e.g. board independence, corruption and bribery, executive compensation, shareholder protection).

The consideration of those factors raises three main challenges: the difficulty to determine their monetary value, to integrate them in quantitative models and the fact that ESG-related disclosure may be limited, unverified or non-standardized (Hayat & Orsagh, 2015). However, awareness has been growing and the ESG data usage has been rising as today’s investors face a wide choice of ESG data providers such as Bloomberg, FTSE Russel, MSCI, S&P, Thomsons

Reuter, RobecoSAM, or Sustainalytics. According to Bloomberg, the number of their ESG customers grew from 5 172 in 2012 to 14 935 in 2017, and their motivations are diverse (Bloomberg, 2018).

Amel-Zadeh and Serafeim (2017) looked at investors' motivations to use ESG data. They discovered that 82% of the respondents use ESG information in their investment decision mostly because of the materiality to investment performance. Furthermore, Renneboog, Ter Horst, and Zhang (2008) and Bollen (2007) explain that investors nowadays integrate personal and societal values in their investment decisions.

2.2.2. ESG Disclosure

It is crucial to have a clear view on ESG data before developing SRI strategies. More precisely, an understandable and standardized format is required for the disclosure of ESG data. Otherwise, no relevant analysis or comparison can be made. Therefore, we will highlight the importance of ESG disclosure in the investment process from the supply and demand side of information.

ESG factors are, by definition, non-financial elements. It means that they are consequently difficult to quantify and verify compared to accounting metrics. However, in financial markets, the recognition and integration of such factors were born out of the awareness that non-monetary issues and issues that are not part of traditional financial metrics might also impact the risk and return of investments (Hayat & Orsagh, 2015).

As a result, an increasing number of investors take ESG factors into consideration in their investment process. Their disclosure thus plays a central role for investors and financial markets as a whole (Gilbert & Slater, 2004). Consequently, in order to improve the ESG disclosure offering and to meet the investors demand, several key players of the financial industry undertook major projects.

With fewer than 20 firms issuing sustainability reports in the early 90s, this number grew to reach 9 000 back in 2016, showing an exponential growth in ESG reporting and measuring (Amel-Zadeh & Serafeim, 2017). This trend is supported by the growing interest of investors that is reflected by the number of signatories to the UN Principle for Responsible Investment (PRI) that committed to incorporate ESG factors in their investment decisions. In 2017,

signatories were 1928 with \$68 trillion assets under management (Principle for Responsible Investment, 2017).

2.2.2.1. Demand of ESG Disclosure

The huge demand for ESG disclosure has strongly contributed to enhance the supply side. Nowadays, a growing number of investors seriously look at ESG factors before making investment decisions and are looking for relevant and material information. Investors consider ESG factors because they want to evaluate the medium- and long-term risk profile of companies (EY, 2017).

The CFA Institute conducted a survey in May 2017 in which their members shared their view on how ESG issues influence the investment process (CFA Institute, 2017). The results of this survey show that 73% of the responders take ESG issues into consideration, and 51% take these non-financial factors into account systematically. Among those who do not look at ESG factors, 19% do so because of a lack of available information. This number slightly declined in comparison with 2015 (21%) but remains high since it is the third reason for not taking into consideration ESG factors.

The EY report (2017) entitled “Is your non-financial performance revealing the true value of your business to investors?” also analyzed trends in ESG reporting and influences on investors. The results corroborate the findings of the CFA Institute (2017) on arguments against considering ESG factors in the investment process. Indeed, 42% of the surveyed investors answered that “Nonfinancial measurements are seldom available for comparison with those of other companies”, and another 42% answered that “Nonfinancial information is often inconsistent, unavailable, or not verified” (EY, 2017, p. 24).

This reflects a strong demand for ESG data, which is not fulfilled yet. Although the importance of ESG data to assess the medium- and long-term potential of a company is well understood by investors, the supply of such data does not meet the investors’ needs and still has to mature. In October 2016, PwC released “Investors, corporate, and ESG: bridging the gap”. This report investigated the opinions of both supply and demand sides on ESG data. One of the main findings is that all the respondents are confident in the quality of ESG data disclosed, while only 29% of investors said they are confident in the quality of the ESG information they received (PwC, 2016).

Accordingly, we can clearly observe that there is an “ESG quality gap” in the disclosed information. Demand, on the one hand, is looking for additional and comparable ESG data in order to integrate it in the investment process. Supply, on the other hand, has to find solutions in order to meet the demand’s needs. This is currently being done via third-parties trying to provide frameworks and guidelines for a harmonized and, therefore, relevant ESG disclosure. This point will be developed in the next section.

2.2.2.2. Supply of ESG Disclosure

In the last decade, some actors have tried to harmonize the ESG disclosure environment. Those kinds of initiatives and standards help companies to credibly report on their ESG activities (Deloitte, 2016; PwC, 2016). As listed by Deloitte (2016), the main referenced standards and initiatives related to ESG disclosure are the Global Reporting Initiative (GRI) G4 Guidelines, the Sustainability Accounting Standards Board (SASB) provisional standards, the International Integrated Reporting Council (IIRC), and stock exchanges initiatives like the World Federation of Exchanges (WFE) or the United Nations Sustainable Stock Exchange (SSE) guidelines.

However, among those initiatives, the GRI is the best-known (Brown, de Jong & Levy, 2009) and the most frequently used (PwC, 2016) framework for non-financial factors reporting. In fact, the GRI qualified itself as a “pioneer of sustainability reporting” (Global Reporting Initiative [GRI], 2018) as the first guidelines were released in 1997. Moreover, they succeeded in transforming ESG disclosure from a marginal to a mainstream activity.

In addition to guidelines initiatives, regulators around the world became conscious of the growing importance of ESG factors. As a result, in Europe, the European Parliament and the Council of the European Union adopted in October 2014 a directive regarding the disclosure of non-financial and diversity information. The directive 2014/95/EU requires large public-interest companies in Europe, which employ more than 500 people to disclose ESG information in their financial statements. As of 2018, those companies will have to publish, in addition to their annual report, information on their policies related to environmental protection, social responsibility, human rights, anti-corruption and diversity on company boards (Directive 2014/95/EU, 2018). This directive comes from a willingness to increase transparency and investors’ confidence, as well as to offer investors the possibility to assess risks and opportunities of their investments more efficiently. To help the reporting process, the European

Commission released non-binding guidelines, and companies will benefit from flexibility in the way they will disclose ESG information.

If we take the example of the S&P 500 companies, the Governance & Accounting Institute (as cited in PwC, 2016) reported that only 20% of companies issued ESG reports in 2011 while 81% issued this kind of reports in 2015. The growth of ESG reporting was huge in the past 7 years and the example of the S&P constituents is unquestionably not an exception. In fact, the patterns applied to all companies in the world. As of today, about half of the large and mid-cap companies report on their ESG activities (Nixon, 2018). What was not even considered in the past will “cease to exist as something separate from financial reporting” wrote Tim Nixon in *The Economist* (2018).

Chapter 3: Literature Review and Hypotheses Development

The quest to know if a relation exists between ESG factors and financial performance is not new and can be traced back to the beginning of the 70s (Friede, Busch, & Bassen, 2015). The general idea is that, if the semi-strong form of the efficient market hypothesis holds, the stock market should recognize and adjust a single firm's value according to both financial and corporate performance, taking non-financial metrics also into account.

In this chapter, we first develop arguments that might explain both a potential positive or negative relation between ESG factors and market performance. The goal is to explain from a theoretical point of view why investments based on ESG factors should outperform or underperform traditional investments as well as to highlight the added value of taking ESG factors into consideration.

Hereafter, we review empirical academic studies dealing with the relation between ESG factors and market performance. The goal is to summarize the used methodologies and the results obtained in the prior literature. Based on this literature review, we then develop our hypotheses.

3.1. Performance of ESG-related Investments: A Theoretical Overview

While trying to explain the impact of ESG factors on financial performance and on stocks performance, different theories and hypotheses were put forward to justify both positive and negative impacts. Among the most cited theories in the prior literature, the *stakeholder theory* and the *modern portfolio theory* provide relevant points of view in the debate of ESG investments' performance.

3.1.1. Stakeholder Theory

On the one hand, many studies found a positive impact through different channels. Nevertheless, major arguments developed in favor of an outperformance of ESG-related investments are all directly or indirectly linked to a well-known theory, the stakeholder theory. First described by Edward Freeman in "Strategic management: A stakeholder approach" back in 1984, the *stakeholder theory* is commonly opposed to the *shareholder theory* developed earlier by Milton Friedman (Smith, 2003). The latter supports the fact that managers ought to maximize the shareholders profit only, meaning that there is a unique principal-agent

relationship between the shareholders and the managers of the company (Smith, 2003). As far as the stakeholder theory is concerned, it suggests that managers have a duty to a larger scope than only shareholders. That is to say, all stakeholders of the company that either voluntarily or involuntarily contribute to the activities of the company (Post, Preston & Sachs, 2002). It means that the firm is interconnected with several groups of individuals and organizations and has to deal with them in order to succeed (Freeman, 2010). Nowadays, the stakeholder theory prevails for both academics and professionals.

According to this theory, implementing CSR activities (i.e. developing ESG factors) should help companies to meet expectations of a wider range of stakeholders and not being seen purely as a cost or a waste of time as it is the case in the shareholder theory. As explained by Sahut and Pasquini-Descomps (2015), proponents of the shareholder theory argue that there is no room for ESG constraints in the firm's strategy:

“ESG engagement should be done separately, by for instance giving to charity. A shareholder investing in a firm with ESG constraints makes a consumption choice where the charity portion is going to the firm, hence he expects a lower cost of capital from the firm. This model should lead to neutral effect for the performance of firms with high ESG ratings...” (Sahut & Pasquini-Descomps, 2015, p. 43)

However, taking into consideration all stakeholders is the equivalent of taking into consideration all potential beneficiaries and/or risk bearers of the company (Post, Preston, & Sachs, 2002). In that sense, companies that undertake ESG activities are more likely to be seen positively by their stakeholders (including investors) and, ultimately, to outperform other companies. The literature offers several views in which ESG factors could explain a positive impact on the financial performance of companies.

A first view is that ESG activities and performance confer a positive aura and enhance a firm's image and reputation (Sahut & Pasquini-Descomps, 2015). According to Figge (2017), ESG disclosure can be seen as a mechanism used to show transparency, reliability and accountability to customers, and hence impacts the investors' perception.

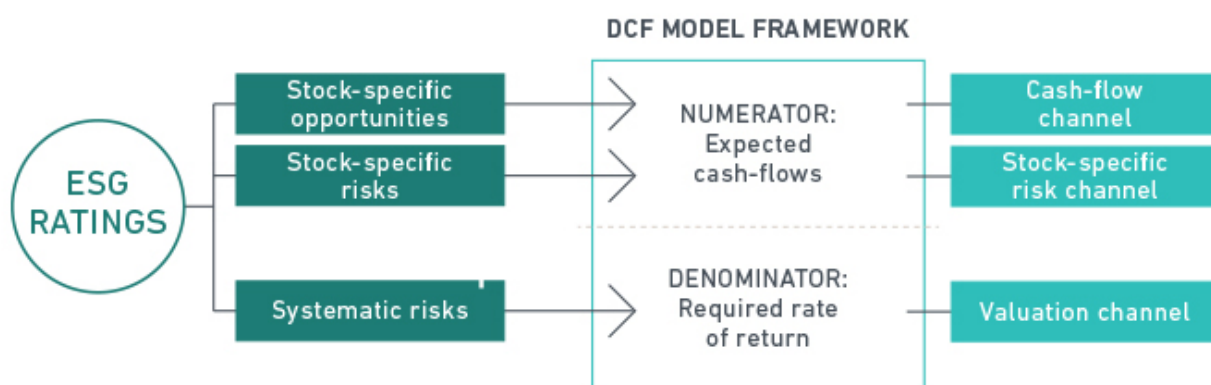
Furthermore, it has been shown that CSR and ESG activities can become part of a company's competitive advantage. In their study, Gupta and Benson (2011) show that companies can use

“sustainability initiatives to gain operational efficiency, increase operational effectiveness, improve strategic positioning/fit, spur to innovation, redesign commerce, and enhance value”.

Another widely accepted view is the positive impact on performance through a reduction in the cost of capital. In their study Sahut and Pasquini-Descomps (2015) explain that, although the CSR practices and ESG activities necessary to put a “socially responsible” structure in place generate costs, these are compensated by a decrease in the cost of capital of the firm. Plumlee, Brown, Hayes and Marshall (2015) add that ESG performances contribute to a firm value through both the cash flow and the cost of equity component. Another impact of ESG on individual firm’s performance is through the reduction in residual risk. A company with high ESG performance should in theory have lower residual risk compared to the market (Sassen, Hinze, & Hardeck, 2016).

Overall, these arguments demonstrate that improving ESG at firm-level can lead to better stakeholder perception and, eventually, enhance financial and stock performance. Giese (2017) wrote on behalf of the MSCI that ESG factors affect the equity market via three transmission channels: the cash-flow channel, the idiosyncratic channel, and the valuation channel. Within a standard discounted cash-flow (DCF) model framework, Giese (2017) summarizes that ESG performance improves the financial valuation of companies at both numerator and denominator level.

Figure 1: Fundamental transmission channels from ESG to financial values through a DCF model (MSCI, 2017, p.1)



As put forward in Geise's study, the following rationale explains the three value transmission channels. The Cash-flow channel is defined as: *"High ESG-rated companies are more competitive and can generate abnormal returns, leading to higher profitability and dividend payments"* (Geise, 2017, p. 2). Then, the idiosyncratic risk channel should be understood as follows: *"High ESG-rated companies are better at managing company-specific business and operational risks and therefore have a lower probability of suffering incidents that can impact their share price. Consequently, their stock prices display lower idiosyncratic tail risks"* (Geise, 2017, p. 2). Finally, the valuation channel is explained in that way: *"High ESG-rated companies tend to have lower exposure to systematic risk factors. Therefore, their expected cost of capital is lower, leading to higher valuations in a DCF model framework."* (Geise, 2017, p. 2).

3.1.2. Modern Portfolio Theory

On the other hand, screening is commonly used in investment strategies in order to select ESG securities. This is especially the case in the funds industry; screening of any type (e.g. positive, negative, theme-based, etc.) is a widespread practice for the integration of ESG factors (GSIA, 2016).

This selection process has actually a major implication. Even if companies can perform better thanks to the integration of ESG factors in their business strategy for all the reasons mentioned in the previous section, it is not guaranteed that investors will access this extra return. Indeed, some argue that taking ESG factors into account in the portfolio creation, prevents investors from having access to their returns although such companies, on average, outperform their benchmark (Sahut & Pasquini-Descomps, 2015). The modern portfolio theory propounded by Makrowitz in 1952 goes in that direction, providing the argument against ESG-related investments outperformance (Verheyden, Eccles, & Feiner, 2016).

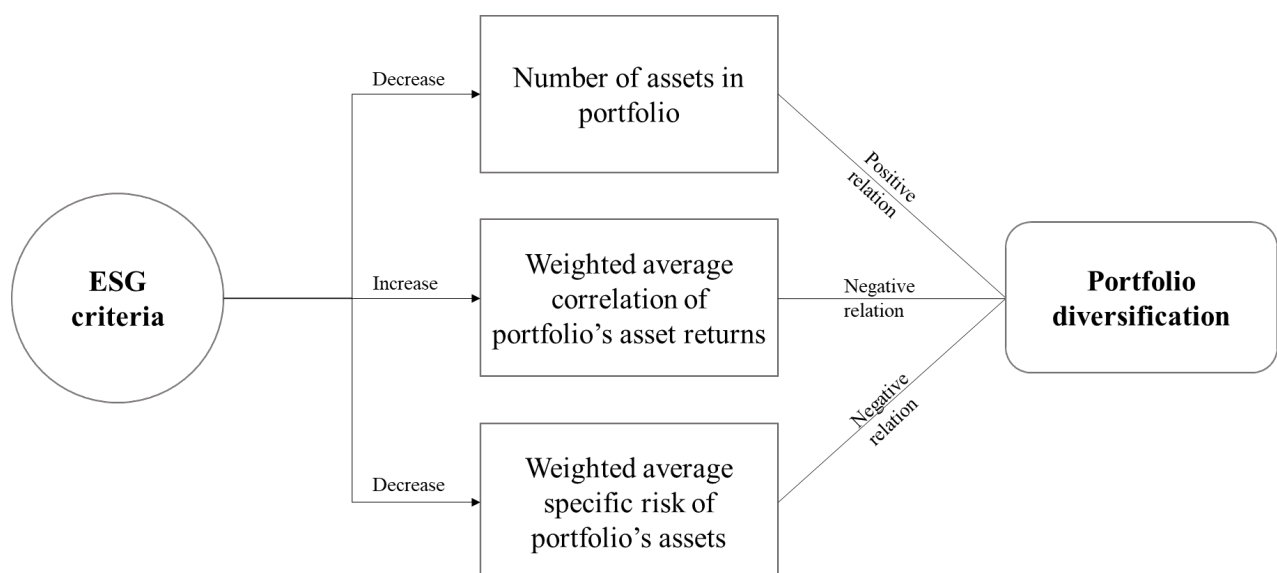
According to the modern portfolio theory, the total risk of an investment can be split into the unsystematic risk (also called the unique or idiosyncratic risk) and the systematic risk (also called market risk) (Van der Wijst, 2010). We differentiate between these two kinds of risk because of the *diversification effect*. The latter states that there is a relation between the portfolio risk and the number of assets in which we invest. In short, the higher the number of assets, the less risk we bear. In fact, the total portfolio risk will decrease with the number of assets up to a certain level of risk that will always remain, namely the market or systematic risk. The risk that

disappears with diversification is the unique or systematic risk for which investors are not remunerated for since it can be avoided (Van der Wijst, 2010).

Consequently, the major argument against the outperformance of ESG investments compared to conventional ones is derived from the diversification effect. Indeed, “according to the modern portfolio theory, it is impossible for an ESG-screened universe to be more diversified than a conventional universe, since the former is a subset of the latter” (Verheyden, Eccles, & Feiner, 2016, p. 51). Therefore, from a portfolio management perspective, taking ESG into account for the stock selection process may reduce the investable universe. This could negatively impact the risk-adjusted performance via a reduction of the diversification effect (Ortas, Moneva, & Salvador, 2014).

However, Hoepner (2010), in his study, states the following “Portfolio diversification and environmental, social or governance criteria: Must responsible investments really be poorly diversified?” tried to refute this argument by breaking down the diversification effect into three drivers. According to the author, the portfolio diversification depends on (1) the number of assets, (2) the correlation of the assets returns, and (3) the average specific risk of the assets.

Figure 2: ESG impact on the three drivers of portfolio diversification (Hoepner, 2010, p. 11)



Hoepner (2010) concluded that ESG factors likely worsen the first two drivers of portfolio diversification because of the reduction in the investment universe and of the excess correlation in the selected securities. However, the last driver is improved by ESG factors since the screening based on such criteria aims at selecting better securities with lower specific risk on average. Therefore, it compensates for the two other drivers and it is not proved that ESG investing reduces the portfolio diversification. Furthermore, Barnett and Salomon (2006) explain in their article that social screening intensity (e.g. ESG screening) reduces the investment universe but reaches an investment universe of a higher quality, more likely to generate better financial performance.

3.2. Impact of ESG Factors on Firm's Risk/Return Performance

After a theoretical overview of the arguments explaining how ESG investments should perform on the financial markets, we now review previous empirical studies and analyze their methodology and empirical findings. To do so, we first review two meta-studies that investigate a large scope of the literature in the field in order to derive a general trend in the findings. Then, seven studies are analyzed in depth, enabling a comprehensive understanding of the used methodology to reach their findings. We chose recent studies or studies that are cited abundantly in academic papers in order to select the most relevant sample. Furthermore, we managed to choose studies that used different methodologies in order to reflect as much as possible the current scope of research focusing on the relation between ESG factors and market performance.

To draw conclusions from all theories, Friede, Busch, and Bassen (2015) looked at more than 2000 studies on the relation between ESG and financial performance from 1970 to 2015 and found clear evidence of the positive impact of ESG criteria and of the interest to integrate ESG considerations into the investment process. Overall, they noted that “90% of studies find a nonnegative ESG–CFP [Corporate financial Performance] relation, of which 47,9% in vote-count studies and 62,6% in meta-analyses yield positive findings” (Friede, Busch, & Bassen, 2015, p. 217). Furthermore, they highlighted that portfolio studies, which consist of studies on artificial portfolios, indexes, or mutual funds, generally show a weaker relationship. This may be the case because such studies are affected by other elements (especially in indexes and

mutual funds, multiple screens and fees can interfere) and, therefore, it is difficult to isolate only one factor to test the hypothesis.

The University of Oxford, in collaboration with Arabesque Partners, published a meta-study in March 2015 entitled: “From the stockholder to the shareholder: How sustainability can drive financial outperformance” (Clark, Feiner, & Viehs, 2015). More than 200 different sources from 2007 to 2014 were investigated in this report. Moreover, the authors addressed two distinct questions related to the relation between sustainability practices and financial performance. They first explored the impact on the operational performance which is then translated into cash flows. They found that 88% of the reviewed sources show that better ESG practices imply better operational performance of companies. In addition, 90% of the studies show that ESG practices reduce the cost of capital of firms. Furthermore, the authors focused on the market performance of companies. They found that 80% of the sources show that better sustainability practices influence positively the stock price performance (Clark, Feiner, & Viehs, 2015).

Verheyden, Eccles, & Feiner (2016) analyzed the impact of ESG screening on risk, return, and diversification between 2010 and 2015. They first constructed portfolios based on an ESG best-in-class screening (using Sustainalytics score and compliance to the UN Global Compact) and based on ESG momentum (they selected companies based on the evolution and not the level of their ESG score). After creating portfolios at a 10% and 25% screen level, an analysis based on CAPM and its derived performance indicators was conducted. Eventually, the authors found no evidence of return reduction but clear evidence of risk reduction following an ESG screen (Verheyden, Eccles, & Feiner, 2016).

Bauer, Koedijk, and Otten (2005) in “International evidence on ethical mutual fund performance” used an international sample (Germany, the UK and the US) of ethical funds to compare their performance relative to conventional mutual funds. For the 1990-2001 period, they applied the Carhart four-factor model for a better benchmark computation and found no evidence of a significant difference in risk-adjusted returns between ethical and conventional funds.

In “The wages of social responsibility”, Statman and Glushkov (2009) analyzed the impacts of building an investment strategy consisting in buying stocks with high ESG scores and not investing in stocks with low scores. They used the KLD scores in order to create year-end equally weighted portfolios over the 1992-2007 period. Then, they applied the CAPM, Fama-

French three-factor, and Carhart four-factor model to assess the performance using different benchmarks. Overall, results were mixed. Even though they found that investors can get an advantage by buying high-ESG stocks, it is offset by the exclusion of low-ESG stocks.

A review of the performance of socially responsible indexes was conducted by Statman (2006). In his study, the author analyzed the DS 400 Index relative to the S&P 500. Other indexes such as the DJ Sustainability Index and the Citizens Index were used for control purpose. Regarding the methodology, Statman used the CAPM and the derived Sharpe ratio to assess performance. Over 14 years (1990 – 2004), a higher alpha for the DS 400 Index was found. However, this result was not statistically significant.

Lee and Faff (2009) published “Corporate sustainability performance and idiosyncratic risk: A global perspective” in 2009. In this study, the authors used data from the Dow Jones Sustainability Index in order to create a leading and a lagging sustainable portfolio. Hereafter, they used a 6-factor model in preference of the Carhart four-factor or Fama-French three-factor models to analyze the market performance over the 1998 – 2002 period. Finally, they found that the leading portfolio did not underperform compared to the market but that the lagging portfolio outperforms both the market and the leading portfolio. The authors argue that it can be explained by the fact that traditional asset pricing models are not able to take those factors into account. Basically, they found that leading sustainable companies exhibited lower idiosyncratic risk, and once they had included that in the pricing model, no significant differences remained (Lee & Faff, 2009).

In “The effect of socially responsible investing on portfolio performance”, Kempf and Osthoff (2007) analyzed US companies from 1992 to 2004. They wanted to investigate whether investors can increase their performance by selecting sustainable securities. Therefore, they analyzed the performance of a zero-investment portfolio based on an ESG criterion (i.e. buying stocks with high sustainable ratings and shorting stocks with low sustainable ratings). The ratings from KLD Research & Analytics were used. Applying the Carhart 4-factor model, they found that a best-in-class approach can lead to up to 8,7% per year abnormal returns, even after controlling for transaction costs (Kempf & Osthoff, 2007).

At the end of their study, Kempf and Osthoff asked: “Does it result from a temporary mispricing in the market or does it compensate for an additional risk factor?” (Kempf & Osthoff, 2007, p. 921). Manescu (2011) touched on this question in his study entitled “Stock returns in relation

to Environmental, Social and Governance performance: Mispricing or compensation for risk?”. Large US listed companies between 1992 and 2008 were analyzed with KLD data. The methodology was slightly different than for the other studies as Manescu (2011) used cross-sectional regressions instead of a portfolio analysis. In fact, a Fama-MacBeth procedure was used (Beta of each individual stock is assessed first, and then those Betas are used as an explanatory variable in the cross-sectional model which aims to explain the excess return by the four factors of Carhart and an additional ESG variable). Findings of this study were mixed depending on which ESG variable was used. The author then concluded that: “certain ESG attributes might be value relevant but they are not efficiently incorporated into stock prices” (Manescu, 2011, p. 95).

3.3. Impact of ESG Disclosure on Firm’s Risk/Return Performance

As we developed in section 2.2.2. ESG Disclosure, the quantity of information available on ESG issues has kept on growing. According to Eccles, Serafeim, and Krzus (2011), the high level of market interest in companies’ transparency around its ESG performance highlights investors’ concerns regarding CSR and the use of ESG disclosure as proxy for management quality is growing. One might wonder what the impact of this plethora of new information is on companies and on the market as a whole. Although previous studies analyzing the impact of companies’ transparency and ESG disclosure are scarce, we highlight hereafter the previous results and methodologies used.

Cheng, Ioannou, and Serafeim investigated in their paper “*Corporate social responsibility and access to finance*” (2014) the impact of CSR strategies on the access to finance capital markets. They found that firms with CSR-oriented strategies faced less capital constraints mainly through two channels: stakeholders’ engagement and CSR disclosure. In their paper, they argued that “Higher levels of transparency reduce informational asymmetries between the firm and investors, thus mitigating perceived risk” (Cheng, Ioannou, & Serafeim, 2014, p. 35). Information asymmetry being one of the frictions leading to higher cost of capital, ESG disclosure would then lead to higher information symmetry and lower agency costs.

In their paper “The relevance of environmental disclosures: Are such disclosures incrementally informative?” Clarkson, Fang, Li, and Richardson (2013) studied the impact of voluntary disclosure on firm valuation through two mechanisms: a denominator effect through the cost of capital or a numerator effect through a facilitation in financial performance prediction. Using a

regression analysis based on a modified Ohlson Model, an accounting model, their results suggested that incremental information provided by voluntary disclosure is value-relevant although the impact on the cost of capital would not be significant. Hence, proactive environmental strategy combined with adequate disclosure to investors can positively impact firms' stock price.

Taylor, Vithayathil, and Yim (2018) highlighted in their study that the increase in the level of available information in the market offers new tools to evaluate publicly traded firms beyond the common measures of performance and beyond the disclosure of financials and physical assets. The authors postulated that, under the natural-resource-based-view of the firm, CSR activities complement resources such as traditional production factors and other tangible and intangible assets as what makes companies hard to be imitated. Hence, CSR or ESG activities contribute to the competitive advantage and to the safeguard of firms. In order to see if ESG disclosure is value-enhancing or merely acts as window dressing, they used a panel regression analysis with Tobin's Q as dependent variable representing firm value and the Bloomberg ESG Disclosure Score as independent variable and proxy for voluntary disclosure. They found that, except for the social dimension of ESG activities, neither ESG disclosure as a whole, nor Environmental or Governance disclosure scores showed a significant relationship with firm value. The authors commented that *"as organizations have become more aware of the benefits of environmental and governance reporting, it may be that benefits to Tobin's q that were afforded by such initiatives have now been competed away"* (Taylor, Vithayathil, & Yim, 2018, p. 7). The increased availability of ESG information would then have eliminated the advantage that early adopters may have had when starting to disclose ESG information.

In their 2014 study, Eccles, Ioannou, and Serafeim (2014) investigated the impact of a corporate culture of sustainability on internal processes and on company performance between 1993 and 2010. They found direct benefits between voluntary disclosure of ESG data and firm value. As far as their methodology is concerned, they used a sample of 180 companies that they divided in two groups, High Sustainability firms and Low Sustainability firms, based on the number of environmental and social policies that they had adopted for a determined number of years. They then built equally and value-weighted portfolios and looked at links with performance, corporate governance, shareholder engagement and disclosure. Their results showed that high sustainability firms outperform low sustainability firms and that high sustainability firms are more likely to integrate ESG information in their financial reporting. However, this

outperformance is only likely to occur in the long-term. Additionally, the authors provided an alternative explanation for the outperformance. They argued that the adoption of ESG initiatives and their disclosure could be a “luxury good” that only well-performing firms could afford, and this would introduce a bias in their analysis.

Ioannou and Serafeim (2017), in their paper “*The Consequences of Mandatory Corporate Sustainability Reporting*”, found that an increase in ESG disclosure driven by regulation has a direct impact on firms' valuation and that “current efforts to increase transparency around organizations' impact on society are effective at improving disclosure quantity and quality as well as corporate value” (Ioannou & Serafeim, 2017, p. 1). They argued that increasing ESG disclosure might push companies to change managerial practices and improve their processes. Their results highlight that firms do increase disclosure following the new regulation and that there exists a positive correlation between disclosure and Tobin's Q used as a proxy for firm value.

Fatemi, Glaum, and Kaiser (2017) studied the impact of ESG activities and disclosure on firm valuation. While they found arguments in favor of a positive impact of ESG factors on valuation, they also found that ESG disclosure plays what they call a moderating role by reducing the positive or negative impact of, respectively, ESG strengths and ESG weaknesses. More precisely, “while firms with ESG concerns benefit from ESG-related disclosure, firms with ESG strengths experience lower valuation effects when they intensify their disclosure efforts” (Fatemi, Glaum, & Kaiser, 2017, p. 1). In their analysis, they used a regression model specifying firm value as a function of the ESG performance and of the degree of disclosure using the Bloomberg Disclosure score as proxy for firms' transparency. The authors put different theories forward as possible explanations of the moderating role of ESG disclosure. It may be that if a firm shows ESG strengths, high disclosure may be seen a sign that the company is over-investing in ESG or investors may perceive that a firm is trying to cover the lack of depth in its ESG initiatives with noise. To explain the reduced impact of ESG weaknesses on firm value due to high disclosure, the authors explain that “by properly framing the appropriateness of its operations and its ESG policies, the firm succeeds in its efforts to legitimate its behavior and to affect investor expectations. Alternatively, the firm may convince investors that it has made credible commitments to overcome ESG weaknesses in the future” (Fatemi, Glaum, & Kaiser, 2017, p. 11).

3.4. Hypotheses Development

As we highlighted in Chapter 2, *Socially Responsible Investments* became a major trend of the 21st century. Growing up to \$ 22,9 trillion assets under management in 2016 with Europe and the United States of America leading the path in the field (Eurosif, 2016), these new investment strategies represent a shift in investors' motivations and considerations, which is in line with the expansion of CSR activities. In the SRI universe, ESG factors proved to be of particular interest for investors and in the investment industry as a whole. They participate in the investment decision thanks to more enlightened choices, allow monitoring of socially responsible investment, and help to determine more precisely material issues that may represent risks or opportunities for companies. As a result, the disclosure of such factors is crucial to allow the investment side to make thoughtful decisions in the investment process and to bring more transparency in the markets.

In the previous sections, we pointed out theories such as the Stakeholder theory that provides arguments in favor of an outperformance of SRI, while, on the contrary, the Modern Portfolio theory makes the case for an underperformance of such investments. When investigating the academic literature in this field, we understand that there is no straightforward consensus. Even if a positive impact seems to dominate, empirical studies deal with a broad scope of different regions, ESG indicators, and methodologies, which does not facilitate the comparison. Moreover, the majority of the studies are looking at the empirical relation between ESG performance and financial performance using the CAPM or a derived model. This emphasizes the lack of studies dealing with the impact of firms' transparency and disclosure regarding ESG factors.

Demand for ESG data keeps on increasing, either from investors or regulators. In this context, we want to explore that path and analyze to what extent ESG disclosure affects financial markets and, more precisely, stocks' performance. Indeed, disclosure of CSR initiatives and ESG performance is very important to stakeholders as it can directly impact companies (Roy & Gitman, 2012) and investors' perceptions. If we assume that ESG factors and activities contribute directly to the value creation of companies and, in parallel that they are factors to be considered in the investment process, their disclosure must also be taken into account. "In order for costs and benefits [related to ESG factors] to be efficiently reflected in stock prices, there must be sufficient information available on ESG performance for the market to incorporate it efficiently" (Manescu, 2011, p. 97).

This is why, in this master thesis, we will investigate the following question:

To which extent does Environmental, Social, and Governance disclosure impacts the risk-adjusted performance in the European equity market?

We observed in prior literature that various sets of ESG measures had been tested in portfolio analyses in order to assess their impacts on equity markets. In those studies, mainly ESG performance ratings (KLD scores, Sustainalytics ratings, ...) were used. However, to our knowledge, ESG disclosure ratings, such as the Bloomberg ESG Disclosure Score, have not yet been investigated in a portfolio analysis. Using this ESG disclosure score in a portfolio analysis will help us generate relevant insights in order to provide us with some answers for our research question. Our aim in this master thesis is to show if the incorporation of an ESG disclosure factor in the investment process could be relevant and to see what the impact of disclosure on risk-adjusted performance is. In other words, we aim at showing how, based on this criterion, a screened portfolio performs in comparison with an unscreened equity universe. Furthermore, it would be interesting to compare those findings with the ones relative to ESG performance studies with a view to point out similarities or differences.

To that end, we will test several hypotheses. First, we want to know how highly ESG transparent companies perform compared to the market portfolio. Three different outcomes could be observed (outperformance, underperformance, or neutral performance). In line with scenarios presented by Manescu (2011), we will introduce the two most expected results of the hypothesis. On the one hand, the no-effect scenario argues that even if the ESG information is relevant, if this information is fully incorporated in the price of the stock, there will not be a risk-adjusted return difference between high ESG disclosure stocks and conventional ones, as the Efficient Market Hypothesis suggests (Statman & Glushkov, 2009). This scenario goes in the sense of the analysis of Taylor, Vithayathil, and Yim (2018), which explained that the previous “first-adopters” effect may have been competed away as disclosure becomes the new normal. On the other hand, investors could consider ESG transparent companies as companies that take into account these ESG concerns, that are aware of the linked risk and opportunities, and that manage them with caution. Following the stakeholder theory, investors could interpret it as a sign of determination in the pursuit of an ESG strategy and value it. Therefore, stocks

with high ESG disclosure scores could outperform the unscreened universe. These two most expected results lead us to the first hypothesis:

H1: The performance of high ESG disclosure portfolio differs from that of the market.

Secondly, regarding the performance of low ESG disclosure stocks relative to the unscreened universe, different outcomes can also be imagined. Consistent with the argument that explains that high ESG disclosure investments could outperform the market, low ESG disclosure investments could underperform it. A low ESG disclosure could indeed be perceived as a strong sign of negligence regarding ESG issues and their consideration. As investors place importance on ESG factors in their investment decisions, this could lead to a disinterest of those securities and, therefore, underperformance. However, the risk-factor scenario (Manescu, 2011) argues that a risk premium for non-sustainability risk could explain a better market performance of low ESG stocks. Therefore, stocks with low ESG disclosure could outperform the unscreened universe of equities. These two different expected results lead us to the second hypothesis:

H2: The performance of low ESG disclosure portfolio differs from that of the market.

Additionally, we will look at how high-rated and low-rated portfolios differ with respect to each other regarding their risk profile. We saw in the previous section that higher level of transparency reduces information asymmetry what directly impacts perceived risk (Cheng, Ioannou, & Serafeim, 2014). Indeed, by being more transparent and by disclosing more ESG information, companies give information to investors and to the market, which could mitigate the potential impact of negative ESG/CSR news (Fatemi, Glaum, & Kaiser, 2017). Hence, one might wonder what differences in volatility exist between companies that are very transparent and the more opaque ones. This leads to the third and last hypothesis:

H3: High ESG disclosure portfolios show a lower level of risk than their low ESG disclosure counterparts.

Chapter 4: Methodology and Data Description

In this chapter, we focus on the development of our empirical analysis. We first set a theoretical framework before taking a closer look to the methodology we use in the analysis. Finally, we conclude with a section describing the data used and how they were retrieved.

4.1. Theoretical Framework

In this section, we provide the reader with the explanations of statistical concepts and financial models required to understand our analysis. This section sets the theoretical framework on which we base our empirical analysis.

4.1.1. The Capital Asset Pricing Model

Following the development of modern portfolio theory by Markowitz in 1952, the Capital Asset Pricing Model (CAPM) marked the beginning of the asset pricing theory. This model is commonly attributed to Sharpe (1964) but was also independently developed by Linter (1965), Mossin (1966) and Fischer (1972) (Bodie, Kane, & Marcus, 2014). Today, this model is still considered as one of the most important developments of the last decades both in the academic world and in the investment industry.

The CAPM describes the relationship that we should observe between an asset's risk and the expected return. Bodie et al. (2014) explain in their book "Investments" that this relationship has two main functions. First, the model provides a rate of return that can serve as a benchmark representing the "fair" or expected return given a certain level of risk. Secondly, it helps to estimate expected return on assets that are not commonly traded in the market place. The derivation of the CAPM by Sharpe ultimately gives the following algebraic relation (Sharpe, 1964):

$$E(R_i) = R_f + [E(R_m) - R_f]\beta_{iM} \quad (1)$$

Where:

$E(R_i)$ = expected return of asset i

R_f = the risk-free rate

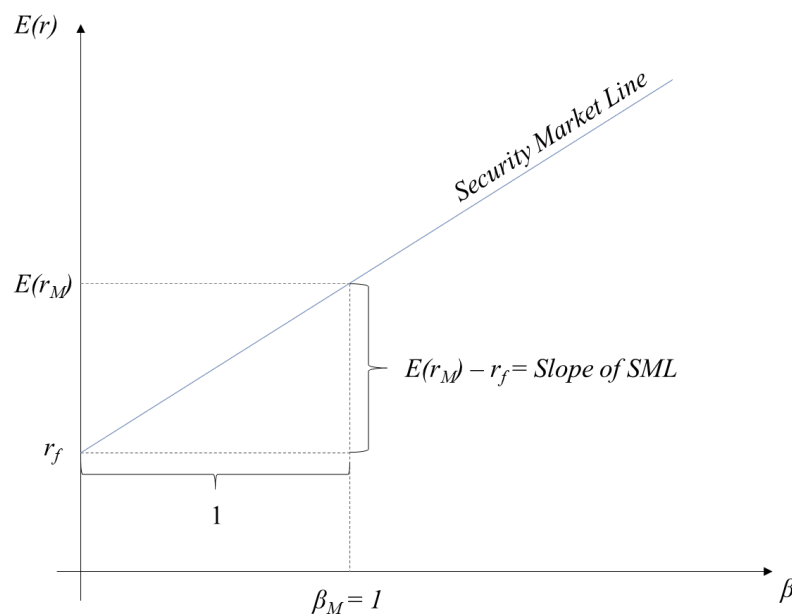
$[E(R_m) - R_f]$ = excess return of the market portfolio, market risk premium

β_{iM} = measure of systematic risk of asset i

That gives us a clear pricing relation that stresses the fact that investors value assets to their risk contributions (Van der Wijst, 2011). In other words, the expected return on any asset i ($E(R_i)$) is a function of the risk-free rate (R_f), plus a risk premium equal to the asset's market beta (β_{iM}) (i.e. the volume of risk) multiplied by the excess market return ($E(R_m) - R_f$) (i.e. the price of risk).

Graphically, this relation is commonly represented by the Security Market Line which plots beta on the x-axis and expected return on the y-axis.

Figure 3: The Security Market Line (Bodie et al., 2014, p. 298)



This Security Market Line, as explained by Bodie et al. (2014), can be used as a benchmark in the evaluation of individual assets or portfolio. Indeed, “*Given the risk of an investment, as measured by its beta, the SML provides the required rate of return necessary to compensate investors for risk as well as the time value of money*” (Bodie, Kane & Marcus, 2014, p. 298). Therefore, securities standing above (under) the Security Market Line would be underpriced (overpriced).

However, the CAPM relies on a set of assumptions in order to be valid. In total, the CAPM relies on seven assumptions as cited by Bodie et al. (2014):

1. Risk aversion: investors expect higher return to compensate for higher risk.
2. Utility maximizing investors: risk-return combinations that maximize their utility.
3. Frictionless markets: no taxes, no transaction costs and no impediment to trading.
4. One-period horizon: all investors have the same investment horizon.
5. Homogeneous expectations: shared expectations regarding risk and returns.
6. Divisible assets: investments are infinitely divisible.
7. Competitive markets: investors take the market price as given.

From those assumptions and from the CAPM as such, limitations have arisen. Among the biggest limitations, Roll's critique (1977) argues that the true market portfolio is not observable. In fact, the market portfolio should invest in all kinds of investments such as equities, bonds, but also arts, lottery tickets, etc. The broadest definition of the market portfolio is clearly not observable in practice. Another limitation is the fact that the CAPM rests on one factor explaining the return. However, it has been demonstrated by academics (namely Fama and French (1992) and Carhart (1997)) that other factors should be included in the relation. This will be covered in more detail in the following sections. Finally, yet importantly, the CAPM relies on static factors although some academics claim that, for instance, the beta of an asset evolves over time.

4.1.2. Risk and Performance Indicators

From the CAPM were derived a number of risk and performance indicators that aim to assess the performance of portfolios. In this part, we develop the most commonly used as well as the most relevant indicators for our analysis.

1. Sharpe ratio (SR): this ratio that divides excess return by the standard deviation of returns over the period, measures the total reward per unit of total risk. By using total risk as denominator, this ratio does not assume that the portfolio is well diversified (Sharpe, 1994).

$$SR = \frac{\bar{R}_p - \bar{R}_f}{\sigma_p} \quad (2)$$

2. Treynor ratio (TR): this ratio, similar to the Sharpe Ratio, divides excess return by the portfolio's beta. By doing so, this ratio determines the reward per unit of systematic risk instead of total risk (Treynor, 1965).

$$TR = \frac{\bar{R}_p - \bar{R}_f}{\beta_p} \quad (3)$$

3. The M^2 measure of performance (Modigliani & Modigliani, 1997): this measure, equivalent to the Sharpe Ratio, also uses the total volatility as a measure of risk. However, compared to the latter, it goes further than ranking portfolio performance and offers a convenient tool to interpret difference in return compared to a given benchmark. To compute the M^2 , an adjusted portfolio P^* that matches the volatility of the market portfolio "M" is created. As the two portfolios now have the same volatility, performance can be compared by comparing returns.

$$M_P^2 = r_{P^*} - r_M \quad (4)$$

$$M_P^2 = (r_P - r_f) \frac{\sigma_M}{\sigma_P} - (r_M - r_f) \quad (5)$$

4. Jensen's alpha: this measure is derived from the CAPM and was first used by Jensen (1968). α_P measures the average return generated by a portfolio over the return that could be derived from the CAPM given the beta of the portfolio and the average return in the market (Bodie et al., 2014).

$$\alpha_P = \bar{R}_P - [\bar{R}_f + \beta_P(\bar{R}_M - \bar{R}_f)] \quad (6)$$

5. Information ratio (IR): this ratio divides the portfolio's alpha by its non-systematic risk or tracking error. It measures the amount of abnormal return per unit of risk that could be, in principle, diversified away (Bodie et al., 2014).

$$IR = \frac{\alpha_P}{\sigma(e_P)} \quad (7)$$

4.1.3. Fama-French Three-factor Model

As aforementioned, one of the limitations of the CAPM is that it is a single-factor model. However, some academics tried to enhance the CAPM by incorporating other factors. Over the years, the work of Fama and French has gained recognition in the academic world (Fama & French, 1992; Fama & French, 1996).

Fama and French (1992) first analyzed all NYSE, AMEX, and NASDAQ stocks between 1963 and 1990. They concluded that the simple relation between the average return and market beta (as described in the CAPM) weakened during the period 1963 – 1990 (Fama & French, 1992). Instead of this single-factor relation, other factors demonstrated statistically significant effects. In addition to the market beta from the CAPM, Fama & French (1992) found that the size of the company and its book-to-market ratio seem to explain the average return.

Their multi-factor asset pricing model can be algebraically written as follows (Fama & French, 1996):

$$E(R_i) - R_f = \alpha_i + \beta_{iM}[E(R_m) - R_f] + \beta_{iSMB}[E(SMB)] + \beta_{iHML}[E(HML)] \quad (8)$$

Where:

$E(R_i) - R_f$ = the expected excess return of the asset i

α_i = the intercept of the equation

$\beta_{iM}, \beta_{iSMB}, \beta_{iHML}$ = the three betas measuring the risk premium associated with each factor

$E(R_m) - R_f$ = the expected excess return of the market portfolio

$E(SMB)$ = Small market capitalization Minus Big, expected excess return of small caps over big ones

$E(HML)$ = High book-to-market ratio Minus Low, expected excess return of high book-to-market firms (i.e. value stocks) over low ones (i.e. growth stocks)

As far as the SMB (Small Minus Big) factor is concerned, it allows to consider the expected returns of small and big market capitalization. This factor is computed by making the difference of average return between small and big portfolios (French, 2018):

$$SMB = \frac{1}{3} (Small\ Value + Small\ Neutral + Small\ Growth) - \frac{1}{3} (Big\ Value + Big\ Neutral + Big\ Growth) \quad (9)$$

When assessing a stock or portfolio, a significantly negative β_{iSMB} signals that the stock or portfolio is relatively weighted toward large-cap stocks. On the contrary, a significantly positive β_{iSMB} signals that the stock or portfolio is relatively weighted toward small-cap stocks.

Regarding the HML (High Minus Low) factor, it gives the opportunity to account for the difference in expected return between growth and value stocks. This factor is computed by making the difference of average return between high book-to-market ratio (value stocks) and low book-to-market ratio portfolios (growth stock) (French, 2018):

$$HML = \frac{1}{2} (Small\ Value + Big\ Value) - \frac{1}{2} (Small\ Growth + Big\ Growth) \quad (10)$$

When assessing a stock or portfolio, a significantly negative β_{iHML} signals that the stock or portfolio is relatively weighted towards value stocks. Conversely, a significantly positive β_{iHML} signals that the stock or portfolio is relatively weighted toward growth stocks.

Initially, those factors were computed for the US only. But Fama and French (2012) looked at the impact of regions on those factors and now compute those factors for Europe, Japan, Asia Pacific and North America in addition to a global version.

4.1.4. Carhart Four-factor Model

In his study entitled “On persistence in mutual fund performance”, Carhart (1997) provided an extension to Fama-French three-factor model. Actually, Carhart (1997) explained that a fourth factor should be added to the asset-pricing model: a momentum factor. This momentum factor states that past 12 months winners (losers) will outperform (underperform) in the next 12 months.

Algebraically, the model is written as follows (Carhart, 1997):

$$E(R_i) - R_f = \alpha_i + \beta_{iM}[E(R_m) - R_f] + \beta_{iSMB}[E(SMB)] + \beta_{iHML}[E(HML)] + \beta_{iWML}[E(WML)] \quad (11)$$

Here, the WML factor stands for “Winners Minus Losers” and represents the Carhart’s momentum effect. According to French’s website (2018), this WML factor is computed as follows:

$$WML = 1/2 (Small\ High + Big\ High) - 1/2 (Small\ Low + Big\ Low) \quad (12)$$

It is the difference between two winner-portfolios and two loser-portfolios. A significant positive (negative) β_{iWML} signals that the portfolio is relatively weighted towards past winners (losers).

4.2. Methodology

Now that we have a clear idea of the theoretical framework in which our empirical analysis is conducted, we describe how we test our hypotheses. In this section, our choices are mainly justified by our review of empirical studies in the literature review.

4.2.1. Artificial Portfolio Construction

In the first place, as we observed in the literature review (see sections 3.2. and 3.3 in particular), most of the studies dealing with the empirical relation between ESG factors (whatever the tested factor) and the market performance use a portfolio analysis. As Friede et al. (2014) explained, there are three types of portfolio analysis. First, we have analyses of real pooled investment vehicles such as mutual funds (see for example Bauer et al., 2005). Secondly, there are studies which analyze indexes' performance such as Statman’s (2006), who analyzes the DS 400 index. Finally, other studies create artificial portfolios based on a specific factor/strategy in order to

examine how they perform (see for examples Eccles et al., 2016; Kempf & Osthoff, 2007; Lee & Faff, 2009; Manescu, 2011; Statman & Glushkov, 2009).

In this master thesis, we chose to run a portfolio analysis using an artificial portfolio construction. This choice is motivated by methodological and statistical advantages. Indeed, we want to analyze the risk-adjusted returns of firms which are ESG transparent over those of firms which are not. Therefore, the best methodology is to screen the investment universe based on an ESG disclosure criterion in order to create a leading and a lagging portfolio at different levels (see for instance: Kempf & Osthoff, 2007). As a result, we get portfolios of stocks that share a single feature and, consequently, we can test this feature more precisely. Studies of real investment vehicles that share a common feature, such as SRI mutual funds, test the SRI feature against conventional investments, of course. However, this kind of study also takes into consideration the portfolio management skills of the fund's managers and other variables such as fees and taxes that will interfere with the results. The index and artificial portfolio analyses are not affected by these biases and can therefore better isolate a desired variable. Since we venture, in this master thesis, to isolate the ESG disclosure level and that SRI or ESG indexes are commonly built on several ESG screens, we decided to use artificial portfolio creation in order to isolate the ESG disclosure level of stocks as much as possible. Moreover, we will use a positive screening strategy as well as a best-in-class screening strategy at 10% and 25% level (in line with Kempf & Osthoff, 2007). Both approaches rank stocks based on a specific criterion and then select the best ones. However, the best-in-class strategy also aims at balancing the portfolio with regard to sectors. Consequently, we avoid a sector bias which is likely when using a positive screening approach.

Additionally, all the constructed portfolios are equally and value-weighted, which is in line with previous studies (see for instance: Eccles, Ioannou, & Serafeim, 2014). We chose to use two weighting methods as this choice can potentially impact our results. As a matter of a fact, by using an equally weighted portfolio the performance of all screened companies is reflected equally. As it has been argued that larger companies hold more resources and more incentives to engage in ESG activities and to disclose more information, in particular because they are more under the scrutiny of investors, an equally weighted portfolio gives more weight to small capitalization firms that may also undertake remarkable ESG efforts. On the other hand, an equally weighted portfolio should be rebalanced as often as possible in order to maintain the weights. However, due to data availability, we will rebalance our portfolios annually. What is

more, by equally weighting our portfolios, we may introduce a contrarian effect as well and we may overexpose our portfolios to a small capitalization premium (Hannam & Jamet, 2017). These drawbacks lead us to concurrently use value-weighted portfolios to avoid biases that could arise from the weighting methodology.

4.2.2. Screening using Bloomberg ESG Disclosure Score

In order to create portfolios, we use the *ESG Disclosure Score* provided by Bloomberg L.P. to screen eligible stocks. We use this rating from Bloomberg because Bloomberg offers a wide range of professional services that are used by 325 000 of the world's most influential actors of the financial industry (Bloomberg, 2018). Through its iconic Bloomberg Terminal, it aims to bring transparency and relevance within global financial data. Moreover, Bloomberg recently launched the *Bloomberg Environmental, Social, and Governance Data (BESG)* function on the Terminal¹. Aware of the growing demand of ESG data, Bloomberg integrated such non-financial factors to its powerful database and financial analytic tools. In fact, ESG factors are implemented across the Bloomberg services and are not isolated from the other features. The <BESG> function allows users to reach needed ESG data by providing links to all ESG resources available on Bloomberg Terminal. We will here only develop the ESG Disclosure Score as it will be at the heart of our empirical analysis. Only an overview will be provided later on, for an exhaustive description of the score please refer to appendix 2. First of all, as explicitly mentioned in its denomination, the Bloomberg ESG Disclosure Score is a rating based on the level of ESG disclosure of entities. It means that, unlike other major ESG ratings, this score focuses more on the disclosure, the transparency of entities and not on performance related to ESG factors. However, Dorfleitner, Halbritter, and Nguyen (2015) investigated three ESG ratings from the biggest providers, namely the ASSET4 measure from Thomson Reuters, the KLD ratings from MSCI, and the ESG disclosure score from Bloomberg and found that even though the ESG scores are computed differently and do not follow the same distribution, they are all relevant as a proxy for CSR level and are highly relevant to investors and managers (Dorfleitner et al., 2015).

¹ The Bloomberg Terminal itself constitutes the main sources of information for this section.

Furthermore, the goal of the ESG disclosure score is to provide investors with a standardized and quantified view on ESG transparency. As explained on Bloomberg's helpdesk:

“Bloomberg ESG data is collected from company-sourced filings such as Corporate Social Responsibility Reports, Annual Reports, DEF 14A, 10-K, Corporate Governance Reports, and any public disclosures on company websites. All data points are fully transparent and can be traced back to the source in a company document. Bloomberg standardizes data reported in multiple units of measure in order to provide fully comparable company metrics globally” (Bloomberg Terminal, 2018).

Regarding the scope of ESG data, it covers leading global indexes (such as Global MSCI All Country, Global FTSE All-World, STOXX Europe 600, etc.) and some additional listed companies with at least \$30 million market capitalization. Overall, the Bloomberg ESG Disclosure Score covers more than 9 000 companies around the world.

Finally, the Bloomberg ESG Disclosure Score is also divided into three sub-scores, each one focusing on one specific area of the ESG factors (Environmental, Social, and Governance factors are assessed individually). The main score and its 3 sub-scores are computed in the same way. The scores take into consideration 100 out of 219 ESG data points available on Bloomberg Terminal. Then, those 100 data inputs are weighted in order to overweight the most commonly disclosed fields. Once weighted, the score is normalized to range between 0 and 100. A company that gets a score of 0 means that this company reports none of the 100 ESG data points, whereas a company that gets a score of 100 means that it reports all of the 100 data points and is consequently fully ESG transparent. Furthermore, Bloomberg adjusts the score composition for some industries/sectors to maintain a high level of relevance. For instance, the “*Total Power Generated*” is taken into account only in utility companies.

4.2.3. Carhart Four-factor Model

After the creation of leading and lagging portfolios, we evaluate them based on a risk-adjusted measure. Indeed, comparing portfolios' performance with their simple average return is not relevant. In order to have a meaningful and relevant comparison, returns should be adjusted for risk (Bodie et al., 2014).

As a starting point of our analysis, we first use performance measures and ratios derived from the CAPM or subsequent theories. These measures will be useful in order to offer first insights and to compare every aspect of our portfolios.

One possible way of adjusting returns for risk is to use an asset pricing model for rating the performance of portfolios. As developed in section 4.1., the Capital Asset Pricing Model (single-factor), the Fama-French three-factor model, and the Carhart four-factor model are all designed to adjust returns for risk premium. As far as this master thesis is concerned, we work with the most recent model, the Carhart four-factor model. This choice is motivated by several reasons. First of all, this model is an extension of the two others and is therefore the most exhaustive one. Indeed, Carhart (1997) added a momentum risk premium to the market, size, and book-to-market risk premia. Furthermore, this four-factor model is the most recent that has been developed. Fama and French (1992) explain in their work that the CAPM relation was true in the past but for more recent period, they argue that the three-factor model was more adapted. Therefore, we assume that the Carhart four-factor model is the most relevant for our analysis of recent data since it has recently established itself in the academic literature and among the investment industry. Furthermore, using this model is in line with the most recent literature (see for instance Bauer et al., 2005; Kempf & Osthoff, 2007; Statman & Glushkov, 2009).

4.3. Data Description

The purpose of this part is twofold. First, we describe the sample selection process and explain the reasoning behind our choices. Then, we focus on the data used and how they are collected.

4.3.1. Sample Selection

As part of this master thesis, we chose to shed light on the European situation. As developed in the first part, regions have different cultures and follow diverse trends in ESG investing and Europe is the most developed part of the world in terms of ESG assets under management compared to traditional investments (Eurosif, 2016). In addition, the European directive 2014/95/EU will accelerate the disclosure of ESG factors as of 2018 and increase the pressure to follow the movement (Directive 2014/95/EU, 2014). In fact, in the academic literature we can distinguish that “country-of-origin” and “legal requirements” may be external determinants for ESG reporting (Hahn & Kühnen, 2013; Ioannou & Serafeim, 2017). Even if there is not a consensus on the effect of country-of-origin, legal requirements seem to positively explain the

ESG reporting as Hahn & Kühnlen (2013) showed in their paper which extensively analyzed the existing literature on determinants of ESG reporting. Therefore, by choosing Europe as region of interest in our study we also avoid biases related to country-of-origin and legal requirements.

In order to analyze the European situation, we selected the STOXX Europe 600 index companies as a starting point of the analysis. We decided to limit our study to this index for mainly three reasons.

Firstly, the STOXX Europe 600 is a broad and well-balanced index covering a wide number of large companies in 17 European countries (Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom) (STOXX, 2018). It is therefore well representing the European situation. In fact, it is composed of the 600 largest companies in terms of free-float market capitalization, covering at least 95% of the free-float market capitalization of Europe (STOXX, 2018).

Secondly, this index is widely used as a benchmark in the fund industry and is also extensively present in the academic literature (STOXX, 2018). As a result, the STOXX Europe 600 and its components receive a good media exposure. For instance, the well-known CNBC channel always looks at the 600 components' performance at each European market opening. As all the 600 index components benefit from the same media exposure, it resolves another potential bias in our methodology. Corporate visibility is indeed an external determinant of ESG reporting that positively affects such disclosure according to the academic literature (Hahn & Kühnlen, 2013). Since the selected companies belong to the STOXX Europe 600, it forms a homogeneous group in terms of media exposure and that will not bias our analysis.

Finally, the choice of the STOXX Europe 600 index was also influenced by the Bloomberg ESG Disclosure Score coverage. Actually, Bloomberg provides this score for major indexes around the world, including the STOXX Europe 600 for the European Region. Hence this choice will ensure a broad data availability.

We took the index composition as of March 2018, namely the first update of 2018 since the STOXX Europe 600 is reviewed each quarter. We chose to work with this recent index composition and adjusted the sample for lack of data. This choice is motivated by the fact that

a recent composition of STOXX Europe 600 provides the best representation of the situation of Europe as of today and is potentially a good proxy for the future.

Using the Bloomberg database, we collected data for the longest period of time possible. Since the Bloomberg ESG Disclosure Score was launched in 2009, we started collecting data as of fiscal year 2009. Then, market data (i.e. stock prices) were collected in $t+1$ starting on 01/01 in order to analyze the impact of the level of ESG disclosure. Therefore, we ended up with a period of interest of eight years, from 2010 to 2017. Starting with an initial sample of 600 companies, we ended up with a final sample of 462 companies (Table 2). A list of all the 462 companies can be found in appendix 3.

Table 2: Sample selection

This table highlights the final number of stocks included in our sample after exclusion for missing data.

<i>Sample selection process</i>	<i>Number of companies</i>
Initial sample	600
Missing ESG data	-125
Missing market data	-13
Final sample	462

4.3.2. Data Collection

Regarding the data collection, two sources of information are used. First, we use Bloomberg Terminal in order to define the sample and to collect all data related to the 462 firms. More precisely, we use the Excel add-in of Bloomberg to download the Bloomberg ESG Disclosure Scores, market prices (daily data in USD to be in line with market data provided by Kenneth French), and all descriptive data such as sectors, industries and market capitalization. Secondly, Kenneth French's website data library (French, 2018) gives us access for data related to the European market needed in the Carhart four-factor model. It provides a European market portfolio indeed as well as the risk-free rate and the three additional factors of the Carhart model for the European market (i.e. SMB, HML, WML). We collect those data on a daily basis over the eight-year period of interest (2010 – 2017).

Chapter 5: Empirical Results and Discussion

This penultimate chapter's purpose is to present the results of our analysis. A first section is dedicated to the presentation of statistics describing our sample, ESG metrics and portfolios. Then, a second one highlights the results of our regressions using the CAPM and Carhart model as well as the results of performance measurement ratios. This part is then subsequently closed by a discussion on the results, on the different links with theories and on our aforementioned hypotheses. As we found similar results for 10% and 25% screens, we will, for the sake of clarity, highlight only the results based on the portfolios formed with a 10% screen (e.g. 10% most transparent companies). However, all analyses are available in appendix 4 to 9.

5.1. Descriptive Statistics

In this first section, we highlight summary statistics on the data used in our analysis. The purpose is to describe at best our investment universe and the related financials and ESG metrics. As aforementioned in 4.3.1. Sample Selection, we gathered data on 462 firms included in the STOXX Europe 600 index for a period between January 2010 and December 2017.

As a starting point, Table 3 describes the composition of our sample as well as the related ESG disclosure score per sector and per year. As we can see, our sample is active in 11 sectors although mostly represented in Industrials, Financials, Consumer Discretionary and Materials with 63% of the selected companies working in these sectors.

Table 3: Sample's statistics related to the ESG disclosure score

This table summarizes the different statistics of our sample of 462 firms. It gives the repartition per sector as well as the range of ESG score per sector in 2017. The second part of the table highlights the evolution of the average, maximum and minimum disclosure score throughout the period.

<i>ESG Disclosure score per sector (2017)</i>				
Sectors	Sample composition (%)	Min	Max	Std dev.
Consumer Discretionary	13	12	67	13
Consumer Staples	8	18	63	11
Energy	4	10	68	16
Financials	19	7	68	14
Health Care	7	14	66	14
Industrials	21	17	67	11
Information Technology	5	9	60	13
Materials	10	21	65	9
Real Estate	4	18	58	10
Telecommunication Services	3	7	57	12
Utilities	5	29	74	13

ESG Disclosure score per year

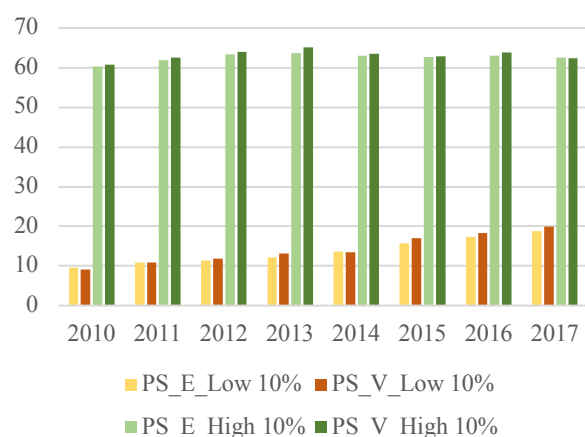
Year	Average	Min	Max	Std.
2010	34	1	71	16
2011	37	5	73	16
2012	38	4	77	16
2013	40	6	81	16
2014	41	6	79	15
2015	42	7	78	14
2016	43	7	78	13
2017	43	7	74	13

Source: Bloomberg

As far as the ESG disclosure score is concerned, we see that sectors are not equal regarding their level of disclosure. It appears that the most transparent sectors, based on 2017 data, are Utilities and Materials, which may be linked to the fact that they are more environmentally sensitive compared to other sectors. The least transparent sectors are Information Technology and Financial. Again, companies working in those sectors are less directly sensitive to ESG issues.

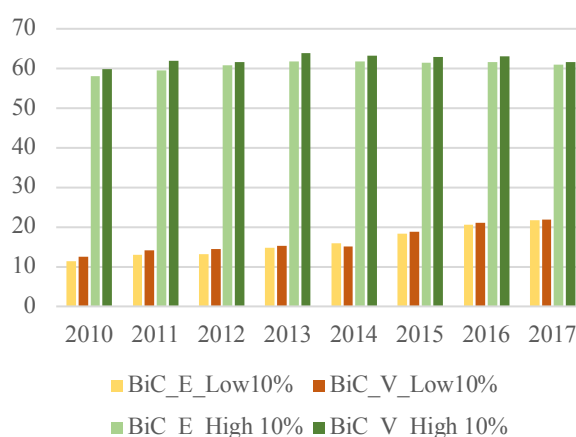
When looking at the evolution of the ESG disclosure score throughout the years, we see an increasing trend. Although maximums are reaching a plateau, minimums keep increasing, leading to a growing average disclosure score. This is also reflected by the standard deviations that decreased during the period, which corroborates the fact that disclosure scores are becoming closer and closer to each other.

Figure 4: Positive Screening – Portfolios' ESG disclosure score



Source: Bloomberg

Figure 5: Best-in-class – Portfolios' ESG disclosure score



Source: Bloomberg

When looking at our portfolios on Figure 4 and 5, we observe that they follow a similar trend. As a reminder, we build portfolios based on a positive screening (PS) or a best-in-class screening (BiC) and we made them equally (E) and value-weighted (V). If it is clear that transparency increased over the years for all portfolios composed of the least transparent companies, either equally or value-weighted and either based on positive screening or on a best-in-class approach, all portfolios composed of the most transparent companies have seen their ESG disclosure score hit a plateau.

Table 4 shows the average market capitalization for all portfolios. In line with the literature, we found that our portfolios composed of the least transparent companies are also the portfolios with the smallest market capitalization. This means that smaller companies may have a hard time disclosing the same level of information as larger companies. Indeed, the latter may benefit from economies of scale and are also more under the scrutiny of investors, which can explain such a difference in the level of disclosure.

Table 4: Portfolios' average market capitalization (in \$B)

This table gives the average market capitalization for each portfolio constructed based on a 10% screen. Market capitalization were computed for portfolios constructed using positive screening and best-in-class screening, as well as equally and value-weighted portfolios.

	2010	2011	2012	2013	2014	2015	2016	2017
<i>Positive screening – Equally weighted</i>								
PS_E_High 10%	41,54	45,51	36,99	38,74	49,91	51,06	46,43	48,36
PS_E_Low 10%	3,69	4,27	4,03	5,33	6,45	7,75	8,16	8,29
<i>Positive screening – Value-weighted</i>								
PS_V_High 10%	84,72	87,43	88,28	78,93	105,00	108,38	113,98	93,62
PS_V_Low 10%	9,14	6,84	7,32	10,65	13,61	14,84	15,88	16,13
<i>Best-in-Class – Equally weighted</i>								
BiC_E_High 10%	30,08	32,04	32,65	34,73	43,77	40,01	40,70	41,56
BiC_E_Low 10%	4,15	4,70	4,09	4,60	6,17	7,22	7,47	7,40
<i>Best-in-Class – Value-weighted</i>								
BiC_V_High 10%	72,64	67,46	87,00	76,55	99,68	90,64	97,77	87,64
BiC_V_Low 10%	10,79	8,28	7,38	7,32	12,29	13,27	13,89	13,88

Source: Bloomberg

Looking at the returns, as surprising as it may seem, Table 5 shows that all low transparency portfolios outperformed their high transparency counterparts as well as the market throughout the period. This result is highlighted more visually in figures 6 and 7. Moreover, we see that equally weighted portfolios always outperform their value-weighted counterparts. This is in line with what can be seen in the literature and with the fact that equally weighted portfolios are more tilted towards smaller firms, which may give access to a small-cap premium. Additionally, one may observe that in periods of market downturn it seems that, most of the time, high transparency portfolios provide better protection with greater returns.

Table 5: Portfolios' annualized returns (in %)

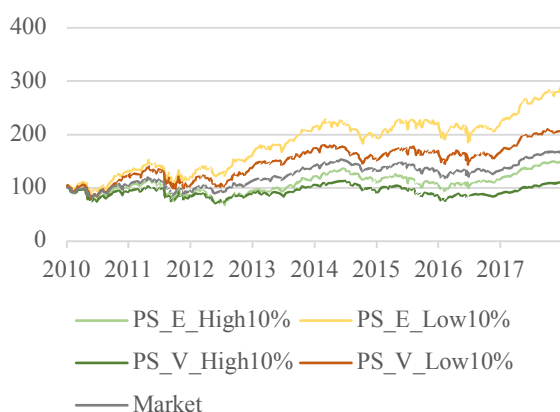
This table summarizes the returns of 8 portfolios formed using a 10% screening method, as well as the European market's return as calculated by French on its website.

When as the European markets return as calculated by FT.com on its website.

	Value-weighted		Equally weighted		Market
	High10%	Low10%	High10%	Low10%	
Positive screening					
2010	-7,72	23,03	0,06	32,40	6,14
2011	-11,69	-14,66	-14,16	-11,00	-13,17
2012	9,35	29,89	7,58	36,26	20,95
2013	18,89	27,83	31,23	33,64	27,92
2014	-9,16	-10,41	-5,78	-6,65	-6,33
2015	-9,83	9,55	-5,25	11,32	-0,52
2016	3,21	-3,13	8,00	-2,04	-0,04
2017	23,24	27,14	27,54	33,41	28,07
Full period	1,24	9,8	5,12	14,30	6,87
Best-in-class					
2010	1,04	19,27	7,10	31,93	6,14
2011	-17,63	-11,81	-18,31	-9,18	-13,17
2012	18,94	25,80	17,27	35,38	20,95
2013	20,58	21,55	33,14	30,21	27,92
2014	-5,78	-8,87	-3,36	-4,13	-6,33
2015	-6,39	3,59	-3,89	11,32	-0,52
2016	-2,05	-8,56	2,55	-1,39	-0,04
2017	22,28	25,86	24,21	31,62	28,07
Full period	2,94	7,23	6,18	14,36	6,87

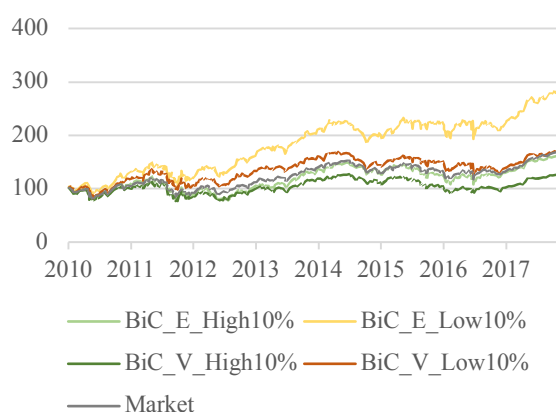
Source: Bloomberg, French (2018)

**Figure 6: Positive Screening:
Portfolios' performance**



Source: Bloomberg

Figure 7: Best-in-Class: Portfolios' performance



Source: Bloomberg

Finally, as far as portfolios' volatility is concerned, we see on Table 6 that all portfolios are more volatile than the market. However, a comparison of high transparent and low transparent portfolios shows that the former appears to feature a higher standard deviation most of the time.

Table 6: Portfolios' standard deviations (in $\times 10^{-3}$)

This table summarizes the daily standard deviations of the 8 portfolios formed using a 10% screening method as well as the market's.

screening method as well as the markets.

	Value-weighted		Equally weighted		
	High10%	Low10%	High10%	Low10%	Market
Positive screening					
2010	14,91	16,84	15,94	15,04	14,25
2011	19,31	20,39	19,98	18,78	17,38
2012	14,62	14,16	16,54	13,53	11,83
2013	9,73	8,61	10,38	8,59	7,99
2014	8,35	7,54	9,34	7,86	7,37
2015	12,45	10,54	12,28	9,76	10,21
2016	12,35	12,95	13,45	12,79	11,86
2017	5,75	6,17	6,23	6,26	5,53
Full period	12,80	12,97	13,64	12,22	11,38
Best-in-class					
2010	15,89	15,01	16,22	14,46	14,25
2011	20,99	18,40	20,98	18,01	17,38
2012	13,85	12,03	16,02	12,48	11,83
2013	9,70	8,37	10,31	8,43	7,99
2014	8,27	7,10	9,00	7,27	7,37
2015	11,81	9,72	11,78	9,37	10,21
2016	12,13	13,17	13,52	12,83	11,86
2017	6,08	5,89	6,34	6,08	5,53
Full period	13,07	11,88	13,72	11,73	11,38

5.2. Empirical Results

5.2.1. Performance Ratios

As a starting point, we look in this section at the different commonly used performance measurement ratios². The goal is to compare our portfolios' ratios in order to see what first insights we can obtain on the link between ESG transparency and performance.

Looking at Table 7, we see that the different ratios already highlight some interesting results. First, we can have a look at the Sharpe Ratio. As explained earlier in this paper, this ratio gives us the excess-return per unit of risk. As we saw that high transparent portfolios showed higher volatility and lower returns compared to low transparent portfolios, it is not surprising to note that the former offer lower risk-adjusted returns as represented by this ratio. We previously noted that low transparency portfolio seemed to exhibit lower volatility, hence risk seems to be much more rewarded for those portfolios.

Table 7: Performance Measurement Ratios

This table summarizes the results of performance measurement ratios for the 8 portfolios formed using a 10% screening method. The table highlights the Sharpe Ratio, the Treynor Ratio, the M², the Alpha and the information ratio.

	Value-weighted		Equally weighted	
	High10%	Low10%	High10%	Low10%
<i>Positive screening</i>				
Sharpe ratio	7,24	84,52	35,18	155,77
Treynor ratio	0,09	1,03	0,42	1,91
M ²	-0,61	0,27	-0,29	1,08
Alpha	-0,2x10 ⁻³	0,1x10 ⁻³	-0,08x10 ⁻³	0,27x10 ⁻³
Information ratio	-145,01	85,29	-47,36	268,03
<i>Best-in-class</i>				
Sharpe ratio	19,11	61,96	44,09	163,19
Treynor ratio	0,23	0,76	0,52	2,00
M ²	-0,47	0,02	-0,19	1,17
Alpha	-1,5x10 ⁻⁴	0,28x10 ⁻⁴	-0,45x10 ⁻⁴	2,8x10 ⁻⁴
Information ratio	-110,15	10,50	-19,90	279,59

² These performance measures are based on the CAPM.

Additionally, the Treynor Ratio gives us similar results when looking at excess-return per unit of systematic risk. As we will see in the next section, low transparent portfolios have higher betas than their counterparts. This means more volatility compared to the market and hence, more systematic risk.

The M^2 measure of Modigliani measures the difference in excess-return between a portfolio and the market when the portfolio is scaled to have the same volatility as the latter. In the same vein, we observe that this ratio is again in favor of an outperformance from low transparent portfolios while their high transparent counterparts seem to lag behind the market. This is corroborated by the Information Ratio.

We can already draw some conclusions from those ratios and from the previous descriptive statistics. As a matter of fact, it seems that high and low transparency portfolios exhibit different return, volatility and performance as a whole. On the one hand, high transparent stocks appear to underperform the market and to show more volatility, what leads to lower risk-adjusted performance. Low transparent stocks, on the other hand, seem to highlight the exact opposite results. These results will be further analyzed in the next section where regression analysis will be used to gain more insight into our portfolios.

5.2.2. Regression Analysis

This section examines the results of the Carhart four-factor model regarding our constructed portfolios. The goal is to test the aforementioned hypotheses and analyze the risk-adjusted performance of portfolios regrouping stocks with high and low level of ESG disclosure. We will first analyze value-weighted portfolios and then equally weighted portfolios. Each element of the four-factor model will be detailed and compared between high- and low-rated ESG disclosure portfolios. Moreover, the results of the CAPM regression will be presented for comparison and control purposes.

5.2.2.1. Value-weighted Portfolios

Table 8 summarizes key results of our regressions regarding the 10% screened portfolios. In this section, we will focus on the first part of the Table, the value-weighted results. The Carhart four-factor model results will be highlighted for positive and best-in-class screening and, in a second step, will be compared to the traditional CAPM.

First of all, we look at the intercept of the model, namely the alpha (α). This is the most important result for our analysis since it indicates whether portfolios of high-rated/low-rated European stocks perform differently from the whole European market. With regard to the positive screening, we observe a negative alpha (-0,000074) for the 10% high-rated portfolio, and a positive alpha (0,000049) for the 10% low-rated portfolio. Those results are softened but show the same direction for the 25% level portfolios. However, it should be noted that none of those results are statistically significant. With reference to the best-in-class strategy, alpha for low- and high-rated portfolios are all negative. However, low-rated portfolios' alphas are higher than their high-rated counterparts. Nevertheless, as for positive screening, none of those results are statistically significant.

Table 8: Regression results of screened ESG disclosure portfolios (10% screening)

This table summarizes for the positive and best-in-class screening the results of both the Carhart four-factor model and CAPM regressions. The portfolios are value-weighted and equally-weighted. The high-rated (low-rated) ESG portfolios are constructed at 10% level, meaning that respectively the 10% of the stocks with the highest (lowest) Bloomberg ESG Disclosure Score compose the portfolio. Daily data are used over the 2010-2017 period.

		Value-weighted		Equally weighted	
		High10%	Low10%	High10%	Low10%
Positive screening					
CARHART	α	$-0,74 \times 10^{-4}$	$0,49 \times 10^{-4}$	$0,47 \times 10^{-4}$	$0,18 \times 10^{-3*}$
	MKTRF	0,91***	1,12***	0,99***	1,12***
	SMB	-0,41***	0,20***	-0,21***	0,43***
	HML	0,11***	-0,022	0,36***	-0,012
	WML	-0,0958***	0,0254	-0,0772***	0,02
	R ² (adj.)	0,92	0,87	0,93	0,88
CAPM	α	$-0,2 \times 10^{-3**}$	$0,1 \times 10^{-3}$	$-0,08 \times 10^{-3}$	$0,27 \times 10^{-3****}$
	MKTRF	1,07***	1,06***	1,14***	0,99***
	R ² (adj.)	0,89	0,87	0,91	0,86
Best-in-class					
CARHART	α	$-0,65 \times 10^{-4}$	$-0,24 \times 10^{-4}$	$0,46 \times 10^{-4}$	$1,9 \times 10^{-4**}$
	MKTRF	0,97***	1,06***	1,04***	1,09***
	SMB	-0,38***	0,30***	-0,17***	0,45***
	HML	0,04*	-0,03	0,26***	-0,03
	WML	-0,02**	-0,02	-0,04***	0,01
	R ² (adj.)	0,92	0,87	0,93	0,88
CAPM	α	$-1,5 \times 10^{-4*}$	$0,28 \times 10^{-4}$	$-0,45 \times 10^{-4}$	$2,8 \times 10^{-4****}$
	MKTRF	1,09***	0,97***	1,15***	0,95***
	R ² (adj.)	0,91	0,86	0,91	0,86

*, **, *** indicate statistical significance at respectively 10%, 5% and 1% level.

Likewise, the first loading factor of the model accounts for the systematic risk (MKTRF) and highlights how risky the portfolios are compared to the market. We clearly see that the market betas for low- and high-rated portfolios following both positive screening and best-in-class strategy are statistically significant at the 1% level. This result was highly expected since the market beta is the most trusted factor explaining stock's performance in both academic and professional worlds.

Furthermore, in the positive screening case, we clearly see that the high-rated portfolio has a beta lower than 1 (0,9103), while the low-rated portfolio has a beta higher than 1 (1,1288). It means that the high-rated portfolio is defensive with respect to the market (i.e. tends to perform below the market), while the low-rated one is more cyclical (i.e. tends to perform over the market). This can be explained by the fact that positive screening strategies do not account for sector weighting, hence, high-rated ESG disclosure firms could be concentrated in defensive sectors and vice-versa. However, when controlling for sectors by applying a best-in-class strategy, the same pattern occurs. Even if the effect is softened, high-rated portfolio beta is lower than 1 (0,975), while the low-rated portfolio has a beta equal to 1,0622.

As far as the size effect is concerned (SMB), we can observe a high level of statistical significance (1% level) for all the analyzed portfolios. Regarding the positive screening, we clearly see a negative effect for the high-rated portfolio (-0,4145) and a positive one (0,2077) for the low-rated portfolio. The same pattern is observed for the best-in-class strategy, with an even more positive impact for the low-rated portfolio. This is in fact not surprising. Indeed, the literature explains (Albers & Günther, 2010) that the size of the company is a determinant in the ESG reporting, with big companies reporting more than small ones. This is totally in line with what we observed in our high- and low-rated portfolios, and it is logically reflected in the Carhart four-factor model.

Regarding the “book-to-market” effect (HML), results are more mixed. With reference to the positive screening, we can see that the factor is positive and statistically significant at 1% level for the high-rated portfolio, while it is slightly negative and not significant for the low-rated one. Applying a best-in-class screening, results are similar for the low-rated portfolio but lower and less statistically significant for the high-rated portfolio (10% level). Overall, it seems that companies with a higher book-to-market ratio tend to disclose more ESG issues.

Finally, the momentum effect developed by Carhart (1997) demonstrates few evidences in this case. In both positive and best-in-class screening, the low-rated portfolio shows results close to zero and not statistically significant which indicates a neutral impact. Nevertheless, the high-rated portfolio in the positive screening case highlights a statistically significant negative impact (-0,0958) at 1% level. Applying a best-in-class screening, this result softens (-0,0286) but is still significant at 5% level. Overall, it illustrates that past losers tend to have a higher ESG disclosure score.

Looking at the traditional Capital Asset Pricing Model provides us with some precious insights about the difference between high- and low-rated ESG disclosure portfolios and about the relevance of the Carhart four-factor model. It is clear that the multi-factors model gives different but relevant results. Indeed, for the high-rated portfolios, the CAPM returns negative alphas for the positive and best-in-class screening with significance at respectively 5% and 10% level. However, these abnormal negative returns are mainly explained by the SMB and, to a lesser extent, by the WML factor. As a result, the alpha in the Carhart model becomes not statistically significant and we cannot claim an abnormal return. Regarding the low-rated ESG portfolios, in both positive and best-in-class screening, positive alphas in CAPM are lessened by the multi-factors model for the same reasons. Furthermore, regarding the market beta, it is interesting to highlight that betas are close to 1 and slightly higher for the high-rated portfolio compared to the low-rated with the CAPM. However, the Carhart model reverse this pattern.

5.2.2.2. Equally Weighted Portfolios

In this subsection, the results of the Carhart four-factor model for the equally weighted portfolios will be described. Those results can be found in the right part of Table 8. Key elements of the equally weighting will be highlighted and compared to their value-weighted counterparts.

First, with reference to abnormal returns measured by the alpha (α), the difference between the high- and low-rated portfolios is clearer than in the value-weighting. Indeed, for both positive and best-in-class screening, we see a positive but close to zero alpha for the high-rated portfolios while a much clearer positive alpha is attributed to the low-rated portfolios. The low-rated portfolio shows even statistical significance at 10% with a positive screening and at 5% with a best-in-class strategy.

Regarding the market beta, all the high-rated portfolios have a lower beta than their low-rated counterparts. However, the difference between high and low ESG disclosure decreases with equally weighted portfolios as compared with value-weighted ones. The beta of the best-in-class screened high-rated portfolio is even slightly above 1 (1,0443).

As far as the size effect is concerned (SMB), we can observe the same logical trend in value- and equally weighting. Results are highly statistically significant and negative (positive) for high (low) level of ESG disclosure. However, although the spread between high- and low-rated portfolios remains similar, the equally weighting increases all results to the same extent. This is in fact not surprising in an equally scheme since small-capitalization stocks are over-weighted and conversely.

With regard to the HML and WML factors, we can notice the highest level of statistical significance for the high-rated portfolios which is opposed to the neutral result of the low-rated portfolios. Regarding the positive screened high-rated portfolio, we see a positive impact of the book-to-market ratio (0,3656) and a negative impact of the momentum effect (-0,0772). This suggests that stocks with a high level of ESG disclosure tend to be the ones with a higher book-to-market ratio and the past losers. Similar but softened results are found with a best-in-class strategy.

Finally, in this case, the Capital Asset Pricing Model once again presents interesting outcomes. In the previous subsection, the value-weighted high-rated portfolios show negative abnormal returns with the CAPM that become neutral when using the Carhart four-factor model. This suggests that this apparently negative alpha is explained by other factors, namely the size and momentum effects. Here, the equally weighted high-rated portfolios show neutral alphas with the CAPM. However, the low-rated portfolios exhibit statistically significant positive results at the highest level. Nonetheless, when adjusting for the Carhart's risk factors, these results remain positive but significant at 5% (best-in-class) and 10% (positive screening). This is mainly explained by the highly positive size effect of the low-rated portfolios. Lastly, the multi-factors model reverses the trend market beta results. Indeed, market betas of the high-rated portfolios decrease with Carhart, while they increase for the low-rated portfolios.

5.3. Discussion

To close this part, we conclude on a discussion of the results highlighted in the previous sections. In the next pages, we summarize what should be remembered from our analysis, we discuss our previously stated hypotheses and we build upon previous literature in order to link our research with theory and to draw our conclusions.

Let's start with some remarkable results from the previous section. As we have examined, alphas for both high and low transparent portfolios are not considered to be different from zero for six out of eight portfolios. What is interesting is that we found positively significant alphas for the two low transparent portfolios that are equally weighted. Looking at market betas, we found that low transparent portfolios have higher betas than their high transparent counterparts. Moreover, non-transparent portfolios' betas are always greater than one while the transparent ones are lower in 3 out of 4 cases. Therefore, low-rated portfolios seem to be more responsive to market fluctuations. On the contrary, we also have noticed that total risk, as represented by the standard deviation, was lower for low transparent portfolios. As we turned our attention to the SMB loading factor, we saw that the results were quite straightforward. Indeed, we saw that high transparent portfolios have negative coefficients while low transparent portfolios have positive ones. This is in line with what we saw in the descriptive statistics, namely that low transparent portfolios are composed of smaller capitalization firms. Results from the HML and WML factors were more mixed. Overall it seems like the companies that disclose more ESG information are the ones with higher book-to-market ratio.

Given those results, we cannot reject the first null hypothesis stating that the performance of high ESG transparent portfolios is equal to the market's performance. Indeed, over the 2010-2017 period, European stocks with high ESG disclosure scores did not lead to abnormal return. However, results regarding the second hypothesis that looks at the performance of low-rated ESG portfolios are more mixed. Even though the low value-weighted portfolios' alphas are not statistically significant, the equally weighted portfolios show positive alphas for both positive and best-in-class screening (respectively significant at 5% and 10 %). Hence, we can say that low ESG transparent portfolios outperform the European equity market if equally weighted. On the one hand, this is not in line with some previous studies that argue that high-rated ESG portfolios outperform markets and their low-rated counterparts (Eccles, Ioannou, & Serafeim, 2014; Kempf & Osthoff, 2007; Verheyden, Eccles, & Feiner, 2016). On the other hand, a neutral performance of high-rated portfolios agrees with other portfolio studies (Manescu, 2011;

Statman & Glushkov, 2009). In addition, two other famous studies found neutral impact using ethical funds and index analysis (Bauer, Koedelijk, & Otten, 2005; Statman, 2006). Furthermore, Lee & Faff (2009) and Manescu (2011) show a potential outperformance of lagging ESG portfolios, which is in line with some of our second hypothesis results.

In fact, those results find several potential relevant explanations in the literature. Taylor, Vithayathil, and Yim (2017) have found that ESG reporting may not affect firms' market-based measures because "the greater availability of CSR-related firm information to the markets today has eliminated the early adopter advantage" (Taylor et al, 2017, p. 7). In other words, it is no longer sufficient today to be ESG transparent; investors may want to see strategic changes before rewarding firms. Fatemi, Glaum, and Kaiser (2017) explained that ESG disclosure plays a moderating role. This role may explain the neutral performance of high-rated stocks since high level of ESG disclosure may be interpreted as justification for over-investments in CSR activities or commitments to change bad CSR actions. Hence, high ESG disclosure weakens potential positive and negative impacts of CSR activities. Another potential explanation is that firms with an already high level of transparency do not benefit from a high level of ESG disclosure because it does not significantly reduce the information asymmetry (Taylor et al, 2017). Therefore, as the high-rated portfolios show a stable ESG disclosure score over the period while the low-rated portfolios' average disclosure score almost doubles between 2010 and 2017, the ESG disclosure momentum could explain why low-rated portfolios tend to perform better than the market (even if not statistically significant) and why high-rated portfolios are in line with the European market performance. Finally, Lee, and Faff (2009) and Manescu (2011) provide a last potential explanation of better performance of low-rated ESG portfolios. They both argue that an idiosyncratic risk factor associated to ESG factors, the so-called "non-sustainability risk", might not be taken into account by traditional pricing models. This non-sustainability premium is expected to increase in recent years since investors are increasingly aware of ESG concerns. Therefore, it could explain the difference in performance between high- and low-rated ESG portfolios observed in our results.

Then, the purpose of our third hypothesis was to look if high transparent portfolios showed a lower level of risk compared to low transparent ones. Unlike previous studies (Cheng, Ioannou, & Serafeim, 2014; Fatemi, Glaum, & Kaiser, 2017) which claimed a mitigating effect of ESG disclosure, our results are in favor of higher volatility from transparent portfolios translating into a higher degree of risk. However, these results must be taken with a grain of salt. Indeed,

as highlighted in the previous section, it appears that high transparent portfolios feature market betas that are less than one compared to betas higher than one for their non-transparent counterparts. Consequently, low-rated portfolios should overreact compared to the market because increased systematic risk. This is confirmed by our portfolios' return during the studied period. As we can see in Table 5 presented 5.1. Descriptive Statistics, although high transparent portfolios generated lower returns, they also appeared to be more defensive.

Finally, although we formed no hypothesis on the link between ESG factors and company size, our regressions using Carhart's model highlighted some interesting results regarding the SMB loading factor. As we have discovered in the previous section, low transparent portfolios show positive SMB load factors while high transparent portfolios have negative ones, which means that the former should be tilted towards small capitalization stocks whereas the latter should be tilted towards large capitalization stocks. Such results are particularly interesting because they emphasize what had already been shown in the literature, namely that large firms disclose more ESG information and are more transparent. Indeed, Giannarakis (2014) found that company and board size directly influence the quantity of information disclosed. He adds: "*large companies are more visible*, they are able to absorb extra costs of the development of CSR disclosure, they attempt to reduce political costs and they avoid regulation and scrutiny from stakeholders" (Giannarakis, 2014, p. 414). As a result, it would appear that our ESG screen leads us to pick larger firms when searching for exposure to transparent firms and vice versa. This tilt towards small firms in low transparent portfolios could help explain the significant alphas that we found for these portfolios as well as the return differences between high- and low-rated portfolios throughout the period because it may expose low transparent portfolio to a small capitalization premium. This is in line with previous studies (Banz, 1981; Dhett, Kim & Mukherji, 1999) that found that this small cap stocks, though bearing more risk, perform better compared to large cap stocks what explains this premium. Even if Fama and French (1993) and Carhart (1997) take this premium into consideration in the model, the size premium might not have been totally captured by the SMB factor.

Chapter 6: Conclusion

The concept of *Socially Responsible Investments* gained importance over the last decades reflecting a change in investors' motivation and considerations. Reaching \$22.891 billion assets under management in 2016 (Eurosif, 2016), SRI are becoming a major trend and are transforming financial markets. In particular, environmental, social and governance factors integration was born of investors' willingness to take societal consideration into account for their investment decisions. These trends, combined with regulators' willingness to increase company transparency through more disclosure, led companies to increase their disclosure regarding CSR and ESG activities up to the actual situation where we now have a profusion of ESG-related information available.

Despite these new evolutions, previous studies mostly highlighted the costs and benefits of CSR or ESG activities on company valuation or analyze SRI mutual funds. To the best of our knowledge, studies focusing on the impact of such disclosure on financial markets remain scarce. Convinced of the interest and importance of the subject, we chose to investigate *the extent to which environmental, social, and governance disclosure impacts the risk-adjusted performance in the European equity market*.

With this master thesis we aim to contribute to the existing literature covering *Socially Responsible Investments*. We offer a fresh perspective by using more recent data compared to previous studies and, more importantly, by using the Bloomberg ESG Disclosure Score as a proxy for transparency and as a new screening method. Additionally, we also comment on the situation of ESG disclosure in Europe.

Our results suggest that using the ESG disclosure score to construct transparent and non-transparent portfolios leads to non-significant alphas close to zero for most portfolios. This provides evidence that high and low transparent portfolios do not behave differently than the market and do not generate abnormal return. One proposed explanation is that high disclosure is becoming the new normal in Europe and that companies cannot gain competitive advantage by being more transparent. The effect of transparency that may have existed before would seem to have been competed away.

However, low transparent portfolio built using equal weights, hence with more weights given to smaller firms, appeared to generate positive significant alphas. Explanations for this

phenomenon are diverse. We have seen that those portfolios are more tilted towards small cap firms and may benefit from a small cap premium. Additionally, these portfolios have also seen their average ESG disclosure score double during the period compared to high transparent portfolios that are plateauing. This may be seen positively by investors.

In the same vein, results are also in favor of a difference in the level of ESG disclosure between large and small capitalization. Large capitalization firms seem to be more able to disclose more information due to lower costs and also higher external pressure compared to small capitalization firms. However, as aforementioned, larger firms also seem to hit a plateau while ESG disclosure score of smaller firms have spiked.

We believe it is also important to disclose the shortcomings and limits of our study. First, it is worth noticing that our portfolios may suffer from survivorship bias. Indeed, we chose to use the STOXX Europe 600 and its composition as of December 2017 as investment universe. Therefore, we do not include stocks that may have disappeared during the studied period. This can lead to overestimated returns because poorly performing stocks and their returns are not included in our data. Additionally, biases may also arise from the sample's period and geographic area. As a matter of fact, our sample is composed of European stocks for a period between 2010 and 2017 and our results may not hold for other periods or regions due, for example, to different cultural aspects or to regions with more information asymmetry. As a concrete example, the European directive on ESG disclosure was promulgated in 2014 and will be active as of 2018. This directive certainly impacted our sample and may have pushed up disclosure scores. Finally, to interpret our results, one must be aware that transaction fees were not taken into account. However, these were not relevant for the scope of our analysis.

As a closing remark, we would like to shed light on remaining open questions that may be worth analysis in further researches. As aforementioned, our sample was composed of European firms. It could be interesting to extend the analysis to other regions in order to be able to compare the results. Moreover, the application of the European directive on ESG disclosure applicable as of 2018 and its changes may be worth being analyzed.

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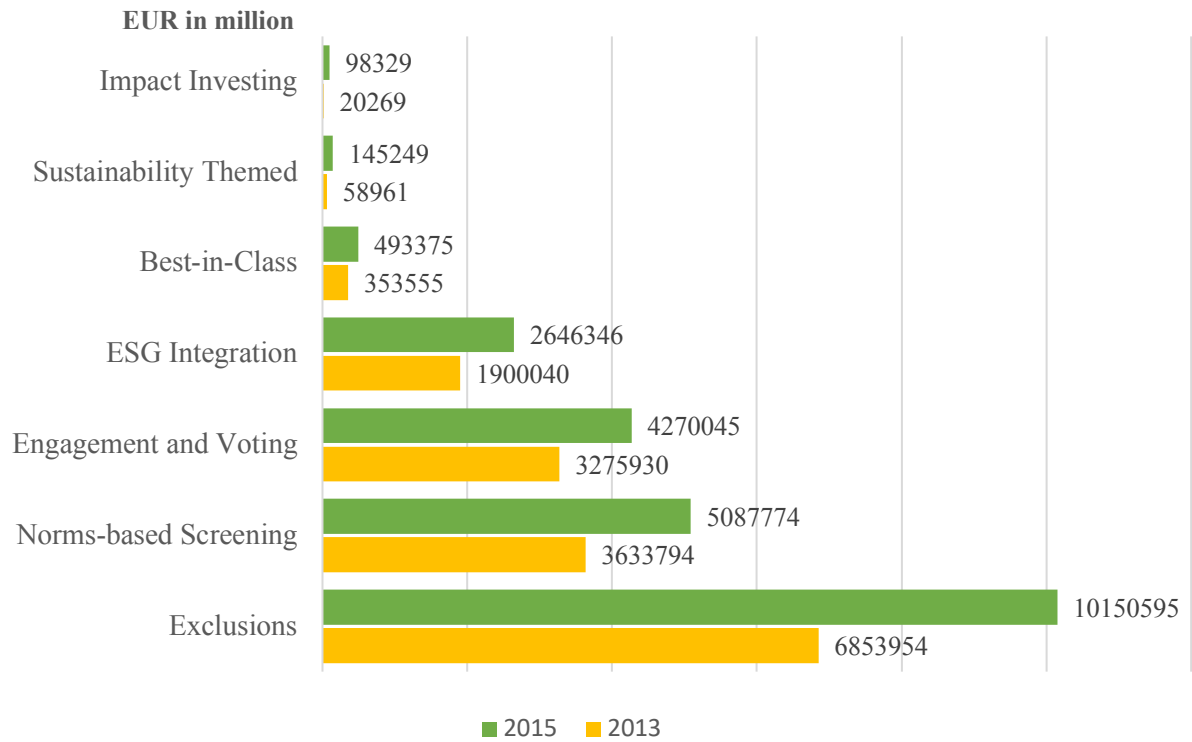
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Appendices

Appendix 1: SRI strategies and features

Figure 1-1: Overview of SRI Strategies in Europe (Eurosif, 2016, p. 4)

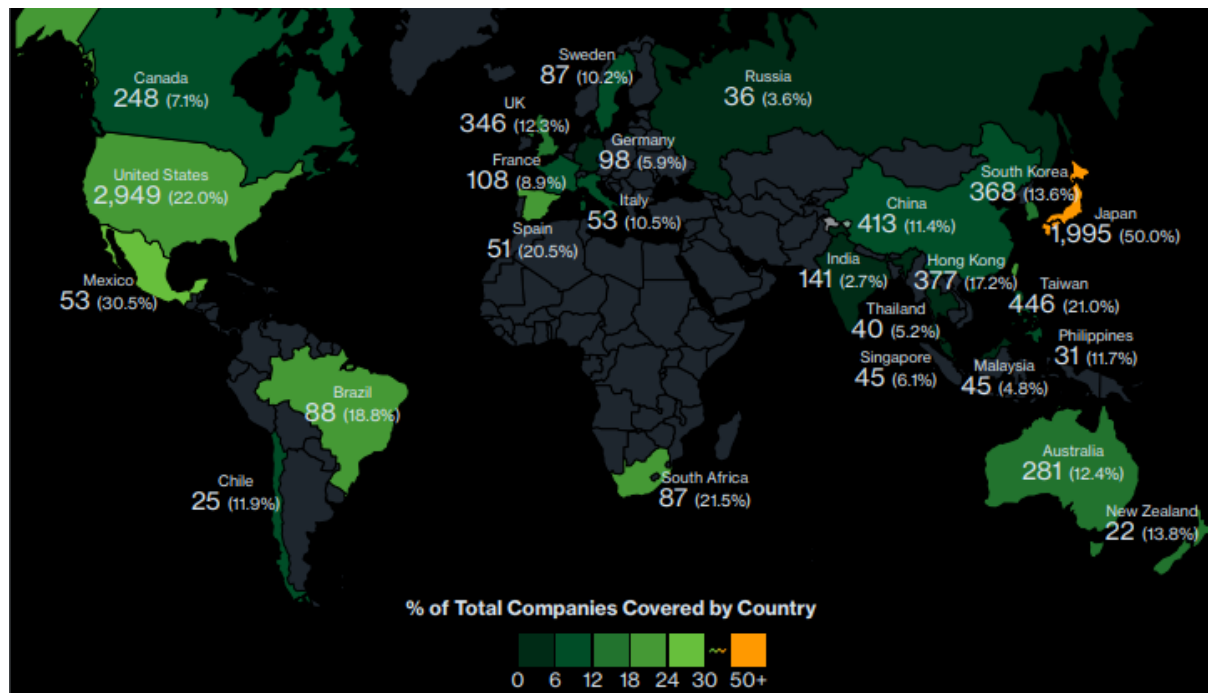


Appendix 2: Bloomberg ESG Disclosure Score

Table 2-1: Bloomberg ESG Disclosure Score details (Bloomberg Terminal)

Description	The Bloomberg ESG Disclosure Score rates companies based on their level of disclosure related to ESG concerns. It means that the more transparent is the company regarding non-financial information, the higher the Bloomberg ESG Disclosure Score is.
Score range	0 to 100
Score update frequency	Annually
Data coverage	100 ESG metrics are used to compute the score. The weighting of those 100 metrics varies for each sub-industry (defined by BICS) in order to take into account business differences. The 100 metrics cover the three ESG components with the following categories: - Environmental: climate risk, resource efficiency, emissions - Social: human capital management, health & safety, supply chain - Governance: remuneration, independency, audit, shareholder rights, diversity, entrenchment, overboarding
Data sources	Annual reports, sustainability reports, press releases, third-party research, and company relationship.
Company coverage	+ 9 000 companies To be eligible, companies must have a market capitalization above \$30 million or be included in a major index: (Global MSCI All Country, Global FTSE All-World, Global S&P Listed Private Equity, US Russell 3000, Canada TSX 300, UK FTSE 350, Europe STOXX 600, Norway OSEBX, Brazil Bovespa, Sweden SBX, India BSE 100, Japan, TSE 1st section, Korea KOSPI 200, Australia ASX 300, Hong Kong, Hang Seng, China SSE180, MSCI China ESG, Shanghai Shenzhen CSI 300, SSE CSR, MXCNESG, SHSZ300, SZ399341, Taiwan TW50, Global Bloomberg US Corporate Bond Index, Bloomberg USD High Yield CorporateBond Index, Bloomberg EUR High Yield Corporate Bond Index and Bloomberg EUR Investment Grade Corporate Bond Index BUSC, BUHY, BEUH and BERC)
Geographic coverage	<i>See figure 2-1 hereafter.</i>

Figure 2-1: Bloomberg ESG Geographic Coverage



Source: Bloomberg Terminal

Note: Data as of 26/01/2018.

18,4% global coverage based on 9451 companies primarily listed on major exchanges.

Appendix 3: List of sample components

Table 3-1: List of sample components

This table highlights the 462 companies included in the sample.

	Company Name	Ticker	GICS Sector Name
1	A2A SpA	A2A IM Equity	Utilities
2	Anglo American PLC	AAL LN Equity	Materials
3	ABB Ltd	ABBN SE Equity	Industrials
4	Abertis Infraestructuras SA	ABE SQ Equity	Industrials
5	Associated British Foods PLC	ABF LN Equity	Consumer Staples
6	Anheuser-Busch InBev SA/NV	ABI BB Equity	Consumer Staples
7	Accor SA	AC FP Equity	Consumer Discretionary
8	Credit Agricole SA	ACA FP Equity	Financials
9	Ackermans & van Haaren NV	ACKB BB Equity	Financials
10	ACS Actividades de Construccio	ACS SQ Equity	Industrials
11	Koninklijke Ahold Delhaize NV	AD NA Equity	Consumer Staples
12	Adecco Group AG	ADEN SE Equity	Industrials
13	Admiral Group PLC	ADM LN Equity	Financials
14	Aéroports de Paris	ADP FP Equity	Industrials
15	adidas AG	ADS GY Equity	Consumer Discretionary
16	Air France-KLM	AF FP Equity	Industrials
17	Aggreko PLC	AGK LN Equity	Industrials
18	Aegon NV	AGN NA Equity	Financials
19	Ageas	AGS BB Equity	Financials
20	Ashtead Group PLC	AHT LN Equity	Industrials
21	Air Liquide SA	AI FP Equity	Materials
22	AIB Group PLC	AIBG ID Equity	Financials
23	Airbus SE	AIR FP Equity	Industrials
24	Arkema SA	AKE FP Equity	Materials
25	Aker BP ASA	AKERBP NO Equity	Energy
26	Akzo Nobel NV	AKZA NA Equity	Materials
27	Alfa Laval AB	ALFA SS Equity	Industrials
28	Alstom SA	ALO FP Equity	Industrials
29	Altran Technologies SA	ALT FP Equity	Information Technology
30	Allianz SE	ALV GY Equity	Financials
31	Amer Sports Oyj	AMEAS FH Equity	Consumer Discretionary
32	ams AG	AMS SE Equity	Information Technology
33	ANDRITZ AG	ANDR AV Equity	Industrials
34	Antofagasta PLC	ANTO LN Equity	Materials
35	Aryzta AG	ARYN SE Equity	Consumer Staples
36	ASML Holding NV	ASML NA Equity	Information Technology
37	Assa Abloy AB	ASSAB SS Equity	Industrials
38	Atlas Copco AB	ATCOA SS Equity	Industrials
39	Atlantia SpA	ATL IM Equity	Industrials
40	Atos SE	ATO FP Equity	Information Technology
41	Aviva PLC	AV/ LN Equity	Financials
42	AVEVA Group PLC	AVV LN Equity	Information Technology
43	AstraZeneca PLC	AZN LN Equity	Health Care
44	BAE Systems PLC	BA/ LN Equity	Industrials
45	Babcock International Group PL	BAB LN Equity	Industrials
46	Julius Baer Group Ltd	BAER SE Equity	Financials
47	Baloise Holding AG	BALN SE Equity	Financials
48	Banco BPM SpA	BAMI IM Equity	Financials
49	Barclays PLC	BARC LN Equity	Financials
50	Barry Callebaut AG	BARN SE Equity	Consumer Staples
51	BASF SE	BAS GY Equity	Materials
52	British American Tobacco PLC	BATS LN Equity	Consumer Staples
53	Bayer AG	BAYN GY Equity	Health Care
54	Societe BIC SA	BB FP Equity	Industrials
55	BBA Aviation PLC	BBA LN Equity	Industrials
56	Banco Bilbao Vizcaya Argentari	BBVA SQ Equity	Financials
57	Balfour Beatty PLC	BBY LN Equity	Industrials
58	Banco Comercial Portugues SA	BCP PL Equity	Financials
59	Barratt Developments PLC	BDEV LN Equity	Consumer Discretionary
60	Beiersdorf AG	BEI GY Equity	Consumer Staples

61	Beazley PLC	BEZ LN Equity	Financials
62	BillerudKorsnas AB	BILL SS Equity	Materials
63	BioMerieux	BIM FP Equity	Health Care
64	Bank of Ireland Group PLC	BIRG ID Equity	Financials
65	Berkeley Group Holdings PLC	BKG LN Equity	Consumer Discretionary
66	Bankinter SA	BKT SQ Equity	Financials
67	British Land Co PLC/The	BLND LN Equity	Real Estate
68	BHP Billiton PLC	BLT LN Equity	Materials
69	Bolsas y Mercados Espanoles SH	BME SQ Equity	Financials
70	Bayerische Motoren Werke AG	BMW GY Equity	Consumer Discretionary
71	Danone SA	BN FP Equity	Consumer Staples
72	BNP Paribas SA	BNP FP Equity	Financials
73	Boskalis Westminster	BOKA NA Equity	Industrials
74	Boliden AB	BOL SS Equity	Materials
75	HUGO BOSS AG	BOSS GY Equity	Consumer Discretionary
76	BP PLC	BP/ LN Equity	Energy
77	Burberry Group PLC	BRBY LN Equity	Consumer Discretionary
78	BT Group PLC	BT/A LN Equity	Telecommunication Services
79	BTG PLC	BTG LN Equity	Health Care
80	Bureau Veritas SA	BVI FP Equity	Industrials
81	Britvic PLC	BVIC LN Equity	Consumer Staples
82	Bellway PLC	BWY LN Equity	Consumer Discretionary
83	Carrefour SA	CA FP Equity	Consumer Staples
84	CaixaBank SA	CABK SQ Equity	Financials
85	Capgemini SE	CAP FP Equity	Information Technology
86	Carlsberg A/S	CARLB DC Equity	Consumer Staples
87	Castellum AB	CAST SS Equity	Real Estate
88	Close Brothers Group PLC	CBG LN Equity	Financials
89	Commerzbank AG	CBK GY Equity	Financials
90	Carnival PLC	CCL LN Equity	Consumer Discretionary
91	Christian Dior SE	CDI FP Equity	Consumer Discretionary
92	Centamin PLC	CEY LN Equity	Materials
93	CEZ AS	CEZ CK Equity	Utilities
94	Cie Financiere Richemont SA	CFR SE Equity	Consumer Discretionary
95	Clariant AG	CLN SE Equity	Materials
96	Centrica PLC	CNA LN Equity	Utilities
97	CNP Assurances	CNP FP Equity	Financials
98	Casino Guichard Perrachon SA	CO FP Equity	Consumer Staples
99	Cobham PLC	COB LN Equity	Industrials
100	Coloplast A/S	COLOB DC Equity	Health Care
101	Colruyt SA	COLR BB Equity	Consumer Staples
102	Continental AG	CON GY Equity	Consumer Discretionary
103	Compass Group PLC	CPG LN Equity	Consumer Discretionary
104	Croda International PLC	CRDA LN Equity	Materials
105	CRH PLC	CRH ID Equity	Materials
106	AXA SA	CS FP Equity	Financials
107	Credit Suisse Group AG	CSGN SE Equity	Financials
108	Daimler AG	DAI GY Equity	Consumer Discretionary
109	Danske Bank A/S	DANSKE DC Equity	Financials
110	Deutsche Boerse AG	DB1 GY Equity	Financials
111	Deutsche Bank AG	DBK GY Equity	Financials
112	DCC PLC	DCC LN Equity	Industrials
113	JCDcaux SA	DEC FP Equity	Consumer Discretionary
114	Vinci SA	DG FP Equity	Industrials
115	Diageo PLC	DGE LN Equity	Consumer Staples
116	Derwent London PLC	DLN LN Equity	Real Estate
117	Daily Mail & General Trust PLC	DMGT LN Equity	Consumer Discretionary
118	DNB ASA	DNB NO Equity	Financials
119	dormakaba Holding AG	DOKA SW Equity	Industrials
120	Dechra Pharmaceuticals PLC	DPH LN Equity	Health Care
121	Deutsche Post AG	DPW GY Equity	Industrials
122	Koninklijke DSM NV	DSM NA Equity	Materials
123	DSV A/S	DSV DC Equity	Industrials
124	Deutsche Telekom AG	DTE GY Equity	Telecommunication Services
125	Duerr AG	DUE GY Equity	Industrials
126	Dufry AG	DUFN SE Equity	Consumer Discretionary
127	Erste Group Bank AG	EBS AV Equity	Financials

128	Electrocomponents PLC	ECM LN Equity	Information Technology
129	Electricite de France SA	EDF FP Equity	Utilities
130	EDP - Energias de Portugal SA	EDP PL Equity	Utilities
131	Essilor International Cie Gene	EI FP Equity	Health Care
132	Endesa SA	ELE SQ Equity	Utilities
133	Elisa OYJ	ELISA FH Equity	Telecommunication Services
134	Electrolux AB	ELUXB SS Equity	Consumer Discretionary
135	Man Group PLC	EMG LN Equity	Financials
136	Bouygues SA	EN FP Equity	Industrials
137	Enel SpA	ENEL IM Equity	Utilities
138	Enagas SA	ENG SQ Equity	Energy
139	Engie SA	ENGI FP Equity	Utilities
140	Eni SpA	ENI IM Equity	Energy
141	E.ON SE	EOAN GY Equity	Utilities
142	Equinor ASA	EQNR NO Equity	Energy
143	Telefonaktiebolaget LM Ericsson	ERICB SS Equity	Information Technology
144	Eutelsat Communications SA	ETL FP Equity	Consumer Discretionary
145	EXOR NV	EXO IM Equity	Financials
146	Experian PLC	EXPN LN Equity	Industrials
147	easyJet PLC	EZJ LN Equity	Industrials
148	Fabege AB	FABG SS Equity	Real Estate
149	Fonciere Des Regions	FDR FP Equity	Real Estate
150	Ferrovial SA	FER SQ Equity	Industrials
151	Ferguson PLC	FERG LN Equity	Industrials
152	Eiffage SA	FGR FP Equity	Industrials
153	Flughafen Zurich AG	FHZN SE Equity	Industrials
154	Georg Fischer AG	FI/N SE Equity	Industrials
155	Fresenius Medical Care AG & Co	FME GY Equity	Health Care
156	Freenet AG	FNTN GY Equity	Telecommunication Services
157	Fortum OYJ	FORTUM FH Equity	Utilities
158	TOTAL SA	FP FP Equity	Energy
159	FUCHS PETROLUB SE	FPE3 GY Equity	Materials
160	Valeo SA	FR FP Equity	Consumer Discretionary
161	Fraport AG Frankfurt Airport S	FRA GY Equity	Industrials
162	Fresenius SE & Co KGaA	FRE GY Equity	Health Care
163	Fresnillo PLC	FRES LN Equity	Materials
164	Assicurazioni Generali SpA	G IM Equity	Financials
165	GEA Group AG	G1A GY Equity	Industrials
166	Galp Energia SGPS SA	GALP PL Equity	Energy
167	GAM Holding AG	GAM SE Equity	Financials
168	Gas Natural SDG SA	GAS SQ Equity	Utilities
169	Geberit AG	GEBN SE Equity	Industrials
170	Genmab A/S	GEN DC Equity	Health Care
171	Getlink	GET FP Equity	Industrials
172	Getinge AB	GETIB SS Equity	Health Care
173	Gecina SA	GFC FP Equity	Real Estate
174	G4S PLC	GFS LN Equity	Industrials
175	Givaudan SA	GIVN SE Equity	Materials
176	Societe Generale SA	GLE FP Equity	Financials
177	Galapagos NV	GLPG NA Equity	Health Care
178	GN Store Nord A/S	GN DC Equity	Health Care
179	Great Portland Estates PLC	GPOR LN Equity	Real Estate
180	Grifols SA	GRF SQ Equity	Health Care
181	GlaxoSmithKline PLC	GSK LN Equity	Health Care
182	Hays PLC	HAS LN Equity	Industrials
183	HeidelbergCement AG	HEI GY Equity	Materials
184	Heineken NV	HEIA NA Equity	Consumer Staples
185	Heineken Holding NV	HEIO NA Equity	Consumer Staples
186	Helvetia Holding AG	HELN SE Equity	Financials
187	Henkel AG & Co KGaA	HEN3 GY Equity	Consumer Staples
188	Hexagon AB	HEXAB SS Equity	Information Technology
189	Hargreaves Lansdown PLC	HL/ LN Equity	Financials
190	Halma PLC	HLMA LN Equity	Information Technology
191	Hennes & Mauritz AB	HMB SS Equity	Consumer Discretionary
192	Hammerson PLC	HMSO LN Equity	Real Estate
193	Hannover Rueck SE	HNR1 GY Equity	Financials
194	Thales SA	HO FP Equity	Industrials

195	HOCHTIEF AG	HOT GY Equity	Industrials
196	HSBC Holdings PLC	HSBA LN Equity	Financials
197	HomeServe PLC	HSV LN Equity	Industrials
198	Hiscox Ltd	HSX LN Equity	Financials
199	Huhtamaki OYJ	HUHV FH Equity	Materials
200	Husqvarna AB	HUSQB SS Equity	Consumer Discretionary
201	Howden Joinery Group PLC	HWDN LN Equity	Industrials
202	Iberdrola SA	IBE SQ Equity	Utilities
203	ICA Gruppen AB	ICA SS Equity	Consumer Staples
204	ICADE	ICAD FP Equity	Real Estate
205	Intermediate Capital Group PLC	ICP LN Equity	Financials
206	Infineon Technologies AG	IFX GY Equity	Information Technology
207	IG Group Holdings PLC	IGG LN Equity	Financials
208	InterContinental Hotels Group	IHG LN Equity	Consumer Discretionary
209	3i Group PLC	III LN Equity	Financials
210	Imperial Brands PLC	IMB LN Equity	Consumer Staples
211	IMI PLC	IMI LN Equity	Industrials
212	Inchcape PLC	INCH LN Equity	Consumer Discretionary
213	Industrivarden AB	INDUA SS Equity	Financials
214	Informa PLC	INF LN Equity	Consumer Discretionary
215	ING Groep NV	INGA NA Equity	Financials
216	Intrum AB	INTRUM SS Equity	Industrials
217	Intu Properties PLC	INTU LN Equity	Real Estate
218	Investor AB	INVEB SS Equity	Financials
219	Investec PLC	INVP LN Equity	Financials
220	Inmarsat PLC	ISAT LN Equity	Telecommunication Services
221	Intesa Sanpaolo SpA	ISP IM Equity	Financials
222	Intertek Group PLC	ITRK LN Equity	Industrials
223	ITV PLC	ITV LN Equity	Consumer Discretionary
224	Industria de Diseno Textil SA	ITX SQ Equity	Consumer Discretionary
225	IWG PLC	IWG LN Equity	Industrials
226	Johnson Matthey PLC	JMAT LN Equity	Materials
227	Jeronimo Martins SGPS SA	JMT PL Equity	Consumer Staples
228	Jyske Bank A/S	JYSK DC Equity	Financials
229	KBC Group NV	KBC BB Equity	Financials
230	Konecranes OYJ	KCR FH Equity	Industrials
231	Kering SA	KER FP Equity	Consumer Discretionary
232	Kesko OYJ	KESKOB FH Equity	Consumer Staples
233	Kingfisher PLC	KGF LN Equity	Consumer Discretionary
234	Natixis SA	KN FP Equity	Financials
235	Kone OYJ	KNEBV FH Equity	Industrials
236	Kuehne + Nagel International A	KNIN SE Equity	Industrials
237	Komerční banka as	KOMB CK Equity	Financials
238	Koninklijke KPN NV	KPN NA Equity	Telecommunication Services
239	Kingspan Group PLC	KSP ID Equity	Industrials
240	Kerry Group PLC	KYG ID Equity	Consumer Staples
241	Land Securities Group PLC	LAND LN Equity	Real Estate
242	Leonardo SpA	LDO IM Equity	Industrials
243	Legal & General Group PLC	LGEN LN Equity	Financials
244	Deutsche Lufthansa AG	LHA GY Equity	Industrials
245	LafargeHolcim Ltd	LHN SE Equity	Materials
246	Klepierre SA	LI FP Equity	Real Estate
247	Chocoladefabriken Lindt & Spru	LISN SE Equity	Consumer Staples
248	Lloyds Banking Group PLC	LLOY LN Equity	Financials
249	Logitech International SA	LOGN SE Equity	Information Technology
250	Lonza Group AG	LONN SE Equity	Health Care
251	Legrand SA	LR FP Equity	Industrials
252	London Stock Exchange Group PL	LSE LN Equity	Financials
253	H Lundbeck A/S	LUN DC Equity	Health Care
254	L E Lundbergforetagen AB	LUNDB SS Equity	Financials
255	Lundin Petroleum AB	LUPE SS Equity	Energy
256	Luxottica Group SpA	LUX IM Equity	Consumer Discretionary
257	LANXESS AG	LXS GY Equity	Materials
258	AP Moller - Maersk A/S	MAERSKB DC Equity	Industrials
259	MAN SE	MAN GY Equity	Industrials
260	Mapfre SA	MAP SQ Equity	Financials
261	Mediobanca Banca di Credito Fi	MB IM Equity	Financials

262	LVMH Moet Hennessy Louis Vuit	MC FP Equity	Consumer Discretionary
263	Micro Focus International PLC	MCRO LN Equity	Information Technology
264	Metso OYJ	METSO FH Equity	Industrials
265	Wendel SA	MF FP Equity	Financials
266	Meggitt PLC	MGGT LN Equity	Industrials
267	Marine Harvest ASA	MHG NO Equity	Consumer Staples
268	Marks & Spencer Group PLC	MKS LN Equity	Consumer Discretionary
269	Cie Generale des Etablissement	ML FP Equity	Consumer Discretionary
270	Lagardere SCA	MMB FP Equity	Consumer Discretionary
271	Mondi PLC	MNDI LN Equity	Materials
272	Moneysupermarket.com Group PLC	MONY LN Equity	Information Technology
273	Merck KGaA	MRK GY Equity	Health Care
274	Melrose Industries PLC	MRO LN Equity	Industrials
275	Wm Morrison Supermarkets PLC	MRW LN Equity	Consumer Staples
276	ArcelorMittal	MT NA Equity	Materials
277	MTU Aero Engines AG	MTX GY Equity	Industrials
278	Muenchener Rueckversicherungs-	MUV2 GY Equity	Financials
279	Aurubis AG	NDA GY Equity	Materials
280	Nordea Bank AB	NDA SS Equity	Financials
281	Nestle SA	NESN SE Equity	Consumer Staples
282	Neste Oyj	NESTE FH Equity	Energy
283	National Grid PLC	NG/ LN Equity	Utilities
284	Norsk Hydro ASA	NHY NO Equity	Materials
285	Nibe Industrier AB	NIBEB SS Equity	Industrials
286	Imerys SA	NK FP Equity	Materials
287	Nokia OYJ	NOKIA FH Equity	Information Technology
288	Novartis AG	NOVN SE Equity	Health Care
289	Novo Nordisk A/S	NOVOB DC Equity	Health Care
290	Nokian Renkaat OYJ	NRE1V FH Equity	Consumer Discretionary
291	NEX Group PLC	NXG LN Equity	Financials
292	Next PLC	NXT LN Equity	Consumer Discretionary
293	Novozymes A/S	NZYMB DC Equity	Materials
294	OC Oerlikon Corp AG	OERL SE Equity	Industrials
295	Old Mutual PLC	OML LN Equity	Financials
296	OMV AG	OMV AV Equity	Energy
297	L'Oreal SA	OR FP Equity	Consumer Staples
298	Orange SA	ORA FP Equity	Telecommunication Services
299	Orkla ASA	ORK NO Equity	Consumer Staples
300	Orion Oyj	ORNBV FH Equity	Health Care
301	Outokumpu OYJ	OUT1V FH Equity	Materials
302	Porsche Automobil Holding SE	PAH3 GY Equity	Consumer Discretionary
303	Pargesa Holding SA	PARG SE Equity	Financials
304	Partners Group Holding AG	PGHN SE Equity	Financials
305	Koninklijke Philips NV	PHIA NA Equity	Health Care
306	Pennon Group PLC	PNN LN Equity	Utilities
307	Paddy Power Betfair PLC	PPB ID Equity	Consumer Discretionary
308	Proximus SADP	PROX BB Equity	Telecommunication Services
309	Prudential PLC	PRU LN Equity	Financials
310	Prysmian SpA	PRY IM Equity	Industrials
311	ProSiebenSat.1 Media SE	PSM GY Equity	Consumer Discretionary
312	Persimmon PLC	PSN LN Equity	Consumer Discretionary
313	Pearson PLC	PERSON LN Equity	Consumer Discretionary
314	PSP Swiss Property AG	PSPN SE Equity	Real Estate
315	Publicis Groupe SA	PUB FP Equity	Consumer Discretionary
316	QIAGEN NV	QIA GY Equity	Health Care
317	Randstad NV	RAND NA Equity	Industrials
318	Reckitt Benckiser Group PLC	RB/ LN Equity	Consumer Staples
319	Raiffeisen Bank International	RBI AV Equity	Financials
320	Royal Bank of Scotland Group P	RBS LN Equity	Financials
321	Remy Cointreau SA	RCO FP Equity	Consumer Staples
322	Royal Dutch Shell PLC	RDSA NA Equity	Energy
323	Red Electrica Corp SA	REE SQ Equity	Utilities
324	RELX PLC	REL LN Equity	Industrials
325	RELX NV	REN NA Equity	Industrials
326	Repsol SA	REP SQ Equity	Energy
327	Rheinmetall AG	RHM GY Equity	Industrials
328	Pernod Ricard SA	RI FP Equity	Consumer Staples

329	Rio Tinto PLC	RIO LN Equity	Materials
330	Hermes International	RMS FP Equity	Consumer Discretionary
331	Rightmove PLC	RMV LN Equity	Information Technology
332	Renault SA	RNO FP Equity	Consumer Discretionary
333	Roche Holding AG	ROG SE Equity	Health Care
334	Rotork PLC	ROR LN Equity	Industrials
335	RPC Group PLC	RPC LN Equity	Materials
336	Rolls-Royce Holdings PLC	RR/ LN Equity	Industrials
337	Randgold Resources Ltd	RRS LN Equity	Materials
338	RSA Insurance Group PLC	RSA LN Equity	Financials
339	Rentokil Initial PLC	RTO LN Equity	Industrials
340	RWE AG	RWE GY Equity	Utilities
341	Rexel SA	RXL FP Equity	Industrials
342	Ryanair Holdings PLC	RYA ID Equity	Industrials
343	Saab AB	SAABB SS Equity	Industrials
344	Banco de Sabadell SA	SAB SQ Equity	Financials
345	Safran SA	SAF FP Equity	Industrials
346	Sampo Oyj	SAMPO FH Equity	Financials
347	Sanofi	SAN FP Equity	Health Care
348	Banco Santander SA	SAN SQ Equity	Financials
349	Sandvik AB	SAND SS Equity	Industrials
350	SAP SE	SAP GY Equity	Information Technology
351	SBM Offshore NV	SBMO NA Equity	Energy
352	J Sainsbury PLC	SBRY LN Equity	Consumer Staples
353	Svenska Cellulosa AB SCA	SCAB SS Equity	Materials
354	Schindler Holding AG	SCHP SE Equity	Industrials
355	Swisscom AG	SCMN SE Equity	Telecommunication Services
356	SCOR SE	SCR FP Equity	Financials
357	K+S AG	SDF GY Equity	Materials
358	Schroders PLC	SDR LN Equity	Financials
359	Skandinaviska Enskilda Banken	SEBA SS Equity	Financials
360	Securitas AB	SECUB SS Equity	Industrials
361	SES SA	SESG FP Equity	Consumer Discretionary
362	Suez	SEV FP Equity	Utilities
363	Sage Group PLC/The	SGE LN Equity	Information Technology
364	Cie de Saint-Gobain	SGO FP Equity	Industrials
365	Siemens Gamesa Renewable Energ	SGRE SQ Equity	Industrials
366	Segro PLC	SGRO LN Equity	Real Estate
367	SGS SA	SGSN SE Equity	Industrials
368	Shaftesbury PLC	SHB LN Equity	Real Estate
369	Svenska Handelsbanken AB	SHBA SS Equity	Financials
370	Shire PLC	SHP LN Equity	Health Care
371	Siemens AG	SIE GY Equity	Industrials
372	Sika AG	SIK SE Equity	Materials
373	SEB SA	SK FP Equity	Consumer Discretionary
374	SKF AB	SKFB SS Equity	Industrials
375	Smurfit Kappa Group PLC	SKG ID Equity	Materials
376	Sky PLC	SKY LN Equity	Consumer Discretionary
377	Standard Life Aberdeen PLC	SLA LN Equity	Financials
378	Swiss Life Holding AG	SLHN SE Equity	Financials
379	DS Smith PLC	SMDS LN Equity	Materials
380	Smiths Group PLC	SMIN LN Equity	Industrials
381	WH Smith PLC	SMWH LN Equity	Consumer Discretionary
382	Smith & Nephew PLC	SN/ LN Equity	Health Care
383	Swedish Orphan Biovitrum AB	SOBI SS Equity	Health Care
384	Solvay SA	SOLB BB Equity	Materials
385	Sonova Holding AG	SOON SE Equity	Health Care
386	Software AG	SOW GY Equity	Information Technology
387	Saipem SpA	SPM IM Equity	Energy
388	Axel Springer SE	SPR GY Equity	Consumer Discretionary
389	Swiss Prime Site AG	SPSN SE Equity	Real Estate
390	Spirax-Sarco Engineering PLC	SPX LN Equity	Industrials
391	Swiss Re AG	SREN SE Equity	Financials
392	Snam SpA	SRG IM Equity	Energy
393	Sartorius AG	SRT3 GY Equity	Health Care
394	SSE PLC	SSE LN Equity	Utilities
395	Standard Chartered PLC	STAN LN Equity	Financials

396	Storebrand ASA	STB NO Equity	Financials
397	Stora Enso OYJ	STERV FH Equity	Materials
398	St James's Place PLC	STJ LN Equity	Financials
399	STMicroelectronics NV	STM IM Equity	Information Technology
400	Straumann Holding AG	STMN SE Equity	Health Care
401	Schneider Electric SE	SU FP Equity	Industrials
402	Subsea 7 SA	SUBC NO Equity	Energy
403	Severn Trent PLC	SVT LN Equity	Utilities
404	Sodexo SA	SW FP Equity	Consumer Discretionary
405	Swedbank AB	SWEDA SS Equity	Financials
406	Swedish Match AB	SWMA SS Equity	Consumer Staples
407	Spectris PLC	SXS LN Equity	Information Technology
408	Symrise AG	SY1 GY Equity	Materials
409	Sydbank A/S	SYDB DC Equity	Financials
410	Tate & Lyle PLC	TATE LN Equity	Consumer Staples
411	TP ICAP PLC	TCAP LN Equity	Financials
412	TDC A/S	TDC DC Equity	Telecommunication Services
413	Telefonica SA	TEF SQ Equity	Telecommunication Services
414	Telenor ASA	TEL NO Equity	Telecommunication Services
415	Tele2 AB	TEL2B SS Equity	Telecommunication Services
416	Telia Co AB	TELIA SS Equity	Telecommunication Services
417	Temenos Group AG	TEMN SE Equity	Information Technology
418	Tenaris SA	TEN IM Equity	Energy
419	Teleperformance	TEP FP Equity	Industrials
420	TGS NOPEC Geophysical Co ASA	TGS NO Equity	Energy
421	Telecom Italia SpA/Milano	TIT IM Equity	Telecommunication Services
422	thyssenkrupp AG	TKA GY Equity	Materials
423	Tullow Oil PLC	TLW LN Equity	Energy
424	Telenet Group Holding NV	TNET BB Equity	Consumer Discretionary
425	Travis Perkins PLC	TPK LN Equity	Industrials
426	Tryg A/S	TRYG DC Equity	Financials
427	Tesco PLC	TSCO LN Equity	Consumer Staples
428	Taylor Wimpey PLC	TW/ LN Equity	Consumer Discretionary
429	Ubisoft Entertainment SA	UBI FP Equity	Information Technology
430	Unione di Banche Italiane SpA	UBI IM Equity	Financials
431	UBM PLC	UBM LN Equity	Consumer Discretionary
432	UCB SA	UCB BB Equity	Health Care
433	UniCredit SpA	UCG IM Equity	Financials
434	Peugeot SA	UG FP Equity	Consumer Discretionary
435	Swatch Group AG/The	UHR SE Equity	Consumer Discretionary
436	Unibail-Rodamco SE	UL NA Equity	Real Estate
437	Umicore SA	UMI BB Equity	Materials
438	Unilever NV	UNA NA Equity	Consumer Staples
439	UPM-Kymmene OYJ	UPM FH Equity	Materials
440	United Internet AG	UTDI GY Equity	Information Technology
441	United Utilities Group PLC	UU/ LN Equity	Utilities
442	Victrex PLC	VCT LN Equity	Materials
443	Veolia Environnement SA	VIE FP Equity	Utilities
444	Vifor Pharma AG	VIFN SE Equity	Health Care
445	Vivendi SA	VIV FP Equity	Consumer Discretionary
446	Vodafone Group PLC	VOD LN Equity	Telecommunication Services
447	voestalpine AG	VOE AV Equity	Materials
448	Volvo AB	VOLVB SS Equity	Industrials
449	Volkswagen AG	VOW3 GY Equity	Consumer Discretionary
450	Vestas Wind Systems A/S	VWS DC Equity	Industrials
451	Wacker Chemie AG	WCH GY Equity	Materials
452	William Demant Holding A/S	WDH DC Equity	Health Care
453	Weir Group PLC/The	WEIR LN Equity	Industrials
454	John Wood Group PLC	WG/ LN Equity	Energy
455	Wienerberger AG	WIE AV Equity	Materials
456	Wolters Kluwer NV	WKL NA Equity	Industrials
457	William Hill PLC	WMH LN Equity	Consumer Discretionary
458	WPP PLC	WPP LN Equity	Consumer Discretionary
459	Wartsila OYJ Abp	WRT1V FH Equity	Industrials
460	Whitbread PLC	WTB LN Equity	Consumer Discretionary
461	Yara International ASA	YAR NO Equity	Materials
462	Zurich Insurance Group AG	ZURN SE Equity	Financials

Source: Bloomberg

Appendix 4: Portfolios composition

Table 4-1: High ESG disclosure Portfolios' composition – positive screening (1/4)

This table summarizes the composition of portfolios with the highest ESG disclosure score for the period 2010 to 2017. Stocks are ranked from highest to lowest score. The first part of the table shows stocks included after using a 10% screening and the second part additional stocks included after a 25% screening.

	2010	2011	2012	2013
10% screening	SRG IM Equity	FORTUM FH Equity	GAS SQ Equity	FORTUM FH Equity
	NOVN SE Equity	ISP IM Equity	FORTUM FH Equity	NOVN SE Equity
	EDP PL Equity	GAS SQ Equity	SRG IM Equity	ISP IM Equity
	FI/N SE Equity	NOVN SE Equity	DAI GY Equity	IBE SQ Equity
	ISP IM Equity	NDA SS Equity	ISP IM Equity	EDP PL Equity
	DAI GY Equity	EDP PL Equity	IBE SQ Equity	REP SQ Equity
	NDA SS Equity	SRG IM Equity	NOVN SE Equity	SU FP Equity
	ENI IM Equity	ENI IM Equity	REP SQ Equity	ENEL IM Equity
	GAS SQ Equity	IBE SQ Equity	ENEL IM Equity	EDF FP Equity
	IBE SQ Equity	DAI GY Equity	ENI IM Equity	DAI GY Equity
	REP SQ Equity	REP SQ Equity	EDP PL Equity	BP/ LN Equity
	FORTUM FH Equity	SLA LN Equity	BAS GY Equity	BAYN GY Equity
	SGRE SQ Equity	ENEL IM Equity	BAYN GY Equity	A2A IM Equity
	SCAB SS Equity	BAS GY Equity	SU FP Equity	BMW GY Equity
	STM IM Equity	BAYN GY Equity	EDF FP Equity	GAS SQ Equity
	BAS GY Equity	SCAB SS Equity	OMV AV Equity	PHIA NA Equity
	BLT LN Equity	BLT LN Equity	CABK SQ Equity	AAL LN Equity
	SLA LN Equity	BP/ LN Equity	UBI IM Equity	ENI IM Equity
	SAND SS Equity	A2A IM Equity	A2A IM Equity	BAS GY Equity
	BP/ LN Equity	EDF FP Equity	AAL LN Equity	GEBN SE Equity
	BAMI IM Equity	AAL LN Equity	BLT LN Equity	MT NA Equity
	EDF FP Equity	SAND SS Equity	AZN LN Equity	BLT LN Equity
	RIO LN Equity	STM IM Equity	SGRE SQ Equity	NG/ LN Equity
	ENEL IM Equity	SGRE SQ Equity	ENG SQ Equity	ABBN SE Equity
	III LN Equity	SAB SQ Equity	MNDI LN Equity	OMV AV Equity
	BAYN GY Equity	BMW GY Equity	AV/ LN Equity	SAN FP Equity
	ENG SQ Equity	RIO LN Equity	NHY NO Equity	AV/ LN Equity
	ABBN SE Equity	ABBN SE Equity	BP/ LN Equity	BKT SQ Equity
	GEBN SE Equity	ALO FP Equity	BMW GY Equity	STM IM Equity
	KER FP Equity	EQNR NO Equity	NG/ LN Equity	UBI IM Equity
	MUV2 GY Equity	NZYMB DC Equity	OUTIV FH Equity	SAP GY Equity
	WRTIV FH Equity	RWE GY Equity	STM IM Equity	SGRE SQ Equity
	DANSKE DC Equity	ENG SQ Equity	EQNR NO Equity	EQNR NO Equity
	BMW GY Equity	NG/ LN Equity	ABBN SE Equity	BNP FP Equity
	BBVA SQ Equity	OMV AV Equity	MAN GY Equity	DB1 GY Equity
	BKT SQ Equity	III LN Equity	KER FP Equity	MUV2 GY Equity
	KGF LN Equity	AZN LN Equity	SAB SQ Equity	SRG IM Equity
	KESKOB FH Equity	GEBN SE Equity	COB LN Equity	TIT IM Equity
	RWE GY Equity	ORNBV FH Equity	ORNBV FH Equity	CABK SQ Equity
	UCG IM Equity	ROG SE Equity	SAND SS Equity	INVP LN Equity
	ALO FP Equity	SAN FP Equity	DANSKE DC Equity	COB LN Equity
	GSK LN Equity	KGF LN Equity	UCG IM Equity	MNDI LN Equity
	ORNBV FH Equity	VOW3 GY Equity	ABE SQ Equity	NHY NO Equity
	SAN FP Equity	MRK GY Equity	FP FP Equity	SGO FP Equity
	ROG SE Equity	WRTIV FH Equity	BKT SQ Equity	KER FP Equity
	AZN LN Equity	BKT SQ Equity	FR FP Equity	KESKOB FH Equity
	UMI BB Equity	DANSKE DC Equity	NZYMB DC Equity	ORNBV FH Equity

Table 4-1: High ESG disclosure Portfolios' composition – positive screening (2/4)

	2014	2015	2016	2017
10% screening	FORTUM FH Equity	ISP IM Equity	ISP IM Equity	IBE SQ Equity
	ISP IM Equity	IBE SQ Equity	IBE SQ Equity	FORTUM FH Equity
	REP SQ Equity	FORTUM FH Equity	ENEL IM Equity	BP/ LN Equity
	IBE SQ Equity	HEIA NA Equity	FORTUM FH Equity	ENEL IM Equity
	NOVN SE Equity	REP SQ Equity	HEIA NA Equity	ISP IM Equity
	AAL LN Equity	ENEL IM Equity	BP/ LN Equity	SGO FP Equity
	EDP PL Equity	BP/ LN Equity	BMW GY Equity	BMW GY Equity
	ENEL IM Equity	BAYN GY Equity	BAYN GY Equity	GEBN SE Equity
	BAYN GY Equity	BMW GY Equity	EDP PL Equity	BAYN GY Equity
	HEIA NA Equity	VOW3 GY Equity	VOW3 GY Equity	GAS SQ Equity
	DAI GY Equity	DAI GY Equity	REP SQ Equity	REP SQ Equity
	VOW3 GY Equity	A2A IM Equity	GAS SQ Equity	EDP PL Equity
	BAS GY Equity	ABBN SE Equity	NESN SE Equity	STERV FH Equity
	BMW GY Equity	EDP PL Equity	SGO FP Equity	ABBN SE Equity
	A2A IM Equity	BAS GY Equity	MUV2 GY Equity	BAS GY Equity
	PHIA NA Equity	GAS SQ Equity	HEIO NA Equity	VOW3 GY Equity
	ALO FP Equity	MUV2 GY Equity	JMT PL Equity	ELE SQ Equity
	BP/ LN Equity	HEIO NA Equity	ABBN SE Equity	NESN SE Equity
	GAS SQ Equity	UBI IM Equity	BAS GY Equity	SOLB BB Equity
	UBI IM Equity	SU FP Equity	LHN SE Equity	OMV AV Equity
	KER FP Equity	NOVN SE Equity	OUT1V FH Equity	BOL SS Equity
	GEBN SE Equity	STERV FH Equity	SAN FP Equity	FER SQ Equity
	EQNR NO Equity	KER FP Equity	OMV AV Equity	KER FP Equity
	BBVA SQ Equity	FER SQ Equity	FER SQ Equity	CRH ID Equity
	BKT SQ Equity	LHN SE Equity	GEBN SE Equity	FR FP Equity
	DB1 GY Equity	OUT1V FH Equity	SOLB BB Equity	JMT PL Equity
	ABBN SE Equity	ALO FP Equity	STERV FH Equity	SU FP Equity
	AV/ LN Equity	OMV AV Equity	ELE SQ Equity	FP FP Equity
	MUV2 GY Equity	RDSA NA Equity	BOL SS Equity	NHY NO Equity
	SAN FP Equity	NHY NO Equity	EQNR NO Equity	NOVN SE Equity
	ENI IM Equity	WRT1V FH Equity	FP FP Equity	STM IM Equity
	BOL SS Equity	EQNR NO Equity	RDSA NA Equity	WRT1V FH Equity
	FR FP Equity	FP FP Equity	UBI IM Equity	RDSA NA Equity
	GSK LN Equity	GEBN SE Equity	NOVN SE Equity	HEIA NA Equity
	MNDI LN Equity	JMT PL Equity	ENI IM Equity	LHN SE Equity
	NESN SE Equity	SGO FP Equity	KER FP Equity	OR FP Equity
	NHY NO Equity	ALV GY Equity	SU FP Equity	SAN FP Equity
	OUT1V FH Equity	BOL SS Equity	WRT1V FH Equity	ENI IM Equity
	SGO FP Equity	GSK LN Equity	A2A IM Equity	GIVN SE Equity
	STM IM Equity	BKT SQ Equity	ALO FP Equity	UG FP Equity
	SU FP Equity	BNP FP Equity	CRH ID Equity	SEBA SS Equity
	OMV AV Equity	BN FP Equity	NHY NO Equity	RIO LN Equity
	BNP FP Equity	CRH ID Equity	RI FP Equity	MC FP Equity
	ENG SQ Equity	ENI IM Equity	STM IM Equity	GLE FP Equity
	STERV FH Equity	KGF LN Equity	KGF LN Equity	DGE LN Equity
	TIT IM Equity	ORA FP Equity	DGE LN Equity	BNP FP Equity
	BLT LN Equity	RI FP Equity	UG FP Equity	MAP SQ Equity

Table 4-1: High ESG disclosure portfolios' composition – positive screening (3/4)

	2010	2011	2012	2013
25% screening	AV/ LN Equity	KER FP Equity	ALV GY Equity	RB/ LN Equity
	ACS SQ Equity	KESKOB FH Equity	MUV2 GY Equity	SCAB SS Equity
	UG FP Equity	NHY NO Equity	GEBN SE Equity	STERV FH Equity
	BATS LN Equity	UCG IM Equity	KGF LN Equity	UG FP Equity
	OMV AV Equity	COB LN Equity	ALO FP Equity	VOW3 GY Equity
	AGN NA Equity	FI/N SE Equity	SAN FP Equity	BOL SS Equity
	LHN SE Equity	FR FP Equity	SCAB SS Equity	RI FP Equity
	AF FP Equity	SU FP Equity	SY1 GY Equity	WRT1V FH Equity
	LDO IM Equity	LGEM LN Equity	ITX SQ Equity	GLE FP Equity
	MAERSKB DC Equity	MUV2 GY Equity	ELUXB SS Equity	HEIA NA Equity
	NZYMB DC Equity	AGN NA Equity	GSK LN Equity	MAN GY Equity
	BT/A LN Equity	AV/ LN Equity	RI FP Equity	FP FP Equity
	SAB SQ Equity	FP FP Equity	RWE GY Equity	ENG SQ Equity
	UBI IM Equity	RDSA NA Equity	WRT1V FH Equity	GSK LN Equity
	A2A IM Equity	ACS SQ Equity	BNP FP Equity	MRK GY Equity
	RDSA NA Equity	GSK LN Equity	RSA LN Equity	OUT1V FH Equity
	ALV GY Equity	RB/ LN Equity	ATL IM Equity	ALV GY Equity
	MAP SQ Equity	BBVA SQ Equity	NESTE FH Equity	FR FP Equity
	ATCOA SS Equity	RI FP Equity	UG FP Equity	REL LN Equity
	ATL IM Equity	DBK GY Equity	VOW3 GY Equity	REN NA Equity
	TEF SQ Equity	STERV FH Equity	INGA NA Equity	UL NA Equity
	RSA LN Equity	MKS LN Equity	MAP SQ Equity	INGA NA Equity
	AAL LN Equity	ALV GY Equity	FI/N SE Equity	ALO FP Equity
	RI FP Equity	SREN SE Equity	PHIA NA Equity	AZN LN Equity
	SIE GY Equity	TIT IM Equity	BBVA SQ Equity	AGN NA Equity
	SKFB SS Equity	CARLB DC Equity	G IM Equity	DBK GY Equity
	FP FP Equity	LDO IM Equity	SREN SE Equity	KGF LN Equity
	TIT IM Equity	MAN GY Equity	LDO IM Equity	MMB FP Equity
	VOD LN Equity	SIE GY Equity	UL NA Equity	G IM Equity
	RBS LN Equity	BT/A LN Equity	AGN NA Equity	UG IM Equity
	SREN SE Equity	RSA LN Equity	ACS SQ Equity	ITX SQ Equity
	BN FP Equity	ATL IM Equity	RB/ LN Equity	ACS SQ Equity
	CDI FP Equity	LHN SE Equity	DBK GY Equity	ELUXB SS Equity
	CNA LN Equity	NESTE FH Equity	KESKOB FH Equity	NESN SE Equity
	FR FP Equity	G IM Equity	NESN SE Equity	SPM IM Equity
	SKY LN Equity	MAP SQ Equity	SGO FP Equity	RDSA NA Equity
	STERV FH Equity	SAN SQ Equity	SAN SQ Equity	MKS LN Equity
	ABE SQ Equity	ABE SQ Equity	GIVN SE Equity	DGE LN Equity
	IMB LN Equity	AF FP Equity	CNA LN Equity	NZYMB DC Equity
	MRK GY Equity	ATCOA SS Equity	MMB FP Equity	SWMA SS Equity
	MKS LN Equity	BN FP Equity	PERSON LN Equity	BBVA SQ Equity
	SWMA SS Equity	BOL SS Equity	STERV FH Equity	DANSKE DC Equity
	BOL SS Equity	MAERSKB DC Equity	SWMA SS Equity	MAP SQ Equity
	ELUXB SS Equity	SWMA SS Equity	TKA GY Equity	ABE SQ Equity
	JMAT LN Equity	DPW GY Equity	UPM FH Equity	FGR FP Equity
	DBK GY Equity	INGA NA Equity	REE SQ Equity	SAND SS Equity
	INGA NA Equity	ELUXB SS Equity	RDSA NA Equity	UMI BB Equity
	BLND LN Equity	IMB LN Equity	LLOY LN Equity	SAN SQ Equity
	FRA GY Equity	SKFB SS Equity	AF FP Equity	NOKIA FH Equity
	OR FP Equity	SKY LN Equity	BLND LN Equity	FER SQ Equity
	UNA NA Equity	UG FP Equity	CARLB DC Equity	GIVN SE Equity
	VIE FP Equity	BATS LN Equity	BT/A LN Equity	RIO LN Equity
	VOW3 GY Equity	FRA GY Equity	SEBA SS Equity	ROG SE Equity
	SAN SQ Equity	GIVN SE Equity	MAERSKB DC Equity	MC FP Equity
	SEBA SS Equity	VWS DC Equity	SKY LN Equity	SEBA SS Equity
	REE SQ Equity	TEF SQ Equity	UNA NA Equity	ORA FP Equity
	COB LN Equity	LLOY LN Equity	MKS LN Equity	ATL IM Equity
	ENGI FP Equity	VOD LN Equity	BOL SS Equity	NESTE FH Equity
	NESTE FH Equity	CDI FP Equity	SGSN SE Equity	VWS DC Equity
	GLE FP Equity	CNA LN Equity	SPM IM Equity	LLOY LN Equity
	AI FP Equity	OR FP Equity	VWS DC Equity	CA FP Equity
	DG FP Equity	SDF GY Equity	TIT IM Equity	LDO IM Equity
	REN NA Equity	JMAT LN Equity	BN FP Equity	REE SQ Equity
	ITX SQ Equity	REE SQ Equity	CCL LN Equity	SAB SQ Equity
	MAN GY Equity	ENGI FP Equity	VOD LN Equity	BN FP Equity
	SY1 GY Equity	OUT1V FH Equity	CSGN SE Equity	ENGI FP Equity
	DPW GY Equity	PHIA NA Equity	ATCOA SS Equity	HEIO NA Equity
	DSM NA Equity	ADS GY Equity	HEIA NA Equity	DNB NO Equity
	OUT1V FH Equity	BLND LN Equity	RXL FP Equity	ABI BB Equity

Table 4-1: High ESG disclosure portfolios' composition – positive screening (4/4)

	2014	2015	2016	2017
25% screening	BN FP Equity	SAN FP Equity	ALV GY Equity	LI FP Equity
	WRT1V FH Equity	MAP SQ Equity	BNP FP Equity	OUT1V FH Equity
	ELE SQ Equity	MNDI LN Equity	MAP SQ Equity	BKT SQ Equity
	KGF LN Equity	STM IM Equity	BLT LN Equity	CNP FP Equity
	RI FP Equity	WCH GY Equity	FR FP Equity	KGF LN Equity
	CABK SQ Equity	SEBA SS Equity	SRG IM Equity	BLT LN Equity
	SCAB SS Equity	AZN LN Equity	ORA FP Equity	SCAB SS Equity
	UG FP Equity	BLT LN Equity	BKT SQ Equity	ORNBV FH Equity
	ORA FP Equity	GIVN SE Equity	ADP FP Equity	RI FP Equity
	CRH ID Equity	NESTE FH Equity	GIVN SE Equity	UL NA Equity
	KESKOB FH Equity	SKG ID Equity	MNDI LN Equity	EQNR NO Equity
	MRK GY Equity	UG FP Equity	RNO FP Equity	NOKIA FH Equity
	UL NA Equity	DB1 GY Equity	ENG SQ Equity	SKG ID Equity
	ALV GY Equity	FR FP Equity	LI FP Equity	SRG IM Equity
	LGEN LN Equity	NESN SE Equity	MC FP Equity	ORA FP Equity
	MAP SQ Equity	SOLB BB Equity	SEBA SS Equity	ATL IM Equity
	CA FP Equity	ITX SQ Equity	ITX SQ Equity	EI FP Equity
	CNA LN Equity	ENG SQ Equity	ATL IM Equity	MNDI LN Equity
	EDF FP Equity	LI FP Equity	MRK GY Equity	MRK GY Equity
	GIVN SE Equity	MRK GY Equity	G IM Equity	RNO FP Equity
	HEIO NA Equity	SPM IM Equity	GLE FP Equity	SREN SE Equity
	LHN SE Equity	GLE FP Equity	BN FP Equity	ENG SQ Equity
	OR FP Equity	MC FP Equity	NESTE FH Equity	NESTE FH Equity
	SGRE SQ Equity	ELE SQ Equity	ORNBV FH Equity	BOSS GY Equity
	SPM IM Equity	ROG SE Equity	RIO LN Equity	SAN SQ Equity
	MC FP Equity	SCAB SS Equity	SCAB SS Equity	MKS LN Equity
	AZN LN Equity	SGRE SQ Equity	SKG ID Equity	BATS LN Equity
	METSO FH Equity	SCMN SE Equity	HMSO LN Equity	EDF FP Equity
	AGN NA Equity	HMSO LN Equity	SAN SQ Equity	HMSO LN Equity
	MAN GY Equity	NZYMB DC Equity	SREN SE Equity	MAN GY Equity
	ROG SE Equity	UL NA Equity	NOKIA FH Equity	NZYMB DC Equity
	FP FP Equity	VIE FP Equity	BATS LN Equity	SGRE SQ Equity
	RDSA NA Equity	SAN SQ Equity	EDF FP Equity	VIE FP Equity
	REE SQ Equity	BATS LN Equity	MAN GY Equity	BBVA SQ Equity
	FER SQ Equity	MAN GY Equity	NZYMB DC Equity	CNA LN Equity
	FI/N SE Equity	BBVA SQ Equity	SGRE SQ Equity	YAR NO Equity
	NOKIA FH Equity	ORNBV FH Equity	BBVA SQ Equity	MUV2 GY Equity
	LI FP Equity	AGN NA Equity	SAB SQ Equity	ADP FP Equity
	ORNBV FH Equity	NOKIA FH Equity	BOSS GY Equity	BILL SS Equity
	DANSKE DC Equity	ABI BB Equity	LDO IM Equity	BN FP Equity
	G IM Equity	AI FP Equity	PHIA NA Equity	CARLB DC Equity
	ITX SQ Equity	CNA LN Equity	ABI BB Equity	HEN3 GY Equity
	CNP FP Equity	METSO FH Equity	GSK LN Equity	ITX SQ Equity
	LLOY LN Equity	NK FP Equity	HEN3 GY Equity	NK FP Equity
	SAN SQ Equity	YAR NO Equity	NK FP Equity	PHIA NA Equity
	FGR FP Equity	CNP FP Equity	ROG SE Equity	SLA LN Equity
	NESTE FH Equity	SREN SE Equity	CNP FP Equity	CDI FP Equity
	RIO LN Equity	RIO LN Equity	CDI FP Equity	DAI GY Equity
	SWMA SS Equity	RNO FP Equity	EI FP Equity	HEIO NA Equity
	SEBA SS Equity	SAB SQ Equity	VIE FP Equity	SKFB SS Equity
	AIR FP Equity	ADS GY Equity	MKS LN Equity	LUPE SS Equity
	RB/ LN Equity	DGE LN Equity	LUPE SS Equity	ABI BB Equity
	SKG ID Equity	STAN LN Equity	ACS SQ Equity	GSK LN Equity
	YAR NO Equity	AAL LN Equity	ADS GY Equity	REN NA Equity
	DBK GY Equity	CCL LN Equity	CNA LN Equity	RXL FP Equity
	VOD LN Equity	EOAN GY Equity	EOAN GY Equity	REE SQ Equity
	AF FP Equity	INGA NA Equity	SKFB SS Equity	ACA FP Equity
	DGE LN Equity	NDA SS Equity	SPM IM Equity	ALV GY Equity
	NZYMB DC Equity	ATL IM Equity	UL NA Equity	CLN SE Equity
	RNO FP Equity	CDI FP Equity	REE SQ Equity	LXS GY Equity
	WCH GY Equity	EDF FP Equity	ACA FP Equity	SIK SE Equity
	MKS LN Equity	FI/N SE Equity	SCMN SE Equity	SK FP Equity
	ABI BB Equity	JMAT LN Equity	CARLB DC Equity	INGA NA Equity
	ENGI FP Equity	LDO IM Equity	CCL LN Equity	AAL LN Equity
	LDO IM Equity	SIE GY Equity	REL LN Equity	AKE FP Equity
	NK FP Equity	G IM Equity	SGSN SE Equity	ALO FP Equity
	SGSN SE Equity	INVP LN Equity	SIK SE Equity	DPW GY Equity
	VIE FP Equity	AIR FP Equity	AKE FP Equity	LDO IM Equity
	SCMN SE Equity	EI FP Equity	BILL SS Equity	MTX GY Equity

Table 4-2: Low ESG disclosure Portfolios' composition – positive screening (1/4)

This table summarizes the composition of portfolios with the highest ESG disclosure score for the period 2010 to 2017. Stocks are ranked from highest to lowest score. The first part of the table shows stocks included after using a 10% screening and the second part additional stocks included after a 25% screening.

	2010	2011	2012	2013
10% screening	QIA GY Equity	HSX LN Equity	RMV LN Equity	QIA GY Equity
	VOE AV Equity	SUBC NO Equity	SRT3 GY Equity	ANDR AV Equity
	ACKB BB Equity	SCHP SE Equity	UHR SE Equity	INTRUM SS Equity
	HELN SE Equity	MTX GY Equity	HELN SE Equity	RYA ID Equity
	INDUA SS Equity	RHM GY Equity	MB IM Equity	LUX IM Equity
	ANDR AV Equity	FPE3 GY Equity	ANDR AV Equity	UHR SE Equity
	AGS BB Equity	ACKB BB Equity	FPE3 GY Equity	BIRG ID Equity
	SAMPO FH Equity	CEY LN Equity	SUBC NO Equity	RBI AV Equity
	AMEAS FH Equity	PUB FP Equity	NDA GY Equity	MONY LN Equity
	IFX GY Equity	SRT3 GY Equity	SCHP SE Equity	RMV LN Equity
	SLHN SE Equity	QIA GY Equity	ETL FP Equity	SUBC NO Equity
	EXO IM Equity	INDUA SS Equity	CEY LN Equity	ACKB BB Equity
	GLPG NA Equity	UTDI GY Equity	GLPG NA Equity	ETL FP Equity
	OERL SE Equity	AGS BB Equity	PUB FP Equity	G1A GY Equity
	PPB ID Equity	PGHN SE Equity	ACKB BB Equity	HELN SE Equity
	SRT3 GY Equity	SYDB DC Equity	INDUA SS Equity	OERL SE Equity
	TEMN SE Equity	TRYG DC Equity	OERL SE Equity	SYDB DC Equity
	TEP FP Equity	AMEAS FH Equity	AGS BB Equity	ARYN SE Equity
	UTDI GY Equity	ARYN SE Equity	TRYG DC Equity	GLPG NA Equity
	CEY LN Equity	ETL FP Equity	AMEAS FH Equity	PGHN SE Equity
	GN DC Equity	EXO IM Equity	ARYN SE Equity	INDUA SS Equity
	RHM GY Equity	LUX IM Equity	TEP FP Equity	TRYG DC Equity
	LUNDB SS Equity	TEP FP Equity	UTDI GY Equity	AMEAS FH Equity
	TGS NO Equity	MB IM Equity	BARN SE Equity	AGS BB Equity
	AMS SE Equity	GLPG NA Equity	EXO IM Equity	MB IM Equity
	SOBI SS Equity	PPB ID Equity	PPB ID Equity	EXO IM Equity
	KOMB CK Equity	TEMN SE Equity	TEMN SE Equity	FDR FP Equity
	G1A GY Equity	G1A GY Equity	PGHN SE Equity	PPB ID Equity
	BARN SE Equity	GN DC Equity	SYDB DC Equity	PSM GY Equity
	ETL FP Equity	LUNDB SS Equity	G1A GY Equity	TEMN SE Equity
	TRYG DC Equity	TGS NO Equity	GN DC Equity	GN DC Equity
	DOKA SW Equity	AMS SE Equity	TGS NO Equity	TEP FP Equity
	PSPN SE Equity	SOBI SS Equity	AMS SE Equity	LUNDB SS Equity
	JYSK DC Equity	KOMB CK Equity	SOBI SS Equity	AKERBP NO Equity
	MB IM Equity	BARN SE Equity	KOMB CK Equity	AMS SE Equity
	DUFN SE Equity	DOKA SW Equity	LUNDB SS Equity	SOBI SS Equity
	LUX IM Equity	PSM GY Equity	PSM GY Equity	KOMB CK Equity
	SPSN SE Equity	PSPN SE Equity	DOKA SW Equity	SOW GY Equity
	AKERBP NO Equity	JYSK DC Equity	PSPN SE Equity	UTDI GY Equity
	BOSS GY Equity	DUFN SE Equity	SPSN SE Equity	DOKA SW Equity
	FNTN GY Equity	SPSN SE Equity	JYSK DC Equity	PSPN SE Equity
	PAH3 GY Equity	AKERBP NO Equity	DUFN SE Equity	SPSN SE Equity
	PARG SE Equity	BOSS GY Equity	AKERBP NO Equity	JYSK DC Equity
	SOW GY Equity	FNTN GY Equity	FNTN GY Equity	DUFN SE Equity
	SYDB DC Equity	PARG SE Equity	PARG SE Equity	FNTN GY Equity
	PSM GY Equity	SOW GY Equity	PAH3 GY Equity	PARG SE Equity
	ARYN SE Equity	PAH3 GY Equity	SOW GY Equity	PAH3 GY Equity

Table 4-2: Low ESG disclosure Portfolios' composition – positive screening (2/4)

	2014	2015	2016	2017
10% screening	BEZ LN Equity	MONY LN Equity	KOMB CK Equity	IMI LN Equity
	NXG LN Equity	FME GY Equity	LUN DC Equity	MONY LN Equity
	QIA GY Equity	LUX IM Equity	RMV LN Equity	HL/ LN Equity
	FRE GY Equity	ITV LN Equity	AIBG ID Equity	RMV LN Equity
	MONY LN Equity	G1A GY Equity	INVEB SS Equity	PGHN SE Equity
	ACKB BB Equity	PAH3 GY Equity	JYSK DC Equity	HEXAB SS Equity
	RBI AV Equity	QIA GY Equity	MONY LN Equity	ITV LN Equity
	ANDR AV Equity	AIBG ID Equity	PAH3 GY Equity	SUBC NO Equity
	G1A GY Equity	AVV LN Equity	FME GY Equity	TCAP LN Equity
	INTRUM SS Equity	COLR BB Equity	AVV LN Equity	GEN DC Equity
	FPE3 GY Equity	IWG LN Equity	COLR BB Equity	AIBG ID Equity
	IWG LN Equity	BEZ LN Equity	FPE3 GY Equity	FME GY Equity
	HELN SE Equity	RYA ID Equity	LUNDB SS Equity	INVEB SS Equity
	SUBC NO Equity	INTRUM SS Equity	MB IM Equity	PAH3 GY Equity
	GN DC Equity	LUNDB SS Equity	DUFN SE Equity	DUFN SE Equity
	RMV LN Equity	ACKB BB Equity	IWG LN Equity	FRE GY Equity
	AVV LN Equity	FPE3 GY Equity	BEZ LN Equity	AVV LN Equity
	FDR FP Equity	FRE GY Equity	HSV LN Equity	COLR BB Equity
	UHR SE Equity	RBI AV Equity	QIA GY Equity	FPE3 GY Equity
	RYA ID Equity	GN DC Equity	HELN SE Equity	GN DC Equity
	BIRG ID Equity	PSPN SE Equity	RBI AV Equity	SPR GY Equity
	LUNDB SS Equity	SUBC NO Equity	GN DC Equity	BIRG ID Equity
	UTDI GY Equity	SPSN SE Equity	INTRUM SS Equity	MB IM Equity
	ETL FP Equity	PGHN SE Equity	ACKB BB Equity	UTDI GY Equity
	BAMI IM Equity	ARYN SE Equity	PGHN SE Equity	QIA GY Equity
	ARYN SE Equity	UHR SE Equity	PSPN SE Equity	RBI AV Equity
	GLPG NA Equity	BAMI IM Equity	ARYN SE Equity	INTRUM SS Equity
	PGHN SE Equity	BIRG ID Equity	FRE GY Equity	ACKB BB Equity
	INDUA SS Equity	OERL SE Equity	RYA ID Equity	INDUA SS Equity
	JYSK DC Equity	UTDI GY Equity	BIRG ID Equity	IWG LN Equity
	OERL SE Equity	EXO IM Equity	SPSN SE Equity	PSPN SE Equity
	AGS BB Equity	ETL FP Equity	UHR SE Equity	ARYN SE Equity
	EXO IM Equity	INDUA SS Equity	OERL SE Equity	HSV LN Equity
	PPB ID Equity	PSM GY Equity	UTDI GY Equity	RYA ID Equity
	PSM GY Equity	AGS BB Equity	INDUA SS Equity	OERL SE Equity
	TEMN SE Equity	GAM SE Equity	BAMI IM Equity	UHR SE Equity
	AKERBP NO Equity	GLPG NA Equity	EXO IM Equity	AGS BB Equity
	SOBI SS Equity	PPB ID Equity	PSM GY Equity	HELN SE Equity
	TEP FP Equity	JYSK DC Equity	AGS BB Equity	EXO IM Equity
	KOMB CK Equity	AKERBP NO Equity	GLPG NA Equity	BAMI IM Equity
	SOW GY Equity	TEP FP Equity	PPB ID Equity	GLPG NA Equity
	SPSN SE Equity	DUFN SE Equity	AKERBP NO Equity	PPB ID Equity
	DUFN SE Equity	TEMN SE Equity	GAM SE Equity	GAM SE Equity
	PSPN SE Equity	KOMB CK Equity	TEMN SE Equity	AKERBP NO Equity
	FNTN GY Equity	SOW GY Equity	SOW GY Equity	SOW GY Equity
	PARG SE Equity	FNTN GY Equity	FNTN GY Equity	FNTN GY Equity
	PAH3 GY Equity	PARG SE Equity	PARG SE Equity	PARG SE Equity

Table 4-2: Low ESG disclosure portfolios' composition – positive screening (3/4)

	2010	2011	2012	2013
25% screening	WMH LN Equity	SOON SE Equity	SGE LN Equity	SESG FP Equity
	WDH DC Equity	UBI FP Equity	WEIR LN Equity	SXS LN Equity
	ADEN SE Equity	BRBY LN Equity	WMH LN Equity	UBI FP Equity
	AHT LN Equity	AGK LN Equity	ZURN SE Equity	EBS AV Equity
	MCRO LN Equity	AHT LN Equity	AGK LN Equity	SAMPO FH Equity
	TCAP LN Equity	SPX LN Equity	RPC LN Equity	CEZ CK Equity
	ICA SS Equity	VCT LN Equity	STJ LN Equity	HUH1V FH Equity
	BTG LN Equity	AIBG ID Equity	TATE LN Equity	BWY LN Equity
	DLN LN Equity	DCC LN Equity	DPH LN Equity	DPH LN Equity
	INCH LN Equity	IWG LN Equity	KSP ID Equity	ITRK LN Equity
	ATO FP Equity	KSP ID Equity	VCT LN Equity	RPC LN Equity
	BAB LN Equity	HEXAB SS Equity	BVIC LN Equity	SGE LN Equity
	HSV LN Equity	HUH1V FH Equity	HL/ LN Equity	TCAP LN Equity
	INTRUM SS Equity	LISN SE Equity	INF LN Equity	BARN SE Equity
	SECUB SS Equity	BAB LN Equity	AHT LN Equity	BVI FP Equity
	WEIR LN Equity	EZJ LN Equity	CAP FP Equity	HWDN LN Equity
	WG/ LN Equity	GET FP Equity	HEXAB SS Equity	DMGT LN Equity
	ICP LN Equity	MCRO LN Equity	HUH1V FH Equity	HLMA LN Equity
	BRBY LN Equity	NDA GY Equity	HWDN LN Equity	KSP ID Equity
	ALT FP Equity	INF LN Equity	LISN SE Equity	WEIR LN Equity
	KNIN SE Equity	WMH LN Equity	BRBY LN Equity	BAB LN Equity
	MONY LN Equity	EBS AV Equity	EMG LN Equity	BVIC LN Equity
	CBG LN Equity	ICP LN Equity	EZJ LN Equity	ICA SS Equity
	ZURN SE Equity	BTG LN Equity	GETIB SS Equity	HSX LN Equity
	GETIB SS Equity	HSV LN Equity	INCH LN Equity	LISN SE Equity
	MF FP Equity	ZURN SE Equity	RHM GY Equity	TATE LN Equity
	MRO LN Equity	ICA SS Equity	ICP LN Equity	WMH LN Equity
	NXG LN Equity	HNR1 GY Equity	HSV LN Equity	GETIB SS Equity
	SKG ID Equity	INCH LN Equity	IFX GY Equity	ISAT LN Equity
	HSX LN Equity	BWY LN Equity	BWY LN Equity	KYG ID Equity
	ITRK LN Equity	FDR FP Equity	INTRUM SS Equity	SDR LN Equity
	LSE LN Equity	TNET BB Equity	ITRK LN Equity	ICP LN Equity
	BEZ LN Equity	AVV LN Equity	ISAT LN Equity	EZJ LN Equity
	INVEB SS Equity	INTRUM SS Equity	IWG LN Equity	HEXAB SS Equity
	SGRO LN Equity	SECUB SS Equity	AIBG ID Equity	BRBY LN Equity
	TEN IM Equity	SGE LN Equity	BTG LN Equity	BOKA NA Equity
	AVV LN Equity	WG/ LN Equity	GEN DC Equity	EMG LN Equity
	FDR FP Equity	BEZ LN Equity	TCAP LN Equity	LOGN SE Equity
	HEXAB SS Equity	GEN DC Equity	UBI FP Equity	TGS NO Equity
	HL/ LN Equity	BOKA NA Equity	INVEB SS Equity	CBG LN Equity
	RYA ID Equity	GETIB SS Equity	BOKA NA Equity	CEY LN Equity
	SESG FP Equity	HL/ LN Equity	FME GY Equity	ICAD FP Equity
	IWG LN Equity	MF FP Equity	SECUB SS Equity	RHM GY Equity
	NDA GY Equity	MRO LN Equity	WG/ LN Equity	AHT LN Equity
	ELISA FH Equity	NXG LN Equity	BEZ LN Equity	IFX GY Equity
	EBS AV Equity	TCAP LN Equity	CBG LN Equity	NDA GY Equity
	GAM SE Equity	CBG LN Equity	AVV LN Equity	IGG LN Equity
	RBI AV Equity	ITRK LN Equity	ICAD FP Equity	BEZ LN Equity
	RMV LN Equity	LOGN SE Equity	MF FP Equity	INCH LN Equity
	COLR BB Equity	COLR BB Equity	MRO LN Equity	TEN IM Equity
	GEN DC Equity	INVEB SS Equity	TDC DC Equity	AIBG ID Equity
	SCHP SE Equity	SLHN SE Equity	SLHN SE Equity	GEN DC Equity
	UHR SE Equity	RYA ID Equity	LOGN SE Equity	HSV LN Equity
	HNR1 GY Equity	VOE AV Equity	BOSS GY Equity	MF FP Equity
	BOKA NA Equity	GAM SE Equity	ICA SS Equity	INVEB SS Equity
	SGE LN Equity	IFX GY Equity	NXG LN Equity	SECUB SS Equity
	BIRG ID Equity	FME GY Equity	TEN IM Equity	WG/ LN Equity
	KYG ID Equity	FRE GY Equity	FRE GY Equity	BIM FP Equity
	ICAD FP Equity	RBI AV Equity	QIA GY Equity	MRO LN Equity
	LISN SE Equity	ICAD FP Equity	HSX LN Equity	FME GY Equity
	FME GY Equity	KYG ID Equity	KYG ID Equity	FPE3 GY Equity
	FRE GY Equity	MONY LN Equity	RYA ID Equity	GAM SE Equity
	SUBC NO Equity	RMV LN Equity	GAM SE Equity	BOSS GY Equity
	TNET BB Equity	OERL SE Equity	COLR BB Equity	COLR BB Equity
	DCC LN Equity	TEN IM Equity	IGG LN Equity	IWG LN Equity
	FPE3 GY Equity	UHR SE Equity	BIRG ID Equity	NXG LN Equity
	PUB FP Equity	BIRG ID Equity	RBI AV Equity	ADM LN Equity
	LOGN SE Equity	HELN SE Equity	LUX IM Equity	AVV LN Equity
	MTX GY Equity	ANDR AV Equity	MONY LN Equity	FRE GY Equity

Table 4-2: Low ESG disclosure portfolios' composition – positive screening (4/4)

25% screening	2014	2015	2016	2017
	SW FP Equity RAND NA Equity ROR LN Equity AGK LN Equity WDH DC Equity BAB LN Equity CPG LN Equity BRBY LN Equity SAABB SS Equity SESG FP Equity TATE LN Equity GETIB SS Equity WMH LN Equity BWY LN Equity INF LN Equity SGRO LN Equity UBM LN Equity LISN SE Equity VCT LN Equity AMS SE Equity CEZ CK Equity EZJ LN Equity HL/ LN Equity HLMA LN Equity MCRO LN Equity WEIR LN Equity HNR1 GY Equity MB IM Equity BVIC LN Equity ADM LN Equity HSX LN Equity BVI FP Equity CEY LN Equity ECM LN Equity BAER SE Equity BOKA NA Equity RPC LN Equity DMGT LN Equity DPH LN Equity HEXAB SS Equity NDA GY Equity KYG ID Equity TGS NO Equity EMG LN Equity TCAP LN Equity TEN IM Equity ISAT LN Equity MF FP Equity MRO LN Equity AIBG ID Equity CBG LN Equity STJ LN Equity HSV LN Equity III LN Equity GEN DC Equity FME GY Equity LOGN SE Equity RHM GY Equity SECUB SS Equity LUX IM Equity INVEB SS Equity IGG LN Equity INCH LN Equity BIM FP Equity COLR BB Equity GAM SE Equity ICP LN Equity WG/ LN Equity SYDB DC Equity	HAS LN Equity KNIN SE Equity LOGN SE Equity BALN SE Equity KBC BB Equity AHT LN Equity HLMA LN Equity SBRY LN Equity VOE AV Equity TEL2B SS Equity STB NO Equity ISAT LN Equity BAB LN Equity EMG LN Equity GETIB SS Equity RPC LN Equity BKG LN Equity DMGT LN Equity LHA GY Equity MRO LN Equity ICP LN Equity TRYG DC Equity AGK LN Equity NDA GY Equity WDH DC Equity EZJ LN Equity RAND NA Equity TPK LN Equity VCT LN Equity WMH LN Equity IMI LN Equity MB IM Equity BWY LN Equity LISN SE Equity SAABB SS Equity SGE LN Equity MCRO LN Equity SECUB SS Equity ADM LN Equity HSX LN Equity III LN Equity SYDB DC Equity HL/ LN Equity AMS SE Equity KYG ID Equity SESG FP Equity CBG LN Equity INCH LN Equity BVI FP Equity CEY LN Equity CEZ CK Equity IGG LN Equity MF FP Equity NXG LN Equity SOBI SS Equity TEN IM Equity HNR1 GY Equity ANDR AV Equity TCAP LN Equity TGS NO Equity RHM GY Equity HELN SE Equity HEXAB SS Equity HSV LN Equity WG/ LN Equity RMV LN Equity INVEB SS Equity GEN DC Equity LUN DC Equity	ROR LN Equity LUX IM Equity NDA GY Equity UBM LN Equity DCC LN Equity FHZN SE Equity SW FP Equity KBC BB Equity BWY LN Equity LOGN SE Equity TEP FP Equity CEY LN Equity ISAT LN Equity SBRY LN Equity BA/ LN Equity HAS LN Equity KNIN SE Equity RPC LN Equity BALN SE Equity EMG LN Equity HLMA LN Equity MRO LN Equity STB NO Equity RTO LN Equity ICP LN Equity GETIB SS Equity WTB LN Equity AHT LN Equity BKG LN Equity DMGT LN Equity ADM LN Equity STJ LN Equity MCRO LN Equity SECUB SS Equity III LN Equity WDH DC Equity TRYG DC Equity CEZ CK Equity VCT LN Equity AGK LN Equity EZJ LN Equity SGE LN Equity IMI LN Equity KYG ID Equity SAABB SS Equity SYDB DC Equity WMH LN Equity NXG LN Equity INCH LN Equity HSX LN Equity ETL FP Equity AMS SE Equity SESG FP Equity CBG LN Equity HNR1 GY Equity HL/ LN Equity IGG LN Equity MF FP Equity SOBI SS Equity WG/ LN Equity GIA GY Equity ITV LN Equity TCAP LN Equity TGS NO Equity TPK LN Equity TEN IM Equity SUBC NO Equity GEN DC Equity HEXAB SS Equity	RMS FP Equity SPX LN Equity SVT LN Equity SW FP Equity BWY LN Equity LUN DC Equity BKG LN Equity EMG LN Equity BAB LN Equity FHZN SE Equity HWDN LN Equity INF LN Equity LISN SE Equity DPH LN Equity SPSN SE Equity WTB LN Equity OML LN Equity GIA GY Equity ISAT LN Equity SBRY LN Equity SECUB SS Equity BA/ LN Equity BALN SE Equity HLMA LN Equity MRO LN Equity STB NO Equity AGK LN Equity RTO LN Equity ICP LN Equity GETIB SS Equity KBC BB Equity SYDB DC Equity AHT LN Equity DMGT LN Equity ADM LN Equity MCRO LN Equity RPC LN Equity SGE LN Equity WMH LN Equity HNR1 GY Equity HAS LN Equity AMS SE Equity CEZ CK Equity ETL FP Equity VCT LN Equity EZJ LN Equity CBG LN Equity STJ LN Equity NXG LN Equity PSM GY Equity TPK LN Equity BEZ LN Equity SAABB SS Equity TEN IM Equity TRYG DC Equity KYG ID Equity TGS NO Equity HSX LN Equity MF FP Equity SOBI SS Equity WG/ LN Equity SESG FP Equity TEMN SE Equity WDH DC Equity INCH LN Equity IGG LN Equity LUNDB SS Equity JYSK DC Equity KOMB CK Equity

Table 4-3: High ESG disclosure Portfolios' composition - best-in-class (1/4)

This table summarizes the composition of portfolios with the highest ESG disclosure score for the period 2010 to 2017. Stocks are ranked from highest to lowest score. The first part of the table shows stocks included after using a 10% screening and the second part additional stocks included after a 25% screening.

	2010	2011	2012	2013
10% screening	SRG IM Equity	FORTUM FH Equity	GAS SQ Equity	FORTUM FH Equity
	NOVN SE Equity	ISP IM Equity	FORTUM FH Equity	NOVN SE Equity
	EDP PL Equity	GAS SQ Equity	SRG IM Equity	ISP IM Equity
	FI/N SE Equity	NOVN SE Equity	DAI GY Equity	IBE SQ Equity
	ISP IM Equity	NDA SS Equity	ISP IM Equity	EDP PL Equity
	DAI GY Equity	EDP PL Equity	IBE SQ Equity	REP SQ Equity
	NDA SS Equity	SRG IM Equity	NOVN SE Equity	SU FP Equity
	ENI IM Equity	ENI IM Equity	REP SQ Equity	ENEL IM Equity
	GAS SQ Equity	IBE SQ Equity	ENEL IM Equity	EDF FP Equity
	IBE SQ Equity	DAI GY Equity	ENI IM Equity	DAI GY Equity
	REP SQ Equity	REP SQ Equity	EDP PL Equity	BP/ LN Equity
	FORTUM FH Equity	SLA LN Equity	BAS GY Equity	BAYN GY Equity
	SGRE SQ Equity	ENEL IM Equity	BAYN GY Equity	BMW GY Equity
	SCAB SS Equity	BAS GY Equity	SU FP Equity	PHIA NA Equity
	STM IM Equity	BAYN GY Equity	OMV AV Equity	AAL LN Equity
	BAS GY Equity	SCAB SS Equity	UBI IM Equity	ENI IM Equity
	BLT LN Equity	BLT LN Equity	AAL LN Equity	BAS GY Equity
	SLA LN Equity	BP/ LN Equity	BLT LN Equity	GEBN SE Equity
	SAND SS Equity	AAL LN Equity	AZN LN Equity	MT NA Equity
	BP/ LN Equity	SAND SS Equity	SGRE SQ Equity	BLT LN Equity
	BAMI IM Equity	STM IM Equity	ENG SQ Equity	ABBN SE Equity
	RIO LN Equity	SGRE SQ Equity	MNDI LN Equity	OMV AV Equity
	EDF FP Equity	SAB SQ Equity	AV/ LN Equity	SAN FP Equity
	III LN Equity	BMW GY Equity	NHY NO Equity	AV/ LN Equity
	BAYN GY Equity	RIO LN Equity	BMW GY Equity	BKT SQ Equity
	ENG SQ Equity	ABBN SE Equity	STM IM Equity	STM IM Equity
	ABBN SE Equity	ALO FP Equity	OUT1V FH Equity	UBI IM Equity
	GEBN SE Equity	EQNR NO Equity	ABBN SE Equity	SAP GY Equity
	KER FP Equity	NZYMB DC Equity	MAN GY Equity	SGRE SQ Equity
	MUV2 GY Equity	III LN Equity	KER FP Equity	EQNR NO Equity
	WRT1V FH Equity	AZN LN Equity	SAB SQ Equity	BNP FP Equity
	DANSKE DC Equity	GEBN SE Equity	COB LN Equity	DB1 GY Equity
	BMW GY Equity	ORNBV FH Equity	ORNBV FH Equity	MUV2 GY Equity
	BBVA SQ Equity	ROG SE Equity	SAND SS Equity	TIT IM Equity
	BKT SQ Equity	SAN FP Equity	DANSKE DC Equity	INVP LN Equity
	KGF LN Equity	KGF LN Equity	UCG IM Equity	COB LN Equity
	KESKOB FH Equity	VOW3 GY Equity	ABE SQ Equity	MNDI LN Equity
	UCG IM Equity	WRT1V FH Equity	BKT SQ Equity	SGO FP Equity
	ALO FP Equity	MRK GY Equity	FR FP Equity	NHY NO Equity
	GSK LN Equity	BKT SQ Equity	NZYMB DC Equity	KER FP Equity
	ORNBV FH Equity	DANSKE DC Equity	ALV GY Equity	KESKOB FH Equity
	SAN FP Equity	KER FP Equity	MUV2 GY Equity	RB/ LN Equity
	ROG SE Equity	KESKOB FH Equity	GEBN SE Equity	UG FP Equity
	UMI BB Equity	NHY NO Equity	KGF LN Equity	VOW3 GY Equity
	AZN LN Equity	UCG IM Equity	ALO FP Equity	ORNBV FH Equity
	AV/ LN Equity	COB LN Equity	SAN FP Equity	SCAB SS Equity
	ACS SQ Equity	FI/N SE Equity	SCAB SS Equity	STERV FH Equity

Table 4-3: High ESG disclosure Portfolios' composition - best-in-class (2/4)

	2014	2015	2016	2017
10% screening	FORTUM FH Equity	ISP IM Equity	ISP IM Equity	IBE SQ Equity
	ISP IM Equity	IBE SQ Equity	IBE SQ Equity	FORTUM FH Equity
	REP SQ Equity	FORTUM FH Equity	ENEL IM Equity	BP/ LN Equity
	IBE SQ Equity	HEIA NA Equity	FORTUM FH Equity	ENEL IM Equity
	NOVN SE Equity	REP SQ Equity	HEIA NA Equity	ISP IM Equity
	AAL LN Equity	ENEL IM Equity	BP/ LN Equity	SGO FP Equity
	EDP PL Equity	BP/ LN Equity	BMW GY Equity	BMW GY Equity
	ENEL IM Equity	BAYN GY Equity	BAYN GY Equity	GEBN SE Equity
	BAYN GY Equity	BMW GY Equity	VOW3 GY Equity	BAYN GY Equity
	HEIA NA Equity	VOW3 GY Equity	EDP PL Equity	GAS SQ Equity
	DAI GY Equity	DAI GY Equity	REP SQ Equity	REP SQ Equity
	VOW3 GY Equity	ABBN SE Equity	NESN SE Equity	EDP PL Equity
	BAS GY Equity	A2A IM Equity	SGO FP Equity	STERV FH Equity
	BMW GY Equity	EDP PL Equity	GAS SQ Equity	ABBN SE Equity
	PHIA NA Equity	BAS GY Equity	MUV2 GY Equity	BAS GY Equity
	A2A IM Equity	MUV2 GY Equity	HEIO NA Equity	VOW3 GY Equity
	ALO FP Equity	HEIO NA Equity	JMT PL Equity	NESN SE Equity
	BP/ LN Equity	UBI IM Equity	ABBN SE Equity	SOLB BB Equity
	UBI IM Equity	SU FP Equity	BAS GY Equity	OMV AV Equity
	KER FP Equity	NOVN SE Equity	LHN SE Equity	BOL SS Equity
	GEBN SE Equity	STERV FH Equity	OUT1V FH Equity	FER SQ Equity
	EQNR NO Equity	KER FP Equity	SAN FP Equity	KER FP Equity
	BBVA SQ Equity	FER SQ Equity	OMV AV Equity	CRH ID Equity
	BKT SQ Equity	LHN SE Equity	FER SQ Equity	FR FP Equity
	DB1 GY Equity	OUT1V FH Equity	GEBN SE Equity	JMT PL Equity
	ABBN SE Equity	ALO FP Equity	SOLB BB Equity	SU FP Equity
	AV/ LN Equity	OMV AV Equity	STERV FH Equity	FP FP Equity
	MUV2 GY Equity	RDSA NA Equity	BOL SS Equity	NOVN SE Equity
	SAN FP Equity	NHY NO Equity	EQNR NO Equity	STM IM Equity
	ENI IM Equity	WRT1V FH Equity	FP FP Equity	WRT1V FH Equity
	BOL SS Equity	EQNR NO Equity	UBI IM Equity	NHY NO Equity
	FR FP Equity	GEBN SE Equity	NOVN SE Equity	RDSA NA Equity
	MNDI LN Equity	JMT PL Equity	KER FP Equity	HEIA NA Equity
	NESN SE Equity	SGO FP Equity	SU FP Equity	OR FP Equity
	NHY NO Equity	ALV GY Equity	WRT1V FH Equity	SAN FP Equity
	SGO FP Equity	GSK LN Equity	ALO FP Equity	LHN SE Equity
	STM IM Equity	BOL SS Equity	CRH ID Equity	UG FP Equity
	SU FP Equity	BKT SQ Equity	NHY NO Equity	GIVN SE Equity
	GSK LN Equity	BNP FP Equity	RI FP Equity	SEBA SS Equity
	OUT1V FH Equity	BN FP Equity	STM IM Equity	RIO LN Equity
	OMV AV Equity	CRH ID Equity	KGF LN Equity	MC FP Equity
	BNP FP Equity	KGF LN Equity	UG FP Equity	GLE FP Equity
	STERV FH Equity	ORA FP Equity	DGE LN Equity	DGE LN Equity
	TIT IM Equity	RI FP Equity	ALV GY Equity	BNP FP Equity
	BN FP Equity	SAN FP Equity	BNP FP Equity	MAP SQ Equity
	WRT1V FH Equity	MAP SQ Equity	MAP SQ Equity	LI FP Equity
	BLT LN Equity	STM IM Equity	FR FP Equity	OUT1V FH Equity

Table 4-3: High ESG disclosure portfolios' composition - best-in-class (3/4)

	2010	2011	2012	2013
25% screening	UG FP Equity	FR FP Equity	SY1 GY Equity	RI FP Equity
	BATS LN Equity	SU FP Equity	ITX SQ Equity	WRT1V FH Equity
	AGN NA Equity	LGEN LN Equity	RI FP Equity	BOL SS Equity
	LHN SE Equity	MUV2 GY Equity	WRT1V FH Equity	GLE FP Equity
	AF FP Equity	AGN NA Equity	ELUXB SS Equity	HEIA NA Equity
	LDO IM Equity	AV/ LN Equity	GSK LN Equity	MAN GY Equity
	MAERSKB DC Equity	ACS SQ Equity	BNP FP Equity	GSK LN Equity
	NZYMB DC Equity	RB/ LN Equity	RSA LN Equity	MRK GY Equity
	BT/A LN Equity	GSK LN Equity	ATL IM Equity	OUT1V FH Equity
	SAB SQ Equity	BBVA SQ Equity	UG FP Equity	ALV GY Equity
	UBI IM Equity	RI FP Equity	VOW3 GY Equity	FR FP Equity
	ALV GY Equity	DBK GY Equity	INGA NA Equity	REL LN Equity
	MAP SQ Equity	STERV FH Equity	MAP SQ Equity	REN NA Equity
	ATCOA SS Equity	MKS LN Equity	FI/N SE Equity	UL NA Equity
	ATL IM Equity	ALV GY Equity	PHIA NA Equity	INGA NA Equity
	TEF SQ Equity	SREN SE Equity	BBVA SQ Equity	ALO FP Equity
	RSA LN Equity	TIT IM Equity	G IM Equity	AZN LN Equity
	RI FP Equity	CARLB DC Equity	SREN SE Equity	AGN NA Equity
	AAL LN Equity	LDO IM Equity	UL NA Equity	DBK GY Equity
	SIE GY Equity	MAN GY Equity	LDO IM Equity	KGF LN Equity
	SKFB SS Equity	SIE GY Equity	AGN NA Equity	MMB FP Equity
	TIT IM Equity	BT/A LN Equity	RB/ LN Equity	G IM Equity
	VOD LN Equity	RSA LN Equity	ACS SQ Equity	UCG IM Equity
	RBS LN Equity	ATL IM Equity	DBK GY Equity	ITX SQ Equity
	SREN SE Equity	LHN SE Equity	KESKOB FH Equity	ACS SQ Equity
	BN FP Equity	G IM Equity	NESN SE Equity	ELUXB SS Equity
	CDI FP Equity	MAP SQ Equity	SGO FP Equity	NESN SE Equity
	FR FP Equity	SAN SQ Equity	SAN SQ Equity	MKS LN Equity
	SKY LN Equity	ABE SQ Equity	GIVN SE Equity	DGE LN Equity
	STERV FH Equity	AF FP Equity	MMB FP Equity	NZYMB DC Equity
	ABE SQ Equity	ATCOA SS Equity	PSON LN Equity	SWMA SS Equity
	IMB LN Equity	BN FP Equity	STERV FH Equity	BBVA SQ Equity
	MRK GY Equity	BOL SS Equity	SWMA SS Equity	DANSKE DC Equity
	MKS LN Equity	MAERSKB DC Equity	TKA GY Equity	MAP SQ Equity
	SWMA SS Equity	SWMA SS Equity	LLOY LN Equity	ABE SQ Equity
	BOL SS Equity	DPW GY Equity	BLND LN Equity	FGR FP Equity
	ELUXB SS Equity	INGA NA Equity	AF FP Equity	SAND SS Equity
	JMAT LN Equity	ELUXB SS Equity	CARLB DC Equity	UMI BB Equity
	DBK GY Equity	IMB LN Equity	BT/A LN Equity	SAN SQ Equity
	INGA NA Equity	SKFB SS Equity	SEBA SS Equity	NOKIA FH Equity
	BLND LN Equity	SKY LN Equity	MAERSKB DC Equity	FER SQ Equity
	FRA GY Equity	UG FP Equity	SKY LN Equity	MC FP Equity
	OR FP Equity	BATS LN Equity	UNA NA Equity	SEBA SS Equity
	UNA NA Equity	FRA GY Equity	MKS LN Equity	ORA FP Equity
	VOW3 GY Equity	GIVN SE Equity	SGSN SE Equity	ATL IM Equity
	SAN SQ Equity	VWS DC Equity	VWS DC Equity	VWS DC Equity
	COB LN Equity	TEF SQ Equity	TIT IM Equity	LLOY LN Equity
	AI FP Equity	LLOY LN Equity	BN FP Equity	CA FP Equity
	DG FP Equity	VOD LN Equity	CCL LN Equity	LDO IM Equity
	REN NA Equity	CDI FP Equity	VOD LN Equity	SAB SQ Equity
	ITX SQ Equity	OR FP Equity	CSGN SE Equity	BN FP Equity
	MAN GY Equity	SDF GY Equity	ATCOA SS Equity	BLND LN Equity
	DPW GY Equity	BLND LN Equity	HEIA NA Equity	SGSN SE Equity
	WPP LN Equity	ERICB SS Equity	RXL FP Equity	SIE GY Equity
	CA FP Equity	ADS GY Equity	ALFA SS Equity	AF FP Equity
	CCL LN Equity	DG FP Equity	ERICB SS Equity	VOD LN Equity
	REL LN Equity	RNO FP Equity	CDI FP Equity	ATCOA SS Equity
	ERICB SS Equity	SAP GY Equity	DG FP Equity	RNO FP Equity
	HMB SS Equity	CCL LN Equity	MRK GY Equity	RXL FP Equity
	FER SQ Equity	BBY LN Equity	SIE GY Equity	VIV FP Equity
	SAP GY Equity	ITX SQ Equity	ORA FP Equity	CCL LN Equity
	GPOR LN Equity	HMSO LN Equity	HMSO LN Equity	BT/A LN Equity
	LAND LN Equity	UL NA Equity	SAP GY Equity	ERICB SS Equity
	UL NA Equity	LAND LN Equity	GPOR LN Equity	HMSO LN Equity
	ASML NA Equity	ASML NA Equity	ASML NA Equity	GPOR LN Equity
	NOKIA FH Equity	NOKIA FH Equity	ATO FP Equity	ATO FP Equity
	ECM LN Equity	ATO FP Equity	NOKIA FH Equity	ASML NA Equity
	DSM NA Equity	ADS GY Equity	HEIA NA Equity	DNB NO Equity
	OUT1V FH Equity	BLND LN Equity	RXL FP Equity	ABI BB Equity

Table 4-3: High ESG disclosure portfolios' composition - best-in-class (4/4)

	2014	2015	2016	2017
25% screening	KGF LN Equity	MNDI LN Equity	BLT LN Equity	BKT SQ Equity
	RI FP Equity	WCH GY Equity	ORA FP Equity	CNP FP Equity
	SCAB SS Equity	SEBA SS Equity	BKT SQ Equity	KGF LN Equity
	UG FP Equity	UG FP Equity	ADP FP Equity	BLT LN Equity
	ORA FP Equity	AZN LN Equity	GIVN SE Equity	SCAB SS Equity
	UL NA Equity	BLT LN Equity	MNDI LN Equity	UL NA Equity
	CRH ID Equity	GIVN SE Equity	RNO FP Equity	ORNBV FH Equity
	KESKOB FH Equity	SKG ID Equity	LI FP Equity	RI FP Equity
	MRK GY Equity	DB1 GY Equity	MC FP Equity	NOKIA FH Equity
	ALV GY Equity	FR FP Equity	SEBA SS Equity	ORA FP Equity
	LGEN LN Equity	NESN SE Equity	ITX SQ Equity	ATL IM Equity
	MAP SQ Equity	ITX SQ Equity	ATL IM Equity	EI FP Equity
	SGRE SQ Equity	LI FP Equity	MRK GY Equity	MRK GY Equity
	CA FP Equity	MRK GY Equity	G IM Equity	RNO FP Equity
	GIVN SE Equity	GLE FP Equity	GLE FP Equity	SREN SE Equity
	HEIO NA Equity	MC FP Equity	BN FP Equity	BOSS GY Equity
	LHN SE Equity	SGRE SQ Equity	ORNBV FH Equity	SAN SQ Equity
	OR FP Equity	ROG SE Equity	RIO LN Equity	MKS LN Equity
	MC FP Equity	SCMN SE Equity	HMSO LN Equity	MAN GY Equity
	METSO FH Equity	HMSO LN Equity	SAN SQ Equity	SGRE SQ Equity
	AZN LN Equity	UL NA Equity	SREN SE Equity	BATS LN Equity
	AGN NA Equity	SAN SQ Equity	NOKIA FH Equity	HMSO LN Equity
	MAN GY Equity	MAN GY Equity	MAN GY Equity	BBVA SQ Equity
	ROG SE Equity	BATS LN Equity	BATS LN Equity	MUV2 GY Equity
	FER SQ Equity	BBVA SQ Equity	SGRE SQ Equity	ADP FP Equity
	FI/N SE Equity	ORNBV FH Equity	BBVA SQ Equity	BN FP Equity
	NOKIA FH Equity	AGN NA Equity	SAB SQ Equity	CARLB DC Equity
	LI FP Equity	NOKIA FH Equity	BOSS GY Equity	ITX SQ Equity
	DANSKE DC Equity	METSO FH Equity	LDO IM Equity	PHIA NA Equity
	G IM Equity	ABI BB Equity	PHIA NA Equity	SLA LN Equity
	ITX SQ Equity	CNP FP Equity	ABI BB Equity	CDI FP Equity
	CNP FP Equity	SREN SE Equity	GSK LN Equity	DAI GY Equity
	LLOY LN Equity	RNO FP Equity	ROG SE Equity	SKFB SS Equity
	SAN SQ Equity	SAB SQ Equity	CNP FP Equity	GSK LN Equity
	FGR FP Equity	ADS GY Equity	CDI FP Equity	REN NA Equity
	SWMA SS Equity	DGE LN Equity	MKS LN Equity	RXL FP Equity
	SEBA SS Equity	STAN LN Equity	ACS SQ Equity	ACA FP Equity
	AIR FP Equity	CCL LN Equity	ADS GY Equity	ALV GY Equity
	DBK GY Equity	INGA NA Equity	SKFB SS Equity	SK FP Equity
	VOD LN Equity	NDA SS Equity	UL NA Equity	INGA NA Equity
	AF FP Equity	ATL IM Equity	ACA FP Equity	ALO FP Equity
	RNO FP Equity	CDI FP Equity	SCMN SE Equity	DPW GY Equity
	MKS LN Equity	FI/N SE Equity	CCL LN Equity	LDO IM Equity
	LDO IM Equity	LDO IM Equity	REL LN Equity	MTX GY Equity
	SGSN SE Equity	SIE GY Equity	SGSN SE Equity	NIBEB SS Equity
	SCMN SE Equity	G IM Equity	FI/N SE Equity	SAND SS Equity
	HO FP Equity	INVP LN Equity	SAND SS Equity	INVP LN Equity
	GLE FP Equity	AIR FP Equity	VOD LN Equity	KNEBV FH Equity
	SREN SE Equity	RXL FP Equity	INVP LN Equity	SCMN SE Equity
	INVP LN Equity	VOD LN Equity	ICAD FP Equity	G IM Equity
	ATL IM Equity	ACA FP Equity	RXL FP Equity	CCL LN Equity
	ELUXB SS Equity	REL LN Equity	NRE1V FH Equity	REL LN Equity
	FRA GY Equity	ALFA SS Equity	REN NA Equity	SIE GY Equity
	KNEBV FH Equity	VIV FP Equity	SIE GY Equity	ASSAB SS Equity
	SAND SS Equity	FRA GY Equity	INGA NA Equity	METSO FH Equity
	SIE GY Equity	SGSN SE Equity	METSO FH Equity	DBK GY Equity
	LR FP Equity	ACS SQ Equity	MTX GY Equity	STAN LN Equity
	SKFB SS Equity	AF FP Equity	DBK GY Equity	TEF SQ Equity
	CDI FP Equity	BLND LN Equity	STAN LN Equity	BLND LN Equity
	BLND LN Equity	BOSS GY Equity	AIR FP Equity	TIT IM Equity
	HMSO LN Equity	KNEBV FH Equity	SLA LN Equity	UCG IM Equity
	VIV FP Equity	REN NA Equity	TIT IM Equity	IFX GY Equity
	CCL LN Equity	TEF SQ Equity	NDA SS Equity	SWEDA SS Equity
	ERICB SS Equity	ASML NA Equity	ERICB SS Equity	ZURN SE Equity
	ATO FP Equity	ERICB SS Equity	ASML NA Equity	ALT FP Equity
	SAP GY Equity	ALT FP Equity	ALT FP Equity	ATO FP Equity
	ALT FP Equity	CAP FP Equity	ATO FP Equity	ERICB SS Equity
	VIE FP Equity	AIR FP Equity	AKE FP Equity	LDO IM Equity
	SCMN SE Equity	EI FP Equity	BILL SS Equity	MTX GY Equity

Table 4-4: Low ESG disclosure Portfolios' composition - best-in-class (1/4)

This table summarizes the composition of portfolios with the highest ESG disclosure score for the period 2010 to 2017. Stocks are ranked from highest to lowest score. The first part of the table shows stocks included after using a 10% screening and the second part additional stocks included after a 25% screening.

	2010	2011	2012	2013
10% screening	PSM GY Equity	PAH3 GY Equity	SOW GY Equity	PAH3 GY Equity
	SYDB DC Equity	SOW GY Equity	PAH3 GY Equity	PARG SE Equity
	SOW GY Equity	PARG SE Equity	PARG SE Equity	FNTN GY Equity
	PARG SE Equity	FNTN GY Equity	FNTN GY Equity	DUFN SE Equity
	PAH3 GY Equity	BOSS GY Equity	AKERBP NO Equity	JYSK DC Equity
	FNTN GY Equity	AKERBP NO Equity	DUFN SE Equity	SPSN SE Equity
	BOSS GY Equity	SPSN SE Equity	JYSK DC Equity	PSPN SE Equity
	AKERBP NO Equity	DUFN SE Equity	SPSN SE Equity	DOKA SW Equity
	SPSN SE Equity	JYSK DC Equity	PSPN SE Equity	UTDI GY Equity
	LUX IM Equity	PSPN SE Equity	DOKA SW Equity	SOW GY Equity
	DUFN SE Equity	PSM GY Equity	PSM GY Equity	KOMB CK Equity
	MB IM Equity	DOKA SW Equity	LUNDB SS Equity	AMS SE Equity
	JYSK DC Equity	BARN SE Equity	KOMB CK Equity	SOBI SS Equity
	PSPN SE Equity	KOMB CK Equity	SOBI SS Equity	AKERBP NO Equity
	DOKA SW Equity	SOBI SS Equity	AMS SE Equity	LUNDB SS Equity
	TRYG DC Equity	AMS SE Equity	TGS NO Equity	TEP FP Equity
	ETL FP Equity	TGS NO Equity	GN DC Equity	GN DC Equity
	BARN SE Equity	LUNDB SS Equity	G1A GY Equity	TEMN SE Equity
	G1A GY Equity	GN DC Equity	SYDB DC Equity	FDR FP Equity
	KOMB CK Equity	G1A GY Equity	PGHN SE Equity	PSM GY Equity
	SOBI SS Equity	TEMN SE Equity	TEMN SE Equity	PPB ID Equity
	AMS SE Equity	PPB ID Equity	PPB ID Equity	EXO IM Equity
	TGS NO Equity	GLPG NA Equity	EXO IM Equity	MB IM Equity
	LUNDB SS Equity	MB IM Equity	BARN SE Equity	AGS BB Equity
	RHM GY Equity	ETL FP Equity	UTDI GY Equity	AMEAS FH Equity
	GN DC Equity	AMEAS FH Equity	TEP FP Equity	TRYG DC Equity
	CEY LN Equity	TEP FP Equity	AMEAS FH Equity	INDUA SS Equity
	UTDI GY Equity	LUX IM Equity	TRYG DC Equity	PGHN SE Equity
	TEMN SE Equity	EXO IM Equity	AGS BB Equity	GLPG NA Equity
	PPB ID Equity	AGS BB Equity	OERL SE Equity	SYDB DC Equity
	GLPG NA Equity	TRYG DC Equity	INDUA SS Equity	OERL SE Equity
	TEP FP Equity	SYDB DC Equity	ACKB BB Equity	HELN SE Equity
	SRT3 GY Equity	PGHN SE Equity	PUB FP Equity	G1A GY Equity
	OERL SE Equity	UTDI GY Equity	GLPG NA Equity	ETL FP Equity
	EXO IM Equity	INDUA SS Equity	CEY LN Equity	ACKB BB Equity
	SLHN SE Equity	SRT3 GY Equity	ETL FP Equity	SUBC NO Equity
	IFX GY Equity	PUB FP Equity	SCHP SE Equity	RMV LN Equity
	AMEAS FH Equity	CEY LN Equity	NDA GY Equity	MONY LN Equity
	SAMPO FH Equity	ACKB BB Equity	SUBC NO Equity	RBI AV Equity
	AGS BB Equity	FPE3 GY Equity	FPE3 GY Equity	UHR SE Equity
	ANDR AV Equity	RHM GY Equity	ANDR AV Equity	LUX IM Equity
	INDUA SS Equity	MTX GY Equity	MB IM Equity	RYA ID Equity
	HELN SE Equity	SCHP SE Equity	HELN SE Equity	INTRUM SS Equity
	ACKB BB Equity	SUBC NO Equity	UHR SE Equity	ANDR AV Equity
	LOGN SE Equity	HSX LN Equity	SRT3 GY Equity	FRE GY Equity
	VOE AV Equity	ANDR AV Equity	RMV LN Equity	ADM LN Equity
	MTX GY Equity	HELN SE Equity	MONY LN Equity	NXG LN Equity

Table 4-4: Low ESG disclosure Portfolios' composition - best-in-class (2/4)

	2014	2015	2016	2017
10% screening	PAH3 GY Equity	TEL2B SS Equity	PARG SE Equity	PARG SE Equity
	PARG SE Equity	TDC DC Equity	FNTN GY Equity	FNTN GY Equity
	FNTN GY Equity	PARG SE Equity	SOW GY Equity	SOW GY Equity
	PSPN SE Equity	FNTN GY Equity	TEMN SE Equity	AKERBP NO Equity
	DUFN SE Equity	SOW GY Equity	GAM SE Equity	GAM SE Equity
	SPSN SE Equity	KOMB CK Equity	AKERBP NO Equity	PPB ID Equity
	SOW GY Equity	TEMN SE Equity	PPB ID Equity	GLPG NA Equity
	KOMB CK Equity	DUFN SE Equity	GLPG NA Equity	BAMI IM Equity
	TEP FP Equity	TEP FP Equity	AGS BB Equity	EXO IM Equity
	SOBI SS Equity	AKERBP NO Equity	PSM GY Equity	HELN SE Equity
	AKERBP NO Equity	JYSK DC Equity	EXO IM Equity	AGS BB Equity
	TEMN SE Equity	PPB ID Equity	BAMI IM Equity	UHR SE Equity
	PSM GY Equity	GLPG NA Equity	INDUA SS Equity	OERL SE Equity
	PPB ID Equity	GAM SE Equity	UTDI GY Equity	RYA ID Equity
	EXO IM Equity	AGS BB Equity	OERL SE Equity	HSV LN Equity
	AGS BB Equity	PSM GY Equity	UHR SE Equity	PSPN SE Equity
	OERL SE Equity	INDUA SS Equity	SPSN SE Equity	IWG LN Equity
	JYSK DC Equity	ETL FP Equity	RYA ID Equity	INDUA SS Equity
	INDUA SS Equity	EXO IM Equity	FRE GY Equity	ACKB BB Equity
	PGHN SE Equity	UTDI GY Equity	PSPN SE Equity	INTRUM SS Equity
	GLPG NA Equity	OERL SE Equity	PGHN SE Equity	RBI AV Equity
	BAMI IM Equity	BAMI IM Equity	ACKB BB Equity	UTDI GY Equity
	ETL FP Equity	UHR SE Equity	INTRUM SS Equity	MB IM Equity
	UTDI GY Equity	PGHN SE Equity	GN DC Equity	AVV LN Equity
	LUNDB SS Equity	SPSN SE Equity	HELN SE Equity	SPR GY Equity
	RYA ID Equity	SUBC NO Equity	RBI AV Equity	GN DC Equity
	FDR FP Equity	PSPN SE Equity	HSV LN Equity	FPE3 GY Equity
	AVV LN Equity	GN DC Equity	BEZ LN Equity	COLR BB Equity
	UHR SE Equity	RBI AV Equity	IWG LN Equity	FRE GY Equity
	RMV LN Equity	FRE GY Equity	DUFN SE Equity	DUFN SE Equity
	GN DC Equity	FPE3 GY Equity	MB IM Equity	PAH3 GY Equity
	SUBC NO Equity	ACKB BB Equity	LUNDB SS Equity	INVEB SS Equity
	HELN SE Equity	LUNDB SS Equity	AVV LN Equity	FME GY Equity
	IWG LN Equity	INTRUM SS Equity	FPE3 GY Equity	GEN DC Equity
	FPE3 GY Equity	RYA ID Equity	COLR BB Equity	TCAP LN Equity
	INTRUM SS Equity	BEZ LN Equity	FME GY Equity	HEXAB SS Equity
	G1A GY Equity	AVV LN Equity	MONY LN Equity	SUBC NO Equity
	ANDR AV Equity	IWG LN Equity	PAH3 GY Equity	ITV LN Equity
	RBI AV Equity	COLR BB Equity	JYSK DC Equity	PGHN SE Equity
	ACKB BB Equity	PAH3 GY Equity	INVEB SS Equity	RMV LN Equity
	MONY LN Equity	G1A GY Equity	RMV LN Equity	HL/ LN Equity
	FRE GY Equity	ITV LN Equity	LUN DC Equity	MONY LN Equity
	NXG LN Equity	LUX IM Equity	KOMB CK Equity	IMI LN Equity
	BEZ LN Equity	FME GY Equity	GEN DC Equity	KOMB CK Equity
	SYDB DC Equity	MONY LN Equity	SUBC NO Equity	JYSK DC Equity
	WG/ LN Equity	LUN DC Equity	TEN IM Equity	LUNDB SS Equity
	ICP LN Equity	GEN DC Equity	TGS NO Equity	IGG LN Equity

Table 4-4: Low ESG disclosure portfolios' composition - best-in-class (3/4)

	2010	2011	2012	2013
25% screening	PUB FP Equity	UHR SE Equity	LUX IM Equity	BOSS GY Equity
	FPE3 GY Equity	TEN IM Equity	RBI AV Equity	IWG LN Equity
	DCC LN Equity	OERL SE Equity	IGG LN Equity	COLR BB Equity
	TNET BB Equity	RMV LN Equity	COLR BB Equity	GAM SE Equity
	SUBC NO Equity	MONY LN Equity	GAM SE Equity	FME GY Equity
	FRE GY Equity	ICAD FP Equity	RYA ID Equity	FPE3 GY Equity
	FME GY Equity	KYG ID Equity	KYG ID Equity	MRO LN Equity
	ICAD FP Equity	RBI AV Equity	HSX LN Equity	BIM FP Equity
	LISN SE Equity	FRE GY Equity	FRE GY Equity	WG/ LN Equity
	KYG ID Equity	FME GY Equity	TEN IM Equity	SECUB SS Equity
	BOKA NA Equity	GAM SE Equity	NXG LN Equity	INVEB SS Equity
	HNR1 GY Equity	VOE AV Equity	BOSS GY Equity	MF FP Equity
	UHR SE Equity	RYA ID Equity	ICA SS Equity	HSV LN Equity
	GEN DC Equity	SLHN SE Equity	SLHN SE Equity	GEN DC Equity
	SCHP SE Equity	INVEB SS Equity	MF FP Equity	TEN IM Equity
	COLR BB Equity	COLR BB Equity	ICAD FP Equity	INCH LN Equity
	RBI AV Equity	ITRK LN Equity	TDC DC Equity	BEZ LN Equity
	GAM SE Equity	CBG LN Equity	MRO LN Equity	IGG LN Equity
	EBS AV Equity	TCAP LN Equity	CBG LN Equity	AHT LN Equity
	ELISA FH Equity	NXG LN Equity	BEZ LN Equity	NDA GY Equity
	IWG LN Equity	MRO LN Equity	WG/ LN Equity	RHM GY Equity
	NDA GY Equity	MF FP Equity	FME GY Equity	ICAD FP Equity
	SESG FP Equity	GETIB SS Equity	SECUB SS Equity	CEY LN Equity
	RYA ID Equity	BOKA NA Equity	BOKA NA Equity	CBG LN Equity
	HL/ LN Equity	GEN DC Equity	GEN DC Equity	TGS NO Equity
	FDR FP Equity	WG/ LN Equity	BTG LN Equity	BOKA NA Equity
	TEN IM Equity	SECUB SS Equity	IWG LN Equity	BRBY LN Equity
	INVEB SS Equity	INTRUM SS Equity	ISAT LN Equity	EZJ LN Equity
	BEZ LN Equity	TNET BB Equity	ITRK LN Equity	GETIB SS Equity
	LSE LN Equity	FDR FP Equity	INTRUM SS Equity	KYG ID Equity
	ITRK LN Equity	BWY LN Equity	BWY LN Equity	ISAT LN Equity
	MRO LN Equity	INCH LN Equity	HSV LN Equity	WMH LN Equity
	GETIB SS Equity	ICA SS Equity	RHM GY Equity	TATE LN Equity
	SKG ID Equity	HSV LN Equity	INCH LN Equity	LISN SE Equity
	KNIN SE Equity	WMH LN Equity	EZJ LN Equity	ICA SS Equity
	BRBY LN Equity	INF LN Equity	BRBY LN Equity	BVIC LN Equity
	WG/ LN Equity	GET FP Equity	LISN SE Equity	BAB LN Equity
	WEIR LN Equity	EZJ LN Equity	HWDN LN Equity	WEIR LN Equity
	SECUB SS Equity	BAB LN Equity	AHT LN Equity	KSP ID Equity
	INTRUM SS Equity	NDA GY Equity	HUH1V FH Equity	DMGT LN Equity
	HSV LN Equity	LISN SE Equity	INF LN Equity	HWDN LN Equity
	BAB LN Equity	HUH1V FH Equity	BVIC LN Equity	BVI FP Equity
	INCH LN Equity	KSP ID Equity	KSP ID Equity	BARN SE Equity
	ICA SS Equity	IWG LN Equity	VCT LN Equity	ITRK LN Equity
	AHT LN Equity	DCC LN Equity	TATE LN Equity	BWY LN Equity
	ADEN SE Equity	VCT LN Equity	RPC LN Equity	RPC LN Equity
	WMH LN Equity	SPX LN Equity	AGK LN Equity	HUH1V FH Equity
	HAS LN Equity	AHT LN Equity	WMH LN Equity	CEZ CK Equity
	BVIC LN Equity	AGK LN Equity	WEIR LN Equity	SESG FP Equity
	TEL2B SS Equity	BVIC LN Equity	BAB LN Equity	VCT LN Equity
	KSP ID Equity	TATE LN Equity	BVI FP Equity	SPX LN Equity
	HUH1V FH Equity	RPC LN Equity	GET FP Equity	MRW LN Equity
	SIK SE Equity	CEZ CK Equity	FDR FP Equity	SAABB SS Equity
	MHG NO Equity	RRS LN Equity	CEZ CK Equity	SVT LN Equity
	VCT LN Equity	JMT PL Equity	VOE AV Equity	RAND NA Equity
	RRS LN Equity	MRW LN Equity	MRW LN Equity	VOE AV Equity
	TATE LN Equity	TDC DC Equity	CO FP Equity	SBRY LN Equity
	RPC LN Equity	SIK SE Equity	PNN LN Equity	TEL2B SS Equity
	JMT PL Equity	PNN LN Equity	RRS LN Equity	TDC DC Equity
	WIE AV Equity	TEL2B SS Equity	TEL2B SS Equity	PNN LN Equity
	ISAT LN Equity	TKA GY Equity	UU/ LN Equity	RRS LN Equity
	UPM FH Equity	ELISA FH Equity	SIK SE Equity	SY1 GY Equity
	CEZ CK Equity	UU/ LN Equity	SSE LN Equity	SIK SE Equity
	PNN LN Equity	ANTO LN Equity	ANTO LN Equity	TKA GY Equity
	UU/ LN Equity	UPM FH Equity	WIE AV Equity	WIE AV Equity
	SVT LN Equity	EOAN GY Equity	SMDS LN Equity	SSE LN Equity
	SEV FP Equity	SSE LN Equity	SVT LN Equity	UU/ LN Equity
	LOGN SE Equity	HELN SE Equity	LUX IM Equity	AVV LN Equity
	MTX GY Equity	ANDR AV Equity	MONY LN Equity	FRE GY Equity

Table 4-4: Low ESG disclosure portfolios' composition - best-in-class (4/4)

	2014	2015	2016	2017
25% screening	GAM SE Equity	INVEB SS Equity	TCAP LN Equity	INCH LN Equity
	BIM FP Equity	RMV LN Equity	TPK LN Equity	WDH DC Equity
	COLR BB Equity	WG/ LN Equity	ITV LN Equity	SESG FP Equity
	INCH LN Equity	HSV LN Equity	G1A GY Equity	WG/ LN Equity
	IGG LN Equity	HELN SE Equity	WG/ LN Equity	SOBI SS Equity
	INVEB SS Equity	RHM GY Equity	SOBI SS Equity	MF FP Equity
	LUX IM Equity	TGS NO Equity	MF FP Equity	HSX LN Equity
	FME GY Equity	TCAP LN Equity	IGG LN Equity	TGS NO Equity
	SECUB SS Equity	ANDR AV Equity	HL/ LN Equity	KYG ID Equity
	RHM GY Equity	HNR1 GY Equity	HNR1 GY Equity	TRYG DC Equity
	GEN DC Equity	TEN IM Equity	CBG LN Equity	TEN IM Equity
	III LN Equity	SOBI SS Equity	SESG FP Equity	SAABB SS Equity
	HSV LN Equity	NXG LN Equity	ETL FP Equity	BEZ LN Equity
	STJ LN Equity	MF FP Equity	INCH LN Equity	PSM GY Equity
	CBG LN Equity	IGG LN Equity	WMH LN Equity	TPK LN Equity
	MRO LN Equity	CEZ CK Equity	SAABB SS Equity	EZJ LN Equity
	ISAT LN Equity	CEY LN Equity	KYG ID Equity	ETL FP Equity
	TEN IM Equity	BVI FP Equity	IMI LN Equity	VCT LN Equity
	TGS NO Equity	INCH LN Equity	AGK LN Equity	CEZ CK Equity
	KYG ID Equity	CBG LN Equity	EZJ LN Equity	HAS LN Equity
	DPH LN Equity	SESG FP Equity	VCT LN Equity	WMH LN Equity
	DMGT LN Equity	KYG ID Equity	CEZ CK Equity	RPC LN Equity
	NDA GY Equity	HL/ LN Equity	WDH DC Equity	DMGT LN Equity
	BOKA NA Equity	SECUB SS Equity	SECUB SS Equity	AHT LN Equity
	RPC LN Equity	SAABB SS Equity	DMGT LN Equity	GETIB SS Equity
	BVI FP Equity	BWY LN Equity	BKG LN Equity	RTO LN Equity
	CEY LN Equity	LISN SE Equity	AHT LN Equity	AGK LN Equity
	BVIC LN Equity	IMI LN Equity	WTB LN Equity	MRO LN Equity
	WEIR LN Equity	WMH LN Equity	RTO LN Equity	BA/ LN Equity
	EZJ LN Equity	TPK LN Equity	MRO LN Equity	SECUB SS Equity
	CEZ CK Equity	VCT LN Equity	KNIN SE Equity	G1A GY Equity
	VCT LN Equity	RAND NA Equity	HAS LN Equity	SBRY LN Equity
	LISN SE Equity	EZJ LN Equity	BA/ LN Equity	ISAT LN Equity
	UBM LN Equity	WDH DC Equity	RPC LN Equity	WTB LN Equity
	SGRO LN Equity	AGK LN Equity	SBRY LN Equity	SPSN SE Equity
	INF LN Equity	NDA GY Equity	ISAT LN Equity	INF LN Equity
	BWY LN Equity	MRO LN Equity	CEY LN Equity	HWDN LN Equity
	WMH LN Equity	LHA GY Equity	TEP FP Equity	FHZN SE Equity
	TATE LN Equity	DMGT LN Equity	BWY LN Equity	BAB LN Equity
	SESG FP Equity	BKG LN Equity	SW FP Equity	LISN SE Equity
	SAABB SS Equity	BAB LN Equity	FHZN SE Equity	BKG LN Equity
	BRBY LN Equity	RPC LN Equity	DCC LN Equity	SPX LN Equity
	BAB LN Equity	ISAT LN Equity	NDA GY Equity	FERG LN Equity
	AGK LN Equity	VOE AV Equity	ROR LN Equity	DCC LN Equity
	ROR LN Equity	AHT LN Equity	DUE GY Equity	SVT LN Equity
	RAND NA Equity	SBRY LN Equity	BAB LN Equity	TSCO LN Equity
	KNIN SE Equity	KNIN SE Equity	LISN SE Equity	TDC DC Equity
	SPX LN Equity	HAS LN Equity	TDC DC Equity	PNN LN Equity
	ITRK LN Equity	FHZN SE Equity	VOE AV Equity	KNIN SE Equity
	HWDN LN Equity	SMDS LN Equity	SVT LN Equity	TEL2B SS Equity
	VOE AV Equity	UBM LN Equity	UU/ LN Equity	TATE LN Equity
	SY1 GY Equity	PNN LN Equity	TATE LN Equity	NG/ LN Equity
	BARN SE Equity	TATE LN Equity	NG/ LN Equity	CO FP Equity
	TEL2B SS Equity	CO FP Equity	PNN LN Equity	LAND LN Equity
	SMDS LN Equity	BVIC LN Equity	TEL2B SS Equity	MRW LN Equity
	PNN LN Equity	FABG SS Equity	SMDS LN Equity	MHG NO Equity
	TDC DC Equity	SVT LN Equity	CO FP Equity	CEY LN Equity
	SBRY LN Equity	TSCO LN Equity	LAND LN Equity	FABG SS Equity
	MRW LN Equity	MRW LN Equity	TSCO LN Equity	UU/ LN Equity
	CO FP Equity	UU/ LN Equity	SGRO LN Equity	NDA GY Equity
	SSE LN Equity	SGRO LN Equity	MRW LN Equity	CRDA LN Equity
	UU/ LN Equity	SDF GY Equity	MHG NO Equity	SDF GY Equity
	RRS LN Equity	HUH1V FH Equity	SDF GY Equity	VOE AV Equity
	WIE AV Equity	SY1 GY Equity	HEI GY Equity	HEI GY Equity
	TKA GY Equity	HEI GY Equity	FRES LN Equity	FRES LN Equity
	SIK SE Equity	TKA GY Equity	WIE AV Equity	RRS LN Equity
	NG/ LN Equity	SSE LN Equity	RRS LN Equity	JMAT LN Equity
	WG/ LN Equity	GEN DC Equity	GEN DC Equity	JYSK DC Equity
	SYDB DC Equity	LUN DC Equity	HEXAB SS Equity	KOMB CK Equity

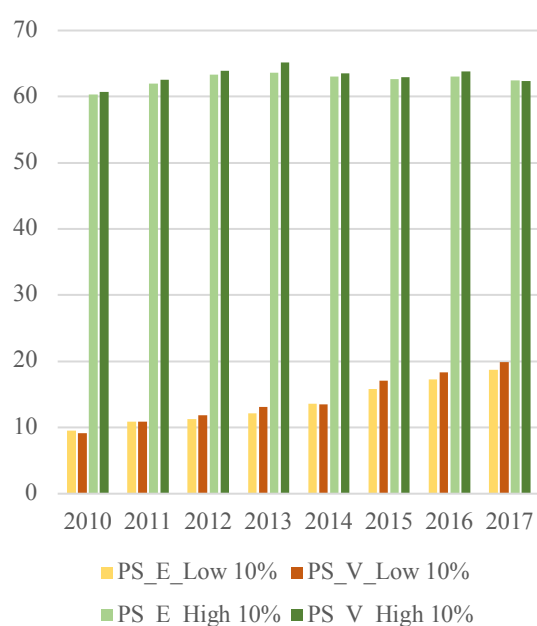
Appendix 5: Portfolios' statistics – ESG Disclosure score

Table 5–1: Portfolios' ESG disclosure score (10% screening).

This table summarizes the ESG disclosure score for each portfolio constructed based on a 10% screening. ESG disclosure scores were computed for portfolios constructed using positive screening (PS) and best-in-class (Bic) screening, as well as equally (E) and value-weighted portfolios (V).

	2010	2011	2012	2013	2014	2015	2016	2017
Positive screening – Equally weighted								
PS_E_High 10%	60	62	63	64	63	63	63	62
PS_E_Low 10%	10	11	11	12	14	16	17	19
Positive screening - Value-weighted								
PS_V_High 10%	61	63	64	65	64	63	64	62
PS_V_Low 10%	9	11	12	13	13	17	18	20
Best-in-class – Equally weighted								
BiC_E_High 10%	58	59	61	62	62	61	62	61
BiC_E_Low 10%	11	13	13	15	16	18	21	22
Best-in-class - Value-weighted								
BiC_V_High 10%	60	62	62	64	63	63	63	62
BiC_V_Low 10%	13	14	15	15	15	19	21	22

**Figure 5-1: Positive Screening:
Portfolios' ESG disclosure score**



**Figure 5-2: Best-in-Class:
Portfolios' ESG disclosure score**

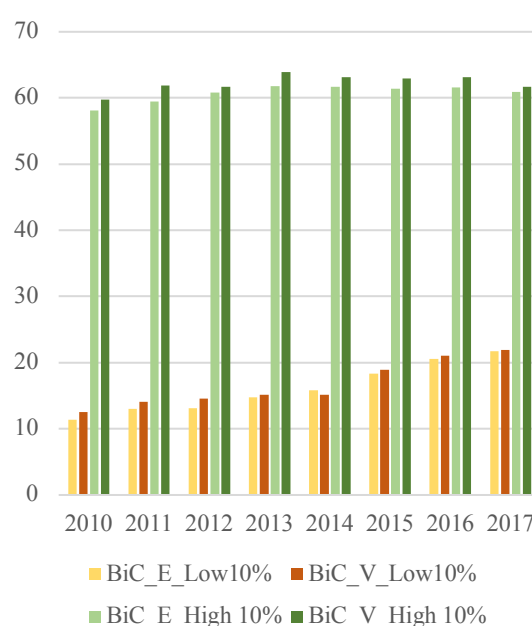
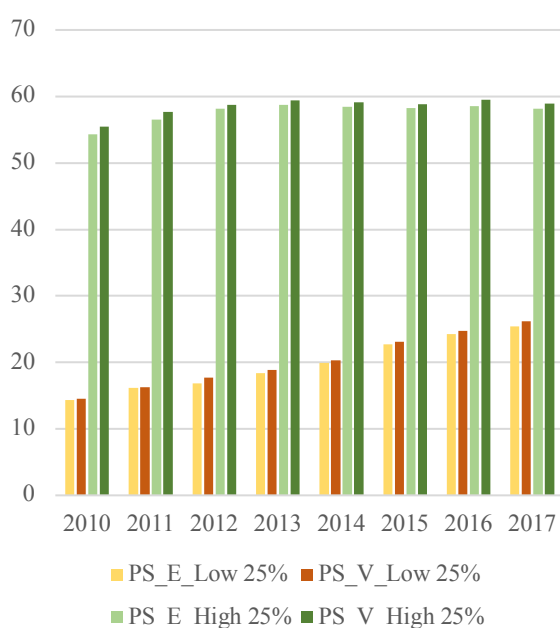
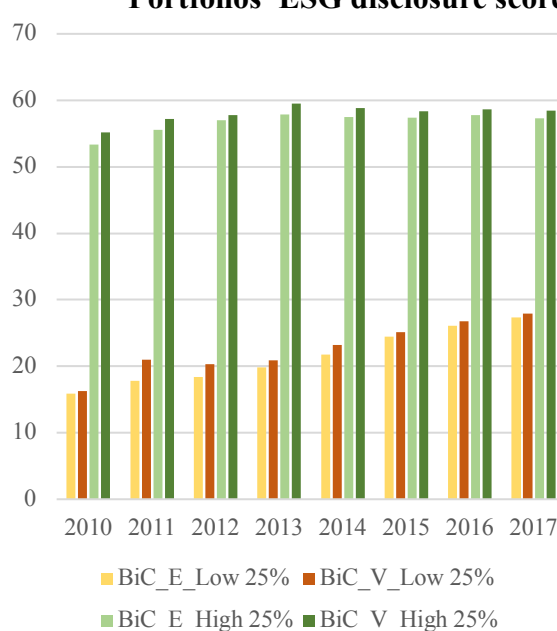


Table 5–2: Portfolios' ESG disclosure score (25% screening).

This table summarizes the ESG disclosure score for each portfolio constructed based on a 25% screen. ESG disclosure scores were computed for portfolios constructed using positive screening (PS) and best-in-class screening (BiC), as well as equally (E) and value-weighted portfolios (V).

Positive screening – Equally weighted								
PS_E_High 25%	54	57	58	59	58	58	59	58
PS_E_Low 25%	14	16	17	18	20	23	24	25
Positive screening - Value-weighted								
PS_V_High 25%	55	58	59	59	59	59	60	59
PS_V_Low 25%	15	16	18	19	20	23	25	26
Best-in-class – Equally weighted								
BiC_E_High 25%	53	56	57	58	57	57	58	57
BiC_E_Low 25%	16	18	18	20	22	24	26	27
Best-in-class - Value-weighted								
BiC_V_High 25%	55	57	58	60	59	58	59	58
BiC_V_Low 25%	16	21	20	21	23	25	27	28

**Figure 5-3: Positive Screening:
Portfolios' ESG disclosure score****Figure 5-4: Best-in-Class:
Portfolios' ESG disclosure score**

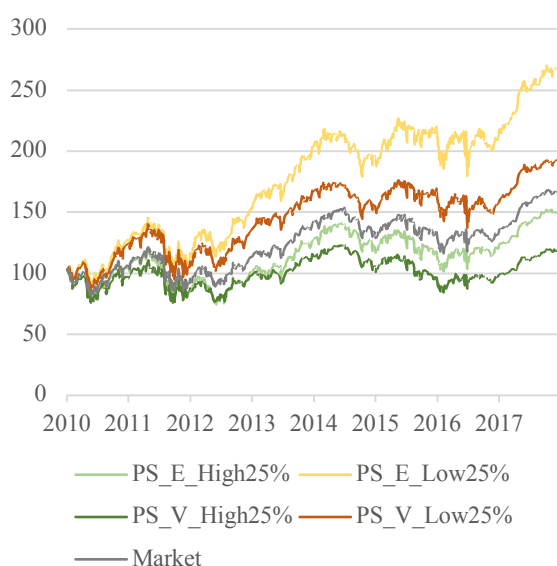
Appendix 6: Portfolios' statistics – Returns

Table 6-1: Portfolios' annualized returns (25% screening)

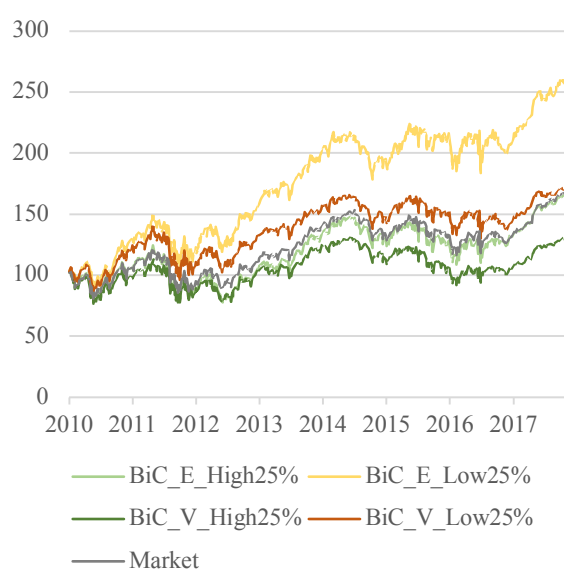
This table summarizes the returns of the 8 portfolios formed using a 25% screening method as well as the market's return as calculated on K. French's website

	Value-weighted		Equally weighted		Market
	High10%	Low10%	High10%	Low10%	
<i>Positive screening</i>					
2010	-4,06	23,67	3,69	28,02	6,14
2011	-12,25	-14,55	-18,12	-12,09	-13,17
2012	14,67	26,78	16,47	34,06	20,95
2013	20,35	25,79	30,10	36,33	27,92
2014	-8,57	-6,83	-4,95	-4,32	-6,33
2015	-9,21	6,57	-4,15	10,80	-0,52
2016	1,97	-5,89	4,19	-2,88	-0,04
2017	21,81	25,60	25,60	30,93	28,07
Full period	2,28	8,90	5,49	13,60	6,87
<i>Best-in-class</i>					
2010	-2,47	22,17	5,91	29,59	6,14
2011	-12,04	-12,68	-17,15	-8,66	-13,17
2012	18,80	22,70	19,41	31,90	20,95
2013	22,82	20,68	30,12	31,51	27,92
2014	-8,90	-6,17	-5,06	-4,65	-6,33
2015	-7,04	1,99	-2,34	9,24	-0,52
2016	1,25	-3,93	5,22	-1,26	-0,04
2017	22,58	20,10	24,78	26,52	28,07
Full period	3,49	7,20	6,54	13,07	6,87

**Figure 6-1: Positive Screening:
Portfolios' performance**



**Figure 6-2: Best-in-Class:
Portfolios' performance**



Appendix 7: Portfolios' statistics – Volatility

Table 7-2: Portfolios' volatility (25% screening) (in $\times 10^{-3}$)

This table summarizes the daily standard deviations of the 8 portfolios formed using a 25% screening method as well as the market's.

	Value-weighted		Equally weighted		Market
	High25%	Low25%	High25%	Low25%	
<i>Positive screening</i>					
2010	15,47	14,98	16,16	14,69	14,25
2011	19,16	19,51	20,28	18,50	17,38
2012	13,59	12,98	15,53	12,93	11,83
2013	9,22	8,31	10,00	8,25	7,99
2014	7,83	7,23	8,45	7,63	7,37
2015	11,84	9,87	11,73	9,53	10,21
2016	12,33	13,21	13,03	13,67	11,86
2017	5,71	5,51	5,88	5,74	5,53
Full period	12,54	12,22	13,34	12,05	11,38
<i>Best-in-class</i>					
2010	15,34	14,81	15,92	14,37	14,25
2011	19,30	18,97	20,33	17,83	17,38
2012	14,14	12,48	15,48	12,50	11,83
2013	9,31	7,81	9,98	8,01	7,99
2014	7,94	6,89	8,55	7,37	7,37
2015	11,55	10,05	11,46	9,57	10,21
2016	12,55	12,86	13,62	13,23	11,86
2017	5,76	5,32	6,04	5,59	5,53
Full period	12,64	11,91	13,37	11,70	11,38

Appendix 8: Regression results at 25% level

Table 8-1: Regression results of screened ESG disclosure portfolios (25% level).

This table summarizes for the positive and best-in-class screening the results of both the Carhart four-factor model and CAPM regressions. Portfolios are value-weighted and equally weighted. High-rated (low-rated) ESG portfolios are construct at 25% level, meaning that the top (bottom) 25% of stocks with the highest (lowest) Bloomberg ESG Disclosure Score are included in the portfolio. Daily data are used over the 2010-2017 period.

		Value-weighted		Equally weighted	
		High25%	Low25%	High25%	Low25%
Positive screening					
CARHART	α	-0,00005	0,000037	0,000028	0,00016*
	MKTRF	0,9126***	1,0980***	1,0225***	1,1348***
	SMB	-0,4004***	0,2092***	-0,1619***	0,4269***
	HML	0,1156***	-0,1238***	0,2596***	-0,1099***
	WML	-0,0719***	-0,0324**	-0,0598***	-0,0228
	R ² (adj.)	94,28%	90,50%	94,12%	90,06%
CAPM	α	-0,00017**	0,000076	-0,000067	0,00024***
	MKTRF	1,0609***	1,0188***	1,1308***	0,9953***
	R ² (adj.)	92,67%	90,02%	93,09%	88,47%
Best-in-class					
CARHART	α	-0,000018	-0,000003	0,000059	0,00015*
	MKTRF	0,9334***	1,0599***	1,0344***	1,1007***
	SMB	-0,3802***	0,1601***	-0,1508***	0,3856***
	HML	0,1043***	-0,1403***	0,2320***	-0,1287***
	WML	-0,0627***	-0,0535***	-0,0584***	-0,0236*
	R ² (adj.)	94,59%	90,71%	94,08%	90,34%
CAPM	α	-0,00013*	0,00002	-0,00003	0,00023***
	MKTRF	1,0722***	0,9946***	1,1337***	0,9692***
	R ² (adj.)	93,20%	90,29%	93,22%	88,88%

*, **, *** indicate statistical significance at respectively 10%, 5% and 1% level.

Appendix 9: Detailed regressions results

Table 9-1: Detailed regression results of the equally weighted high 10% portfolio (positive screening)

<i>Regression Statistics</i>	
Multiple R	0,962871194
R Square	0,927120936
Adjusted R Square	0,926980784
Standard Deviation	0,003686274
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,359560684	0,089890171	6615,108061	0
Residual	2080	0,028264324	1,35886E-05		
Total	2084	0,387825007			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	4,77386E-05	8,11196E-05	0,588496977	0,556262658	-0,000111345	0,000206823
Mkt-RF	0,994795007	0,01045122	95,18457956	0	0,974299065	1,015290949
SMB	-0,213880222	0,023930215	-8,937663899	8,55563E-19	-0,260809891	-0,166950553
HML	0,365583001	0,021760187	16,80054481	1,69068E-59	0,322908986	0,408257017
WML	-0,077204976	0,014478309	-5,332457952	1,07404E-07	-0,105598463	-0,048811489

Table 9-2: Detailed regression results of the equally weighted low 10% portfolio (positive screening)

<i>Regression Statistics</i>	
Multiple R	0,936674167
R Square	0,877358495
Adjusted R Square	0,877122646
Standard Deviation	0,004282232
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,272862121	0,06821553	3720,000169	0
Residual	2080	0,038142015	1,83375E-05		
Total	2084	0,311004137			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0,000181783	9,42341E-05	1,929058477	0,053859505	-3,01989E-06	0,000366586
Mkt-RF	1,123873119	0,012140862	92,5694673	0	1,100063612	1,147682626
SMB	0,430199231	0,027798997	15,47535085	3,25437E-51	0,375682475	0,484715988
HML	-0,012676548	0,025278142	-0,501482605	0,616084588	-0,062249643	0,036896546
WML	0,017202552	0,016819008	1,022804214	0,306519365	-0,015781291	0,050186395

Table 9-3: Detailed regression results of the equally weighted high 25% portfolio (positive screening)

<i>Regression Statistics</i>	
Multiple R	0,970230788
R Square	0,941347782
Adjusted R Square	0,94123499
Standard Deviation	0,003233949
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,349136596	0,087284149	8345,819914	0
Residual	2080	0,021753528	1,04584E-05		
Total	2084	0,370890125			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	2,78986E-05	7,11658E-05	0,392022558	0,695081708	-0,000111665	0,000167462
Mkt-RF	1,022499821	0,009168801	111,519467	0	1,004518838	1,040480805
SMB	-0,161877158	0,020993853	-7,710692936	1,92545E-14	-0,203048312	-0,120706004
HML	0,259603967	0,019090099	13,59888	2,0585E-40	0,222166275	0,297041659
WML	-0,059819577	0,012701746	-4,709555609	2,64646E-06	-0,084729036	-0,034910118

Table 9-4: Detailed regression results of the equally weighted low 25% portfolio (positive screening)

<i>Regression Statistics</i>	
Multiple R	0,949097394
R Square	0,900785863
Adjusted R Square	0,900595067
Standard Deviation	0,003797657
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,272359652	0,068089913	4721,188572	0
Residual	2080	0,02999817	1,44222E-05		
Total	2084	0,302357822			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0,000162428	8,35707E-05	1,943602916	0,052078068	-1,46267E-06	0,000326319
Mkt-RF	1,134819713	0,010767009	105,3978583	0	1,113704476	1,15593495
SMB	0,426859968	0,024653279	17,31453112	7,52316E-63	0,378512295	0,47520764
HML	-0,109911702	0,022417682	-4,902902063	1,01743E-06	-0,153875134	-0,065948269
WML	-0,022819479	0,014915779	-1,529888508	0,126196387	-0,05207089	0,006431932

Table 9-5: Detailed regression results of the value-weighted high 10% portfolio (positive screening)

<i>Regression Statistics</i>	
Multiple R	0,95799302
R Square	0,917750627
Adjusted R Square	0,917592455
Standard Deviation	0,003674526
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,313370496	0,078342624	5802,236665	0
Residual	2080	0,028084456	1,35021E-05		
Total	2084	0,341454951			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-7,4237E-05	8,08611E-05	-0,918080428	0,358683203	-0,000232814	8,43401E-05
Mkt-RF	0,910358711	0,010417913	87,38398504	0	0,88992809	0,930789333
SMB	-0,414547199	0,02385395	-17,37855538	2,84211E-63	-0,461327304	-0,367767094
HML	0,116836451	0,021690838	5,386442428	7,99884E-08	0,074298436	0,159374465
WML	-0,095829551	0,014432167	-6,639997153	3,99087E-11	-0,124132549	-0,067526553

Table 9-6: Detailed regression results of the value-weighted low 10% portfolio (positive screening)

<i>Regression Statistics</i>	
Multiple R	0,933544886
R Square	0,871506054
Adjusted R Square	0,87125895
Standard Deviation	0,004652724
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,305397659	0,076349415	3526,883268	0
Residual	2080	0,045027513	2,16478E-05		
Total	2084	0,350425172			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	4,95224E-05	0,000102387	0,483678213	0,628665171	-0,00015127	0,000250314
Mkt-RF	1,128842565	0,013191272	85,57495796	0	1,102973093	1,154712037
SMB	0,20767676	0,030204127	6,875774259	8,12318E-12	0,14844329	0,266910229
HML	-0,022444118	0,027465171	-0,817184696	0,413916476	-0,076306206	0,031417971
WML	0,025430771	0,018274165	1,391624289	0,164185	-0,010406787	0,06126833

Table 9-7: Detailed regression results of the value-weighted high 25% portfolio (positive screening)

<i>Regression Statistics</i>	
Multiple R	0,971034653
R Square	0,942908297
Adjusted R Square	0,942798506
Standard Deviation	0,00300032
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,309239419	0,077309855	8588,153672	0
Residual	2080	0,018723989	9,00192E-06		
Total	2084	0,327963408			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-5,06348E-05	6,60246E-05	-0,766908886	0,443222725	-0,000180116	7,88463E-05
Mkt-RF	0,912590193	0,008506421	107,2825043	0	0,895908206	0,929272179
SMB	-0,400386344	0,019477199	-20,55666957	1,23327E-85	-0,438583179	-0,362189508
HML	0,115566035	0,017710977	6,525107785	8,50975E-11	0,080832946	0,150299123
WML	-0,071857153	0,011784136	-6,097787171	1,27856E-09	-0,094967083	-0,048747224

Table 9-8: Detailed regression results of the value-weighted low 25% portfolio (positive screening)

<i>Regression Statistics</i>	
Multiple R	0,95143404
R Square	0,905226732
Adjusted R Square	0,905044476
Standard Deviation	0,00376648
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,281842314	0,070460578	4966,779274	0
Residual	2080	0,029507654	1,41864E-05		
Total	2084	0,311349968			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	3,66385E-05	8,28846E-05	0,442042	0,658504768	-0,000125907	0,000199184
Mkt-RF	1,098039869	0,010678618	102,8260299	0	1,077097976	1,118981761
SMB	0,209165188	0,024450889	8,554502488	2,25882E-17	0,161214424	0,257115952
HML	-0,123777351	0,022233645	-5,567119111	2,92478E-08	-0,167379867	-0,080174835
WML	-0,03236633	0,014793328	-2,18790049	0,028787779	-0,061377602	-0,003355058

Table 9-9: Detailed regression results of the equally weighted high 10% portfolio (best-in-class)

<i>Regression Statistics</i>	
Multiple R	0,963931924
R Square	0,929164754
Adjusted R Square	0,929028532
Standard Deviation	0,003654583
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,364403253	0,091100813	6820,978209	0
Residual	2080	0,027780428	1,3356E-05		
Total	2084	0,392183681			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	4,62649E-05	8,04222E-05	0,575274801	0,565167684	-0,000111452	0,000203981
Mkt-RF	1,04433891	0,01036137	100,7915895	0	1,024019175	1,064658645
SMB	-0,176826755	0,023724484	-7,453344684	1,32743E-13	-0,223352963	-0,130300548
HML	0,265198212	0,021573112	12,29299763	1,40315E-33	0,222891071	0,307505352
WML	-0,044486016	0,014353837	-3,099242049	0,001966132	-0,0726354	-0,016336632

Table 9-10: Detailed regression results of the equally weighted low 10% portfolio (best-in-class)

<i>Regression Statistics</i>	
Multiple R	0,938258157
R Square	0,880328369
Adjusted R Square	0,880098231
Standard Deviation	0,00406229
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,252498398	0,063124599	3825,223626	0
Residual	2080	0,034324573	1,65022E-05		
Total	2084	0,28682297			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0,000187371	8,93941E-05	2,0960054	0,03620228	1,20593E-05	0,000362682
Mkt-RF	1,095087173	0,011517289	95,08202447	0	1,072500558	1,117673788
SMB	0,456971674	0,026371199	17,32843742	6,09079E-63	0,40525498	0,508688369
HML	-0,037781497	0,023979819	-1,575553887	0,115280724	-0,084808443	0,00924545
WML	0,006504053	0,015955159	0,407645751	0,683575722	-0,024785691	0,037793796

Table 9-11: Detailed regression results of the equally weighted high 25% portfolio (best-in-class)

<i>Regression Statistics</i>	
Multiple R	0,969984839
R Square	0,940870589
Adjusted R Square	0,940756878
Standard Deviation	0,003253223
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,350281684	0,087570421	8274,269862	0
Residual	2080	0,022013601	1,05835E-05		
Total	2084	0,372295285			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	5,85467E-05	7,15899E-05	0,817806264	0,41356149	-8,18487E-05	0,000198942
Mkt-RF	1,034400027	0,009223447	112,1489665	0	1,016311878	1,052488176
SMB	-0,150838161	0,021118976	-7,142304736	1,26361E-12	-0,192254694	-0,109421629
HML	0,23198286	0,019203875	12,08000247	1,60785E-32	0,194322041	0,269643679
WML	-0,058407276	0,012777447	-4,5711224	5,13594E-06	-0,083465194	-0,033349358

Table 9-12: Detailed regression results of the equally weighted low 25% portfolio (best-in-class)

<i>Regression Statistics</i>	
Multiple R	0,950559322
R Square	0,903563025
Adjusted R Square	0,903377569
Standard Deviation	0,003637229
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,257821686	0,064455422	4872,122684	0
Residual	2080	0,027517221	1,32294E-05		
Total	2084	0,285338907			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0,000153962	8,00403E-05	1,923562262	0,054545817	-3,00494E-06	0,00031093
Mkt-RF	1,100695497	0,010312168	106,737543	0	1,080472251	1,120918743
SMB	0,385635252	0,023611827	16,33229185	1,64059E-56	0,339329976	0,431940527
HML	-0,128732784	0,021470671	-5,995750395	2,38175E-09	-0,170839027	-0,08662654
WML	-0,023632791	0,014285677	-1,654299607	0,098217533	-0,051648506	0,004382925

Table 9-13: Detailed regression results of the value-weighted high 10% portfolio (best-in-class)

<i>Regression Statistics</i>	
Multiple R	0,961698505
R Square	0,924864015
Adjusted R Square	0,924719523
Standard Deviation	0,00358702
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,329428268	0,082357067	6400,785041	0
Residual	2080	0,026762764	1,28667E-05		
Total	2084	0,356191032			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-6,48087E-05	7,89354E-05	-0,821034523	0,411720692	-0,000219609	8,99919E-05
Mkt-RF	0,975013144	0,010169818	95,87321396	0	0,955069061	0,994957226
SMB	-0,388815151	0,023285887	-16,69745913	7,78268E-59	-0,434481224	-0,343149077
HML	0,041094465	0,021174288	1,940771997	0,052420887	-0,00043054	0,08261947
WML	-0,028627628	0,014088477	-2,031988878	0,042281631	-0,056256612	-0,000998644

Table 9-14: Detailed regression results of the value-weighted low 10% portfolio (best-in-class)

<i>Regression Statistics</i>	
Multiple R	0,933458844
R Square	0,871345413
Adjusted R Square	0,871098
Standard Deviation	0,004265825
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,256350717	0,064087679	3521,830241	0
Residual	2080	0,037850312	1,81973E-05		
Total	2084	0,294201028			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-2,35911E-05	9,38731E-05	-0,251308097	0,80160074	-0,000207686	0,000160504
Mkt-RF	1,062228306	0,012094347	87,82849443	0	1,03851002	1,085946593
SMB	0,308469854	0,027692492	11,13911505	4,93895E-28	0,254161966	0,362777743
HML	-0,039776575	0,025181295	-1,579608004	0,114348715	-0,089159742	0,009606592
WML	-0,018824774	0,01675457	-1,123560558	0,261329155	-0,051682247	0,014032699

Table 9-15: Detailed regression results of the value-weighted high 25% portfolio (best-in-class)

<i>Regression Statistics</i>	
Multiple R	0,972608223
R Square	0,945966755
Adjusted R Square	0,945862845
Standard Deviation	0,002941513
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,315079263	0,078769816	9103,704785	0
Residual	2080	0,017997202	8,6525E-06		
Total	2084	0,333076466			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-1,7781E-05	6,47305E-05	-0,274692255	0,783579962	-0,000144724	0,000109162
Mkt-RF	0,933352787	0,008339696	111,9168884	0	0,916997767	0,949707807
SMB	-0,380225453	0,019095446	-19,9118393	6,87037E-81	-0,417673631	-0,342777276
HML	0,104309145	0,017363842	6,007261749	2,2214E-09	0,070256824	0,138361465
WML	-0,062698932	0,011553167	-5,426990824	6,39903E-08	-0,085355907	-0,040041956

Table 9-16: Detailed regression results of the value-weighted high 25% portfolio (best-in-class)

<i>Regression Statistics</i>	
Multiple R	0,952491792
R Square	0,907240614
Adjusted R Square	0,90706223
Standard Deviation	0,003632196
Observations	2085

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	0,268390097	0,067097524	5085,901688	0
Residual	2080	0,027441122	1,31928E-05		
Total	2084	0,295831219			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-3,02119E-06	7,99295E-05	-0,037798161	0,969852238	-0,000159771	0,000153729
Mkt-RF	1,059951947	0,010297899	102,9289495	0	1,039756684	1,08014721
SMB	0,16005588	0,023579155	6,78802435	1,47778E-11	0,113814677	0,206297083
HML	-0,140325338	0,021440962	-6,544731469	7,48378E-11	-0,182373319	-0,098277357
WML	-0,053491777	0,01426591	-3,749622397	0,000181938	-0,081468727	-0,025514827

