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AN INVESTORS PERSPECTIVE: CAN AN ESG AWARE INVESTOR ACHIEVE AB-
NORMAL RETURNS ON THE STOCK MARKET?
– THE CASE OF THE APPAREL MANUFACTURERS
AND RETAILERS INDUSTRY

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Abstract

This thesis analyzes the impact of ESG performance on stock returns in capital markets. Datasets of globally listed companies in the apparel manufacturer and retailer are considered. Portfolios with the best (worst) ranked companies in terms of ESG are constructed. The results of four multiple regression models show no significant results for portfolios composed of the best ESG companies in any of the considered industries. Portfolios consisting of the lowest-rated apparel manufacturer and retailer companies generate significantly positive abnormal returns.

Keywords: ESG, Sustainable Finance, Investment Approach, Stock Returns

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Content

1	Introduction	4
2	Background	5
2.1	<i>Concept of Sustainability and ESG.....</i>	5
2.1.1	Development of the term ESG.....	6
2.1.2	Environment	8
2.1.3	Social	9
2.1.4	Governance	10
2.2	<i>Sustainability in the context of investing</i>	11
2.2.1	Main drivers for sustainable investing	11
2.2.2	Investment strategies.....	13
2.2.3	ESG Analysis Tools.....	17
2.2.4	Investment vehicles in sustainable finance	18
2.3	<i>Theoretical Foundation of ESG in an investment context</i>	20
2.3.1	Shareholder Theory	21
2.3.2	Stakeholder Theory.....	21
2.3.3	Agency Theory	24
2.4	<i>Hypothesis Development</i>	26
3	Methodology	27
3.1	<i>Data Collection and Data Preparation</i>	27
3.2	<i>Portfolio Creation</i>	30
3.3	<i>Regression Model Delineation</i>	30
3.3.1	Fama-French Three-Factor Model.....	31
3.3.2	Carhart Four-Factor Model.....	33
3.3.3	Fama-French Five-Factor Model	35
3.3.4	Fama-French Five-Factor Model + Momentum	36
4	Analysis.....	37
4.1	<i>The impact of ESG performance on stock returns in the Apparel Manufacturers and Retailers industry</i>	37
4.1.1	ESG in the Apparel Manufacturers and Retailers industry	37
4.1.2	Dataset Description.....	40
4.1.3	Descriptive Analysis	43
4.1.4	Presentation of Results.....	45

4.1.5	Discussion of Results.....	50
5	Conclusion	53
5.1	<i>Summary.....</i>	<i>53</i>
5.2	<i>Limitations and Further Research.....</i>	<i>54</i>
	References.....	I
	Appendix.....	XV

1 Introduction

The concept of ESG investing refers to the inclusion of environmental, social, and governance aspects within the investment decision of responsible investors. This represents an entirely new and fast-growing investment approach in which companies are evaluated beyond their profitability. BlackRock (2020) categorizes climate risk as major investment risk incorporating the impact of the climate change. Rating agencies have been developing scores that not only consider the environmental impact of companies but also the influence on society. These developments demonstrate the strong interest of the investment industry in this newly formed sector, as it continues to gain momentum through opening opportunities. Additionally, literature has extensively studied the implications for arising ESG issues on investment decision making.

Although this topic is of great importance to numerous actors in the financial industry, such as asset and fund managers, institutional investors, and conscious private investors, the effects on investment performance is not yet fully discovered. Latest research suggests a dynamic relationship between ESG scores and stock performance, resulting in increased stock performance for European companies that engage in ESG measures and disclose their reports (Ye, Song, and Liang 2022). In contrast, most Asian markets do not reward companies with strong corporate social responsibility practices through better stock performance (Yen, Shiu, and Wang 2019). Not only different perceptions in the capital market, but also regulations and the exposure of different industries to ESG are relevant. While literature revealed geographical differences, there is limited research focusing on specific industries on a global level. As geographic boundaries in many industries are disappearing due to globalization, a more holistic perspective is beneficial for investors.

To unfold the potential of ESG performance on stock performance from an international perspective, this thesis investigates effects on stock returns within the global apparel manufacturers and retailers industry.

First, the concept of ESG is introduced and presented within an investment context. Then, investment approaches are highlighted and theoretical foundations in the investment context are presented. The analysis subsequently focuses on stock returns of high and low ESG performing companies across the apparel manufacturers and retailers industry. In addition, the impact of individual pillars environment, social, and governance are described in more detail. Afterwards, the results are presented and discussed. Finally, the findings of this thesis are summarized, and limitations are stated before an outlook to further research is given.

2 Background

This chapter discusses the concept of ESG and further investigates sustainability in an investing context. Therefore, different approaches to the dimensions of ESG establish a fundamental understanding for the subject and its significance in the context of the capital market. Based on a theoretical foundation of ESG in the investment context, hypotheses are then developed.

2.1 Concept of Sustainability and ESG

As a basis for the analysis and to gain a common understanding of sustainability and ESG, the terms need to be discussed and definitions derived. In literature, there is no uniform definition of the term “sustainability” yet. The most universal and globally known understanding goes back to the Brundtland Report of the United Nations in 1987, where sustainable development “meets the needs of the present without compromising the ability of future generations to meet their own needs“ (WECD 1987). Ultimately, it is about responsibly meeting current needs without risking that future generations will not be able to meet theirs. While this suggests sacrifices and trade-offs in terms of environmental actions and resource allocation, sustainability also includes the social and economic dimensions. Accordingly, sustainability consists of three pillars: Environmental, Social and Economic, which are also known as the Triple Bottom Line, as established by Elkington (1998). This emphasizes the importance of social and environmental

goals within any organizations, however only if they amount to the economic goals of a company and ensure long-term survival in the market.

In this context another framework has evolved, that helps understand and measure the degree of sustainability within a company's operations. With growing awareness about environmental (e.g., global warming, loss of biodiversity) and social (e.g., human rights) issues, stakeholder pressure and objections are increasing. From this need, the term ESG has evolved, referring to the three interrelated and interdependent dimensions environment (E), social (S), and governance (G). The OECD (2020, 6) has defined ESG as "an approach that seeks to incorporate environmental, social, and governance factors into asset allocation and risk decisions, so as to generate sustainable, long-term financial returns". Therefore, ESG presents a specific set of criteria in a broader sense than sustainability, as the governance perspective extends to business ethics, stakeholder diversity, and community engagement, among others.

2.1.1 Development of the term ESG

While the term ESG became prominent only within the last decade, the concept is not new but has gradually evolved over time. In the 1970s with the passing of the Occupational Safety and Health (OSH) Act in the United States, the focus on environment, health, and safety in the workplace began (Clark 1999). The aim was to reduce negative externalities on nature and communities, as well as establishing labor and safety standards for all workers. As this developed further, Corporate Social Responsibility (CSR) appeared in the early 2000s. Within that concept, the social perspective is added distinctively while also going beyond legal expectations and compliance (European Commission 2001). Through this voluntary, self-regulated characteristic, sustainable, and responsible actions became much more proactive rather than reactive within an organization's environment. This is also expressed through corporate philanthropy,

such as financial contributions and long-term partnerships with NGOs or employee volunteering. When this was not sufficient for the increasing stakeholder demands, ESG practices expanded as a more quantitative and externally regulated concept.

The updated view on sustainability also included measurable goals within all three dimensions which could even be supported through external audits. Sets of specific KPIs allow for transparency for all stakeholders, simplified comparability within industries, investments and finally compliance with upcoming legislature around sustainability. Indicating the importance of sustainability, ESG created a momentum within organizations. With environmental and social issues presenting some of the most difficult challenges of the decade, particularly investors recognize and value ESG as a key area of focus. This is also reflected in the all-time high of USD 650bn being invested in ESG-focused funds worldwide in 2021, now accounting for 10 % of worldwide fund assets (Kerber and Jessop 2021).

Due to open markets, technologies, regions, policies, and industries there is a dynamic and open approach to ESG. Several ESG categorization schemes have been developed in literature, with the structure of Dimson, Karakaş, and Li (2015) being considered meaningful. Therefore, the following ESG framework with the pillars environment, social, and governance is derived from the author's work. Further adaptations to this are inspired by the CFA Institute (2015), to provide a list of standard ESG criteria. All three ESG components will be explored in-depth with the respective sub-levels in Figure 1 and their implications for an organizations' performance through measurable KPIs. Keeping in mind that the three dimensions are interconnected and interdependent, some indicators refer to more than one dimension and are therefore difficult to categorize.

ENVIRONMENT	SOCIAL	GOVERNANCE
Climate Change Emission accounting and reporting Climate change strategy Ecosystem Service Access to land Biodiversity management Water and waste water management Environmental Mangement Pollution control Waste and recycling Supply chain environmental standards Product opportunities Environmental standards	Human Rights Child and forced labor Community relations Privacy and free expression Security Labor Standards Diversity Inclusion Health and Safety Supply chain labor standards Product and Consumer Responsibility Product safety Society Charity Education Employment	Corporate Governance Audit and control Board composition Shareholder rights Executive compensation Tax transparency Leadership Business Ethics Bribery and corruption Political influence Lobbying Responsible marketing Whistle-blowing system Sustainable mangagement and reporting Disclosure and reporting Governance of sustainability issues

Figure 1: ESG pillars with sub-levels

2.1.2 Environment

The environmental dimension focuses on an organizations effort to minimize its negative impact on nature. Environmental disclosure, according to Burritt, Hahn, and Schaltegger (2002), entails both qualitative and quantitative data that estimates the effects on environment through a company's operations. Focusing on the use of natural resources and negative environmental externalities, reporting also reflects positive sustainability impacts which translate into a long-term business advantage.

In line with the current public responses to the urgency of climate change, the environmental aspect of ESG plays a significant role in the adoption of ESG the economy. Chen and Yang (2020) researched the asymmetric response of investors on ESG disclosure and found that investors overreact to the environmental dimension more than to social or governance factors. With environmental factors being particularly prominent within the ESG framework, the three sub-categories climate change, ecosystem service, and environmental management can be further explored. One of the most important and consequently most reported indicators is emission accounting and reporting, with focus on greenhouse gases. Other key performance indicators are waste amounts and recycling rates, wastewater management and pollution control. Many of

the environmental performance indicators are tangible and quantifiable, setting standards-based and performance-oriented measurements enabling comparability within industries. The indicators can predominantly be applied universally to all industries. Nevertheless, there are some industry-specific environmental issues which need to be evaluated separately, such as biohazards in the medical field or flaring in oil and gas.

2.1.3 Social

The social dimension focuses on the impact and issues around human rights, labor, product safety and quality and workplace health and safety. Over the past two decades, the scope of the social dimension has progressively widened, incorporating impacts of modern supply chain systems and technology adoption. The focus lies on the impact and issues around human rights, labor, product safety and quality, and workplace health and safety. Over the past two decades, the scope of the social dimension was constantly expanded, incorporating impacts of modern supply chain systems and technology adoption. With relationships to employees, community members and financial stakeholders in the focus, Neilan et al. (2020) even suggest that the term ‘stakeholder’ instead of ‘social’ dimension would be more appropriate. Social practices within organizations are often also considered reflecting workplace culture and characteristics like strong bonds and shared values.

The social dimension can be divided into four sub-categories: human rights, labor standards, product and consumer responsibility, and society. Human rights cover child and forced labor malpractice and policies and guidelines for prevention, especially towards suppliers and along the supply chain, community relations, privacy and freedom of expression and security. Diversity and inclusion within the workplace and health and safety standards are addressed within labor standards. Finally, society is all about the community an organization operates in and includes charity, education and employment opportunities. Baier, Berninger, and Kiesel (2020) found “diversity” to be the most reported issues within the social dimension, which is in line

with current discussions about diversity requirements and the findings that diversity is believed to be one of the most important components of a successful board structure (Hartmann and Carmenate 2021). Nevertheless, there are gaps when it comes to quantifying, measuring and reporting the social dimension within organizations, making it difficult to deal with stakeholder expectations. A major challenge is the complex and intangible nature of social phenomena, resulting in a lack of comparable metrics and consistent standards. Many social performance enhancing initiatives are only likely to pay off in the longer-term (O’connor and Labowitz 2017). Besides those issues in the social dimension, it is a not less important aspect of ESG.

2.1.4 Governance

With governance as a well-researched area of study, many definitions of governance have derived. Brickley and Zimmermann (2010, 236) put it in broad terms as “the system of laws, regulations, institutions, markets, contracts, and corporate policies and procedures (such as the internal control system, policy manuals, and budgets) that direct and influence the actions of the top-level decision makers in the corporation (shareholders, boards, and executives)”. Brennan and Solomon (2008) include the perspective of accountability towards all stakeholders and socially responsible actions throughout all business areas. Ultimately, the governance dimension is about accountability and transparency and therefore a vital basis for environmental and social criteria.

Baier, Berninger, and Kiesel (2020) found that 88.9 % of ESG words in financial reports are governance related, with the strongest category of “corporate governance” addressing shareholder-related subcategories. Therefore, the governance pillar is the one which is already integrated to a higher degree into a company’s reporting, compared the social or environmental aspects. It can be explained by mandatory reporting requirements and regulations, with many countries having corporate disclosure codes, laws or stock exchange rules (Inderst and Stewart

2018). These often include governance related metrics like board structure, executive compensation, and director independence. Since some indicators are already part of financial statements, information collection, processing, and disclosure for governance criteria is easier accessible to many organizations.

The developed framework shows the three sub-levels corporate governance, business ethics, and sustainable management and reporting. Derivable KPIs are variable compensation factor, independence of board composition and diversity in corporate bodies.

2.2 Sustainability in the context of investing

Following the classification and definition of ESG, this chapter describes and derives the relationship between ESG and investing from an investor's perspective. Firstly, the main drivers will be highlighted, and then the individual investment strategies will be presented and differentiated. Finally, metrics and investment vehicles are shown in the context of sustainable investing.

2.2.1 Main drivers for sustainable investing

With the importance of ESG and sustainability in today's economy and its impact in global focus, it also expands to the world of finance. Sustainable investing is defined as “a range of practices in which investors aim to achieve financial returns while promoting long-term environmental or social value” (Stobierski 2022, 2). It should be understood as an investment decision based on ESG influenced by all three dimensions (Silvola and Landau 2021a; Global Sustainable Investment Alliance 2018; Talan and Sharma 2019). There are three main drivers that can be identified and are responsible for shaping the relevance of sustainable investing: purpose, regulation, and performance.

As previously described, sustainability is a structural force that is causing a rising awareness for environmental protection, climate change, and social responsibility. This shift in mindset is

also changing the way investors make investment decisions. In addition to achieving a financial return, many of today's investors strive to promote long-term environmental or social value – a purpose. To align with investors ethics, sustainable objectives are integrated into the entire investment process from the mission onward.

The second driver, which is currently also gaining the most momentum, is regulation. The push for that originated in political visions, expressed for example through the 17 Sustainable Development Goals (SDGs) set by the United Nations as part of the Paris Agreement with the goal of ending poverty, protecting the planet, and ensuring peace and prosperity until 2030 (United Nations 2015). According to SDG Impact (2018) these ambitions will need between USD 5tn and 7tn of investments per year by governments, agencies, and the private sector's assets. While this is a more general approach, it still signals a political push towards sustainable investments. More recently, regulations are shifting towards concrete legislation and efforts that incorporate sustainability transparently into investment information and decision making. A pioneer for this is the European Union with the regulation EU 2020/852 ("EU Taxonomy"). The goal is to establish a common understanding of sustainability to determine whether an economic activity can be considered sustainable or not (Bengo, Boni, and Sancino 2022). Thereby, investors can benefit from standardization which creates security for investors and protects them from greenwashing (European Commission 2020).

The third driver comes from the proven performance increase when integrating an ESG approach into the classical investment approach. Comparing the results of various studies, most literature concludes positive and significant results. J.P. Morgan (2016) also finds a high degree of overlap when considering the impact on total price returns. Caused by different methods and observation scopes, it is not possible to draw a generalized conclusion since several other results in literature show either no significant relationship, or a negative and significant relationship (Giannopoulos et al. 2022; Hvidkjær 2017; Boffo and R. Patalano 2020a). However, based on

the majority of research, ESG should be important for all types of rational investors to fulfill their fiduciary duties and better align their interests with the broader goals of society (Friede, Busch, and Bassen 2015).

With this broader understanding a more comprehensive analysis is needed to make better investment decisions (Stobierski 2022). Therefore, the traditional investment criteria profitability, liquidity, and security are extended by an additional criterion, sustainability, as shown in Figure 2 according to Bruns and Meyer-Bullerdiek (2020):

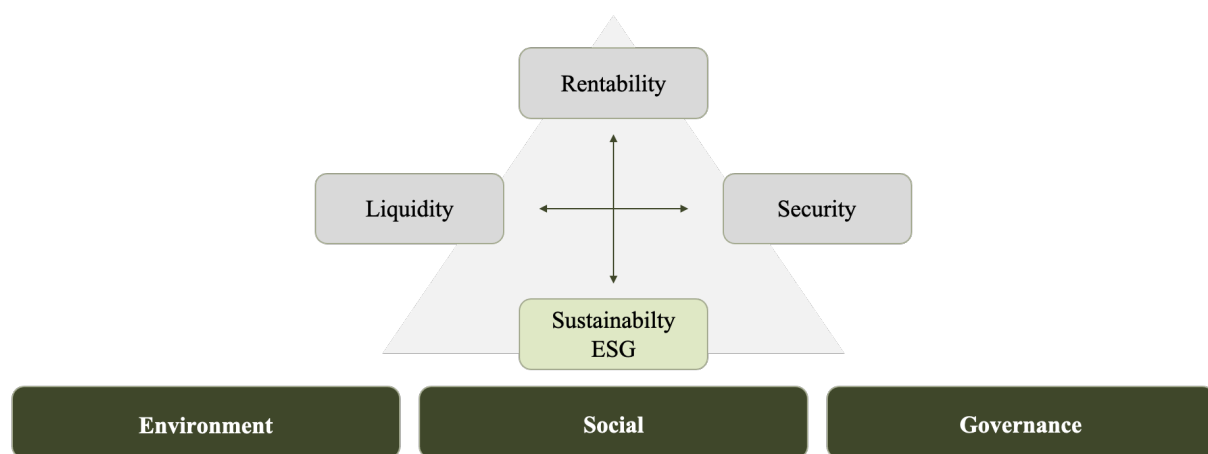


Figure 2: Magic triangle of investments extended by ESG criteria

2.2.2 Investment strategies

An investment strategy supports individual investors in achieving their financial aspirations. Investment strategies are always based on individual preferences, risk tolerance, and available capital. Sustainability can be included in the development of an investment strategy through various methods.

Sustainable investments contemplate multiple approaches, referring to “socially responsible investing” (SRI), “ESG investing”, and “impact investing” that often are used synonymously (Caplan, Griswold, and Jarvis 2013). Since all investment approaches refer to the three ESG factors and include them as a fundamental influence, the separation is further complicated. The

various approaches combine different strategies shown in Figure 3, which form the foundation for investment decisions.

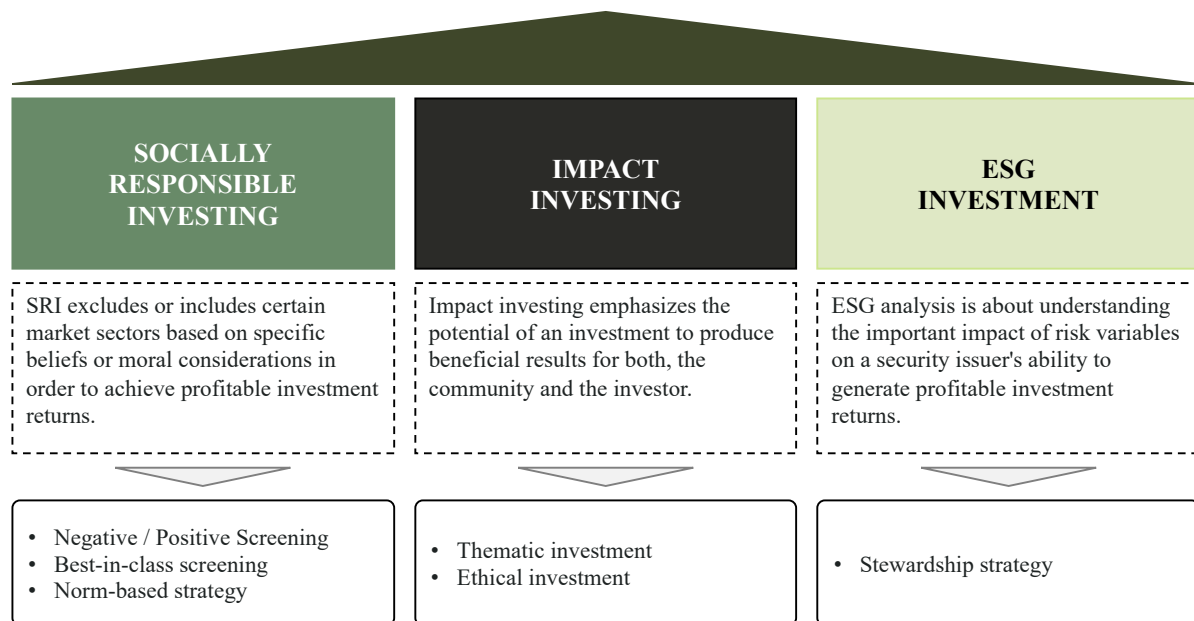


Figure 3: The three different sustainable investment approaches

(Based on Breckinridge Capital Advisors 2022)

Socially responsible investing

In the process of SRI an investor includes or excludes specific stocks from their portfolio premised on individual values and moral considerations, known as positive and negative screening (Nakajima 2021; Caplan, Griswold, and Jarvis 2013). Negative screening represents the simplest of selection strategies for sustainable investments. Thereby, an investor excludes specific shares or securities from their portfolio at their own discretion. Commonly, companies associated with “weapons, nuclear power, child labor, alcohol, tobacco and gambling are excluded from the portfolio” (Nakajima 2021, 6). However, no clear distinction is made on either the company itself or the company's environment with its suppliers and retailers should be excluded (Häßler and Wilhelm 2017; Silvola and Landau 2021; Inderst and Stewart 2018). Today, companies are increasingly turning away from negative screening. Additional characteristics are

sought that include other criteria that allow for deeper and more specific selection of portfolio companies (Caplan, Griswold, and Jarvis 2013).

Negative screening is contrasted with positive/best-in-class and norm-referenced screening. Positive/best-in-class screening involves investing in sectors, companies or projects attributed to their positive ESG performance relative to peers across all industries. Although companies with positive ESG performance are expected to have excellent financial performance in the medium to long term, the number of companies eligible for investment is comparably small (Louche, Arenas, and van Cranenburgh 2012; Inderst and Stewart 2018).

The norm-based strategy reviews investments against minimum standards of business practices based on international norms issued by the Organization for Economic Cooperation and Development, the International Labor Organization, the United Nations, and the United Nations Children's Fund. The United Nations Global Compact, officially launched in 2000, represents international standards. It provides wider investment scope than the positive/best-in-class screening and is mainly used in Europe (Nakajima 2021).

Impact Investment

Impact investments focus on tangible social benefits, thereby complementing the approach of SRI. The aim is to help organizations to generate positive, measurable social and environmental impact in addition to financial return (Barber, Morse, and Yasuda 2021). Efforts are directed to balance economic and social benefits, with different weightings. Therefore, the financial aspect is not the sole purpose and investments do not have to generate high returns (Louche, Arenas, and van Cranenburgh 2012; Caplan, Griswold, and Jarvis 2013).

Besides SRI strategies primarily that are focused on constructing investment portfolios by including or excluding various criteria, a thematic investment strategy can be applied. Consequently, portfolios are constructed by investing in topics or assets that are directly related to the promotion of sustainable development and have an ESG connection. For example, investments

in renewable energy generation assets, green technologies, sustainable education, culture or social projects are recognized (Häßler and Wilhelm 2017; Nakajima 2021). Additionally, impact investing incorporates ethical investing, based on moral and ethical principles and values of the investor, which may include religious beliefs (Michelson et al. 2004).

ESG investment

The ESG investment approach explores how a company's performance is impacted by the three factors E, S, and G (Caplan, Griswold, and Jarvis 2013). Thus, ESG analysis materializes the impact of risk factors on financial health of a security issuer and its ability to generate positive investment returns. Despite the often-synonymous use, ESG investments form a broader approach pursuing profits (He, Liu, and Hamori 2021; Nakajima 2021).

The literature stresses the importance of combining traditional investment approaches with ESG insights. Governance is also included in this perception but is not clearly and specifically defined and delimited (Official Journal of the European Union 2019a; Messini et al. 2020). Nevertheless, investors should pay attention to good governance practices according to the precautionary principle (Official Journal of the European Union 2019; Global Sustainable Investment Alliance 2018). As part of the ESG investment approach, the stewardship engagement strategy describes the dialogue on ESG issues between stock issuers and investors, through ownership and "say-on-pay" rights. By addressing perceived shortcomings in sustainability performance, investors aim to contribute to their elimination (Inderst and Stewart 2018; Häßler and Wilhelm 2017; Nakajima 2021).

Concluding, sustainable investing can be seen as an umbrella and ESG as a data toolkit to identify solutions (BlackRock 2022). Thus, this thesis builds on the broader understanding that ESG investments aim for returns, financially, socially, and environmentally, showing a significant difference to traditional investments.

2.2.3 ESG Analysis Tools

For investors, ESG information of individual companies is difficult to understand and evaluate. Since it often cannot be classified in regulatory terms, helpful metrics from established independent agencies can be used as a tool (Busch, Bauer, and Orlitzky 2016). The most popular tool for quantifying ESG data, are ESG ratings which consolidate different ESG risks into a single number (Boffo and Patalano 2020). Based on ESG scores, investors can better compare investment products, make more informed decisions, and derive actions from them.

Relevant criteria are specified and reviewed for each of the three pillars, E, S, and G, during ESG score assessment procedures. For example, a bad environmental record leaves a corporation more exposed to fines and lawsuits, lowering the E score. Many staff absence days might have a negative influence on the S score since it reflects poor employee treatment. The G score considers elements such as wage differences that cannot be traced and fraud (Boffo and R. Patalano 2020). These factors are combined to provide several sub-metrics that can be allocated to one of the three pillars. The ESG score is then calculated by combining the individual sub-scores.

Determining which data is included in the rating, how the individual metrics are weighted, and how comparable the scores are between different industries resides with the individual rating providers (Bloomberg 2020; MSCI 2022a; Sustainalytics 2022). Currently, rating agencies and the ESG ratings they produce, are in a transitional phase. This is due to ratings becoming more and more comparable with each other, but not yet being completely substitutable (Boffo and Patalano 2020). Among the most well-known and relevant providers at present are Bloomberg, Refinitiv, Thomson Reuters, MSCI and Sustainalytics. Despite different indicators being used to determine ESG scores, the focus for rating agencies and investors is on identifying the companies with the highest ESG compliance.

Other ESG indicators are ESG or SRI indices. These use comparative models that compare the performance of SRI portfolios to either conventional portfolios or market benchmarks. The most used SRI indexes are Domini400 (based on KLD data), FTSE4Good (data from EIRIS), and Dow Jones Sustainability Index (data from SAM) (Widyawati 2020).

In addition to the previously mentioned ESG ratings and indices, there are further methods such as sustainability labels and sustainability-based impact assessments, which focus on social and environmental impact (Popescu, Hitaj, and Benetto 2021). Sustainability labels, unlike ESG scores, are not independently determined but are awarded upon application for a fee. Based on underlying data, it is checked whether all criteria for this seal are fulfilled (Becker, Martin, and Walter 2022; Popescu, Hitaj, and Benetto 2021).

2.2.4 Investment vehicles in sustainable finance

By consciously deploying capital, the financial sector has the power to actively shape the economic model and the environment in which it operates. To create value in the short- and long-term and build a resilient economy, all three factors need to be balanced with the financial aspect (Sandberg et al. 2009). Successful implementation of ESG strategy enables companies to attract new capital on the market, to engage employees efficiently and optimize business processes. In most legal systems, the appointment and removal of board members is carried out through election during the general meeting, assigning investors a great deal of power indirectly. Due to greater awareness among investors, their decision-making power is exercised to an increasing extent. Shareholder activism is driving companies to adopt more sustainable practices (Kai H.E. Liekefett 2021).

To understand how ESG shapes investment decisions, it is important to first understand which investors are considering ESG issues predominantly and what their motives are. Here, a distinction is made between two types of investors: institutional and private investors. According to Boston Consulting Group (2021), institutional investors accumulate USD 61tn of assets

whereas private investors represent USD 42tn with an even growing importance. A survey from Amel-Zadeh et al. (2018) has shown, that the dominant type of investor among institutional investors besides corporate pension funds, public pension funds, charity and family offices are asset managers. In Europe, major ESG adoption factors are given through local regulations, mitigation of ESG risk and avoidance of reputational risk as well as their fiduciary duty. Among private investors, hedge funds and specialized private equity funds are explicitly investing into ESG, driving the demand for a sustainable approach in investing due to their strategic positioning to integrate that trend towards established investment standards (Alfonso-Ercan 2020).

Not only the investment philosophy but also the investment vehicles available to the type of investor is varying. Institutional investors are investing capital from third party investors and are mainly investing their assigned capital on the stock market. In comparison, private investors are individuals that invest their own capital directly on the stock market, in retail funds (Jansson and Biel 2011) or private companies. Within this study, only investments into the stock market are considered since these entail beneficial characteristics especially for private investors as opposed to direct equity investments in the traditional context of private equity and venture capital. Assets being broadly accessible for private investors are categorized into four different asset classes: stocks, bonds, options, and derivatives.

A stock represents the ownership of a fraction of a company, where multiple shares aggregated by one investor form a portfolio. The traditional investor always selects the portfolio that maximizes expected return (Nagy and Obenberger 1994). ESG criteria are supposed to characterize unrepresented topics within environmental, social, and governance areas, reflected for each company. These dimensions are now brought together through a new consciousness, when making an investment decision. In literature, the impact of ESG scores on stock performance has been studied extensively to put that relation into context. Kempf and Osthoff (2007) and Eccles et al. (2011) found evidence that good ESG performance can create a positive impact on

stock performance. To balance risk and reward within a portfolio, investors are investing in different asset classes to diversify their assets and limit individual asset exposure (Goetzmann and Kumar 2008).

Bonds are fixed income instruments that enable companies to borrow funds on the capital market while debtholders, typically investors, receive a fixed interest rate. In sustainable finance, bonds have a special significance since green bonds offer investors a viable investment opportunity into environmental projects. Investments in green bonds by governments are pioneering this trend, encouraging private capital to invest in green assets. Over the past few years, the rapid growth in corporate green bonds also reflects the popularity with investors. While in 2013, only USD 5bn in corporate green bond were issued, it soared to USD 95.7bn by 2018 (Flammer 2021). This trend has remained strong, putting global green bond volume at USD 422bn to date (Matthew Toole 2022). Environmental projects that corporates typically engage in are the use of renewable energy and improvement of energy efficiency in their operations.

Finally, derivatives and options can be considered as efficient investment vehicles on the stock market. These financial contracts are predominantly used to hedge investment risk associated to underlying assets traded on the stock market and can complement an investor's investment strategy.

This thesis focuses on investments in the stock market, since the stock market provides a high degree of liquidity and short investment cycles whereby no long-term capital commitments are required, providing investors with a high degree of flexibility.

2.3 Theoretical Foundation of ESG in an investment context

In the following, ESG in an investment context is presented and the shareholder, stakeholder and principal agent theory will be examined in more detail.

2.3.1 Shareholder Theory

According to Milton Friedman (1970), the only purpose of business is to maximize shareholder value, forming the foundation of the shareholder theory. It states that the absolute goal and duty of a corporation is to maximize profits for its shareholders. Therefore, shareholders are considered as the only group that a company is socially responsible to. Businesses fulfill their social obligation through maximizing revenues, providing people the most freedom to fulfill their own social responsibilities (Friedman 1970). Maximization of shareholder value can be operationalized through the maximization of the present value of all future cash flows (Tse 2011), as demonstrated in the equation (1) below:

$$(1) \quad V_0 = \frac{CF_n}{r-g}$$

where V_0 represents a firm's value today, CF_n all future cashflows, r the investor's required return and g the growth rate. Hence, shareholder value can be either increased by expanding future cashflows, boosting the growth rate or lowering investor's required return. According to Rappaport (1998) a company's ability to generate economic value for shareholders is the only way to measure its performance. However, shareholder theory disregards that shareholders and corporates may have other objectives that are not based on financial performance to ensure long-term success.

2.3.2 Stakeholder Theory

Besides generating profits for shareholders, several other important factors need to be considered for the prosperity of any organization. The increasing awareness towards the impact of companies on communities and countries, driven by the rise of globalization and continuous innovation through technology, results in an altered understanding of business. Consequently, the transition from the traditional shareholder theory towards the stakeholder theory was initiated. First presented by Freeman (1984), the stakeholder theory suggests that a business has,

besides shareholders, several additional groups of stakeholders to serve and is only considered successful when it creates value to most stakeholders. A corporation's stakeholders can be classified into two main groups: internal and external stakeholders. Employees, managers, and owners can be assigned as internal stakeholders through their direct relationship with the company and are interested in the company's performance to guarantee to be paid, achieve a return and retain their jobs. External stakeholders are not involved in the operations or decisions of a company but are affected by actions and outcome of a business in multiple ways. Although they do not have any direct financial stake in the company, suppliers, customers, creditors, communities, and the government all have a vested interest in the long-term success of the company. The most effective businesses are successful at managing the expectations and interests of all their stakeholders. Nevertheless, not all stakeholders are always equally important and require managerial attention in the same extent. To effectively manage all relationships simultaneously and prioritize stakeholders under situational uniqueness, Mitchell et. al (1997) developed a dynamic model to classify stakeholder according to power, legitimacy, and urgency.

In literature, power is described in different scenarios and receives multiple definitions. Even though it may not be easy to define, power is easy to recognize, being "the ability of those who possess power to bring about the outcomes they desire" (Salancik and Pfeffer 1974, 3).

Legitimacy explains an organization's behavior of disclosing environmental and social information to attain to their social commitment to recognize their objectives and assert in an unpredictable environment. Suchman (1995, 574) declares, that "Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions". Governing the interaction with society, legitimacy is establishing a mutual basis for interaction and acceptable behavior. As a part of the community, companies must adapt their behavior according to norms and values to satisfy the expectations. Through active social and environmental efforts, it has

been shown that resource allocation is beneficial for companies that engage in this area, resulting in a deep interrelation among profit and legitimacy (Milanes-Montero and Perez-Calderon 2011). The community legitimizes an organization through its rational and legal framework and may serve as a strategic component to develop the organization further. By disclosing their social responsibility, valuation from an investor's perspective and the perceived value from society can be increased (Reverte 2016). Considering legitimacy provides managers with a helpful framework to prioritize stakeholders and bundle capacities.

Lastly, urgency expresses a time condition, in which a stakeholder claims a call for immediate action, whereas not only the time constant is considered but also the importance of the relationship. The state of urgency defines modern societies and organizations, confronting involved parties with varying degrees of urgency, requiring different levels of attention (Roux-Dufort 2007).

Aggregating those attributes in stakeholder salience, the authors provide managers with a powerful tool to identify and handle individual stakeholder classes (Mitchell, Agle, and Wood 1997). Generally, stakeholders demonstrate a high degree of salience, the more of these characteristics a stakeholder is considered to possess. According to their salience, stakeholders are prioritized. Since organizations are dependent on divergent interests in their environment, the allocation of managers attention is crucial in stakeholder management, in which salience is only intended to provide guidance. Ultimately, managers decide on the stakeholder that must be prioritized in a specific context. As these relations and perceptions are not static and change continuously, it must always be acknowledged that every situation requires individual examination, as the amount of attention required may vary from time to time, depending on the circumstances.

Despite the above-described heuristic, the environment around the company needs to be taken into consideration, yet beyond the societal aspect and community values to satisfy stakeholders

and generate a better financial performance. Other areas consider environmental and governance performance to complement social perceptions through an organization's legitimacy. Ghoul et. al (2017) figured those activities across all the environmental, social and governance dimensions positively affect company performance through maintaining profitability while simultaneously contributing to the resolution of conflicts between stakeholders. A corporation can engage in individual E, S, and G activities at various levels since the ESG score is based on a company's performance in the environmental (E), social (S), and governance (G) sub-factors in equal measure (Humphrey, Lee, and Shen 2012).

2.3.3 Agency Theory

Stated above, managers of a company have significant decision-making power not only in the prioritization of stakeholders, but also in the strategic and operational steering of a company. With divergence of interests among multiple stakeholders, a problem arises which is known as the agency theory (Jensen and Meckling 1976). The principal-agent theory is based on a contract whereby the principal hires the agent to perform a task on their behalf. This problem could occur in many situations, whereas the most known scenario is the ownership of an asset where the principal is the owner that delegates direct control over that asset to a third party, the agent. Translating that into the context of a company, shareholders act as the principal, appointing a manager (agent) to control their asset, the company. Asymmetric information distribution and opportunistic behavior on the part of the agent are characteristic of the relationship between principal and agent (Eisenhardt 1989). The theory states that managers tend to favor their own interests over the interests of the organization, due to having more information available than the owners and stakeholders. The opportunistic disposition of the agent thus entails the risk that the agent might not act in the principal's interest, resulting in hidden actions where only the results are visible to the principal.

To address these issues, agency theory suggests that conflicts of interest are effectively mitigated by functioning control mechanisms such as corporate governance systems and incentives for the agent (Jensen and Meckling 1976). Through improved board monitoring, the financial performance of an organization can be impacted significantly (Carter, Simkins, and Simpson 2003) and reduce agency conflicts. However, ESG activities potentially create a proxy problem between managers and shareholders since no longer only the shareholder's interests and expectations are satisfied but also environmental and social aspects of all stakeholders (Givel 2007). Therefore, ESG expenditures are not in the best interest of shareholders as the direct outflow of financial resources will reduce profits (Peng and Isa 2020). Furthermore, investing into ESG activities might open three different agency problems.

First, managers might spend company resources to improve their social perception in society, thus following their own interest to obtain a private benefit. Secondly, investing in ESG activities could create a lack of funds for more profitable projects (Schuler and Cording 2006), causing a decline in financial returns. In the long-term, that might create a competitive disadvantage for companies active in the ESG field since capital and other resources are spent (Allouche and Laroche 2006), reducing the budget for further innovation. Lastly, managers tend to cover bad financial performance by engaging in ESG activities, shifting the public's attention towards the engagement in socially esteemed topics.

To counteract drawbacks attached to ESG activities and encourage companies to deliver positive impact to society, regulators around the world introduce legislation requiring companies to disclose their environmental, social, and governance activities. In 2020, the European Union released the sustainable finance taxonomy to facilitate sustainable investment (European Commission 2020), alluding to the signaling theory. Signaling is a mechanism based on information exchange within a business transaction, reducing information asymmetry and opportunistic behavior by sharing information voluntarily with external stakeholders (Hahn and Kühnen 2013;

Marcus M. Neumann 2007). Signals are properties or activities that convey information about the characteristics of an economic agent and are subject to the agent's influence (Spence 1973). Ching and Gerab (2017) figured, that managers effectively disclose information on their sustainability engagement to signal their commitment towards their stakeholders. Thus, the company gains a positive reputation among its stakeholders and increases its creditability, being rewarded with better performance. Moreover, companies that do not take those factors into account are disciplined by the market, resulting in decreasing sales that will eventually decrease performance.

2.4 Hypothesis Development

No consensus in literature regarding the interrelation among ESG activities and financial performance can be found. The ambiguity even within independent theoretical frameworks concerning the above is mainly justified by two aspects. The complex environment in which companies operate in is characterized by constant change, pressure to innovate and an increasing awareness of all market participants exerting strong pressure. As a result, uncertainty is increasing, and proven principles and guidelines are being partially abrogated, complicating managing the business and meeting expectations. Secondly, the natural complexity of the numerous relationships. With an enhanced focus on environmental and ethical issues in an increasingly transparent world, new stakeholders appear, and the balance of power alters, requiring rebalancing and re-managing relations. Whereas in the past companies focused mainly on generating profit for their shareholders, they are now facing increased pressure from various stakeholders such as suppliers, employees, and investors (Kolk and van Tulder 2010). The relation between ESG activities and financial performance is impacted directly or indirectly by geography, stakeholder sensitivity, industry, and legal framework.

In order to contribute to the existing discussion in the literature, this study examines the impact of ESG ratings on stock performance from an investor's perspective with special attention to

the apparel and retail industry. The hypotheses established to study the relationship are listed below:

H₁: There is a positive relationship between ESG performance and stock returns

H_{1a}: There is a positive relationship between environmental performance and stock returns

H_{1b}: There is a positive relationship between social performance and stock returns

H_{1c}: There is a positive relationship between governance performance and stock returns

3 Methodology

In the following chapter, the previously developed theoretical foundations are substantiated by means of an empirical study. A multiple linear regression analysis is used for this purpose. The data collection and cleaning process as well as the portfolio creation and model setup are presented within this chapter.

3.1 Data Collection and Data Preparation

ESG Score

The Bloomberg database was used to collect data on ESG performance. Bloomberg's environmental, social, and governance (ESG) data collection includes ESG indicators and ESG disclosure ratings for over 14,000 companies across more than 100 countries (Bloomberg 2022b). All disclosed companies can be divided into industry categories and their corresponding subcategories. This thesis focuses on the ESG performance of companies in the global Apparel Manufacturer and Retailer industry.

The Bloomberg data is disclosed in the three sub-dimensions environment, social and governance. To report transparently and consistently, Bloomberg collects ESG information through the company's sustainability reports, annual reports, and websites as well as through press releases, third-party research, and direct communication (Wong et al. 2021). Some of the metrics

collected are measured quantitatively (e.g., waste disposal or water use), while other information is measured qualitatively (e.g., if the organization has a policy on child labor) (Tamimi and Sebastianelli 2017). As Bloomberg's ESG database has developed, there are over 120 data points with measurements (Wong et al. 2021) known as "Bloomberg indicators" which disclose ESG activity. The environment score incorporates criteria like air quality, waste and water management, and ecological impact. The social score addresses issues like ethics and compliance, safety management, and occupational health, and operational risk management. Meanwhile, the governance score is divided into the three sub-issues board composition, shareholder rights, and executive compensation, which each get an individual score assigned. A more detailed score structure of the three ESG dimensions is illustrated in Appendix A.

Adding to these general metrics, Bloomberg incorporates industry-specific criteria, based on a detailed assessment of each industry's material sustainability issues (Bloomberg 2020). All indicators for each dimension are reflected within a single score that ranges from 0 to 10, with 10 being the highest score that can be achieved (Wang and Sarkis 2017), except governance. For this pillar, a score is assigned for each of the three sub-issues. To derive an overarching ESG score later on, the governance sub-issues are summarized in a single governance score by calculating the unweighted average. Afterwards, the collected data is cleaned to obtain a balanced panel data set, through excluding companies with missing ESG data. The overall ESG score is derived by calculating the average across the environment, social, and governance score, weighting each category in the same magnitude.

Bloomberg publishes data on ESG performance of individual companies from 2015 onwards. Publication of ESG scores for the current year takes place at the end of the following year, therefore the data series considered for the analysis only reaches to 2020.

Market Capitalization

The market value of a company is known as market capitalization and is calculated by multiplying the number of shares with the share price (Companisto Glossar 2022). Market capitalization is a simple way for investors to determine the size of a company, which can help assess the risk of investing (IG Glossar 2022). The market capitalization for every company conserved, is also obtained from Bloomberg on an annual basis. In case there was no market capitalization available due to IPOs after 2015, the company was removed from the dataset. Based on the stock exchange the company is listed on, the market capitalization was converted into USD for better comparability, using the average exchange rates from 2015 to 2020 (OECD, 2022).

Total Monthly Return

The monthly return is the period return rescaled to a one-month period. This allows investors to compare the returns of different assets they own (Smyth 2021). It is calculated as follows:

$$(2) \quad r_t = \frac{P_t}{P_{t-1}} - 1$$

Where:

r_t = total return at month t

P_t = adjusted stock price at month t

The adjusted monthly stock prices are also obtained from Bloomberg. The data scope in this thesis includes all data from 01.01.2015 to 31.12.2020 and thus covering a period of five years. Companies with incomplete data series are removed from the data set. Stock prices are stated in the currency of the country in which the security is listed. However, the conversion to USD is not necessary for total monthly returns as it expresses a ratio that measures the change in value.

3.2 Portfolio Creation

For each dimension and year, an upper (lower) portfolio of companies whose ESG (environment, social, governance) performance is among the best (worst) of all companies is constructed. The stocks are held for one year within the portfolios before they are being rebalanced according to changes in ESG ratings. Variances in market capitalization are captured by weighting portfolios proportionally. As illustrated in Equation 3, this is achieved by dividing the market capitalization of each company by the total market capitalization of all stocks in the portfolio at the time of rebalancing.

$$(3) \quad w_{ijt} = \frac{Market\ Cap_{it}}{\sum_{n=1}^N Market\ Cap_{it}}$$

Where:

w_{ijt} = weight of company i in portfolio j at year t

$Market\ Cap_{it}$ = Market Capitalization of company i at year t

Thus, the monthly return of a portfolio is the sum of the weighted total monthly returns of all stocks in the respective portfolio.

3.3 Regression Model Delineation

To estimate abnormal portfolio returns of the previously constructed upper (UP) and lower (LP) ESG portfolios, Fama-French three-factor model (FF3), Carhart four-factor model (Carhart), Fama-French five-factor model (FF5), and a combination of Fama-French five-factor model and Carhart four-factor model (FF5 + MOM) are applied. The models attempt to explain stock return dispersion by incorporating explanatory variables that describe stock price fluctuations with risk variables. Using the market as performance benchmark, the models reveal if the market is valuating ESG scores so that either companies with high/low ESG scores can achieve excess returns on the capital market. The model was built in Python applying ordinary least square regressions (OLS) to determine the coefficients of the respective factors and intercepts.

Appendix B shows the Python code for determining the factors and intercepts of FF3 for an ESG UP, as a proxy for all other models and portfolios evaluated. The requisite risk factors used in the models are sourced from the Kenneth R. French data library (French 2022).

3.3.1 Fama-French Three-Factor Model

In 1992, Eugene F. Fama and Kenneth R. French developed a three-factor model which explains stock returns based on three factors (Mondello 2017). They concluded in numerous cross-sectional linear regressions on the US stock market that the beta factor alone is not sufficient to fully explain market returns (Fama and French 1993). Two groups of shares in particular show significantly higher returns than other shares on the market. First, shares of small companies with a low market capitalization. This finding is referred to as the size effect. Secondly, there are shares of companies with a high book-to-market ratio of equity. This effect is referred to as the value effect (Vorfeld 2008).

Companies with low market capitalization risk having no or insufficient access to the credit market, which could limit their ability to adapt towards a changing business environment. Securities with a high book-to-market ratio usually are undervalued on the capital market, for example due to fundamental financial difficulties (Scheld 2013). The FF3 includes both above mentioned effects and extends the traditional CAPM approach. The two risk factors represent a return compensation for the risk of losing profit due to high market capitalization and low book-to-market ratio (Mondello 2017).

Portfolio returns are explained in FF3 model applying the following three risk factors (Mondello 2017; Vorfeld 2008):

- *Market or R_M (Market Risk Premium)*: It refers to the excess return of the market and is calculated as the difference in return between a market-weighted stock index and a risk-free investment.

- *Size or SMB (Small Minus Big)*: It refers to the size premium and describes the difference in returns between a portfolio consisting of shares of companies with a small market capitalization and a portfolio consisting of shares of companies with a large market capitalization.
- *Value or HML (High Minus Low)*: It refers to the value premium and results from the difference in returns between a portfolio consisting of shares with a high book-to-market ratio of equity and a portfolio consisting of shares with a low book-to-market ratio of equity.

If a long-short portfolio has a net investment of zero, the three risk factors can be considered as the average return of this portfolio. R_M embodies a long position in the market portfolio and a short position in risk-free assets (Mondello 2017). The size premium is the average return that results from a short position in stocks with large market capitalization. The inflow of money resulting from the short sale is invested in securities with small market capitalization (Fama and French 1993). The value premium embodies the average return resulting from a short position in securities with a low book-to-market ratio, with the resulting cash inflow being invested in securities with a high book-to-market ratio (Mondello 2017).

The FF3 of Fama and French (1993) can be represented as follows:

$$(4) \quad R_{j,t} - R_{f,t} = \alpha_{j,t} + \beta_{j,M} \cdot (R_{M,t} - R_{f,t}) + \beta_{j,SMB} \cdot SMB_t + \beta_{j,HML} \cdot HML_t + \varepsilon_{j,t}$$

Where:

$R_{j,t}$ = total return in month t of individual portfolio j

$R_{f,t}$ = risk free asset return

$R_{M,t}$ = total market portfolio return

$R_{j,t} - R_{f,t}$ = expected excess return

$R_{M,t} - R_{f,t}$ = excess return on a market portfolio index

SMB_t = size premium at month t

$HML_t = \text{value premium at month } t$

$\beta_{j,i} = \text{sensitivity of portfolio } j \text{ to the respective risk factor } i; i = M, SMB, HML$

$\alpha_{j,t} = \text{intercept}$

$\varepsilon_{j,t} = \text{error term}$

The beta factors represent the slope in the regression. This measures the extent to which a security is exposed to the respective risk, e.g., market risk (Vorfeld 2008). Since the FF3 explains stock return by two additional risk factors (SMB and HML), the beta for the expected market risk premium ($\beta_{j,M}$) no longer matches that from the CAPM (Mondello 2017). The other betas ($\beta_{j,SMB}$ and $\beta_{j,HML}$) are also estimated via linear regression. The changes in the return of the specific value of a security compared to the changes in the return of the risk factors SMB and HML are crucial here (Stahl 2016). The beta factor $\beta_{j,SMB}$ incorporates the company size effect and is thereby higher the lower the market capitalization of the company under consideration. The beta factor $\beta_{j,HML}$ accounts for the book-to-market value ratio and is higher the higher the book-to-market value ratio of the company (Stahl 2016).

Here, $\alpha_{j,t}$ represents the expected return arising from company-specific risks not shown in the respective risk factors (SMB, HML) (Stahl 2016). If the risk factors capture the entire variation in expected return, then the intercept $\alpha_{j,t}$ is zero for all portfolios (Mondello 2017). Therefore, the explanatory power of a model is greater the lower $\alpha_{j,t}$ is (Fama and French 1993). Lastly, $\varepsilon_{j,t}$ represents the error term from company-specific risks, in which measurement errors and unobserved influences on the dependent variable $R_{j,t} - R_{f,t}$ are included (Stahl 2016).

3.3.2 Carhart Four-Factor Model

In 1997, Carhart developed the four-factor model. The aim was to be able to estimate expected returns even more precisely by taking into account return patterns that are not described in the FF3. Carhart extended the FF3 by a fourth risk factor, reflecting the short-term momentum

effect (Carhart 1997). Jegadeesh and Titman (1993) demonstrated, that abnormal return resulted from the short-term momentum effect.

The momentum effect describes the phenomenon that stock returns follow their trend in the short-term period of three to twelve months. In the short term, winning stocks tend to remain winning stocks and losing stocks tend to remain losing stocks, thus showing consistency (Jegadeesh and Titman 1993). The authors further showed in their studies that a portfolio of stocks that had above-average performance in the past three to twelve months will generate a higher return in the next three to twelve months compared to the portfolio of stocks with below-average past performance (M. X. Hanauer, Kaserer, and Jäckel 2015). Thus, stock returns are positively correlated with past performance (Jegadeesh and Titman 1993).

In addition to the SMB and HML risk factors, the four-factor model adds the MOM (Winner Minus Loser) risk factor. Therefore, the group of stocks with rising prices (momentum), which have conspicuously higher returns than other stocks on the market is included (Mondello 2017). The MOM factor is calculated by taking the difference in return between two short-term portfolios consisting of stocks with a high prior-year performance (winner portfolios) and portfolios consisting of stocks with a low prior-year performance (loser portfolios) (M. Hanauer, Kaserer, and Rapp 2013). This short-term view relates in each case to the previous year (Stahl 2016). In other words, MOM is the difference in return between a portfolio with winning stocks in the long position and a portfolio with losing stocks in the short position (Mondello 2017).

The four-factor model of Carhart (1997) can be represented as follows:

$$(5) \quad R_{j,t} - R_{f,t} = \alpha_{j,t} + \beta_{j,M} \cdot (R_{M,t} - R_{f,t}) + \beta_{j,SMB} \cdot SMB_t + \beta_{j,HML} \cdot HML_t + \beta_{j,WML} \cdot MOM_t + \varepsilon_{j,t}$$

Where:

MOM_t = momentum factor at month t

$\beta_{j,MOM}$ = sensitivity of portfolio j to the risk factor MOM

All further variables have already been described in Equation 4.

Here, the beta factors also represent the slope in the regression that measures the extent to which a security is exposed to the respective risk. The beta factor $\beta_{j,MOM}$ is also estimated via a linear regression and adjusts the expected difference in the returns of the short-term winner and loser stocks individually (Vorfeld 2008). For stocks with a high prior-year price, this leads to a higher beta (Stahl 2016).

3.3.3 Fama-French Five-Factor Model

In the years after the publication of FF3, various scientific studies proved that the computation of the expected stock return with the FF3 is incomplete (Fama and French 2015). Various risk factors have been identified that are supposed to provide noticeably higher returns compared to other stocks on the market. However, many of these risk factors are not universally accepted and can only be demonstrated at certain times or markets (Chiah et al. 2016). For a long time, Fama and French saw no need to revise their three-factor model. Nonetheless, the factors profitability and investment activity caused great stir (Novy-Marx 2013; Titman, John Wei, and Xie 2004) and were reason enough for Fama and French to revise their three-factor model (Fama and French 2015).

The FF5 is based on their FF3 and adds two additional risk factors to forecast expected returns more accurately. First, it is extended to include the risk factor profitability (Fama and French 2015). Studies have shown that shares of companies with high profitability outperform the overall market in the longer term (Novy-Marx 2013). Thereby, profitability is defined as the ratio of gross profit to balance assets (Baron 2020). The RMW (Robust Minus Weak) factor thus represents the expected return difference between stocks with robust and weak profitability (Fama and French 2015). Second, the FF3 is supplemented by the investment activity factor (Fama and French 2015). This factor incorporates that shares of companies with low investments show an above-average performance in the long-term compared to the overall market

and shares of companies with high investments (Titman, John Wei, and Xie 2004). The change in total assets from the previous year is described as investment activity (Fama and French 2015). CMA (Conservative Minus Aggressive) displays the difference in return between portfolios of equities with high and low balance sheet growth (Fama and French 2015).

The FF5 of Fama and French (2015) can be represented as follows:

$$(6) \quad R_{j,t} - R_{f,t} = \alpha_{j,t} + \beta_{j,M} \cdot (R_{M,t} - R_{f,t}) + \beta_{j,SMB} \cdot SMB_t + \beta_{j,HML} \cdot HML_t + \beta_{j,RMW} \cdot RMW_t + \beta_{j,CMA} \cdot CMA_t + \varepsilon_{j,t}$$

Where:

RMW_t = profitability factor at month t

$\beta_{j,RMW}$ = sensitivity of portfolio j to the risk factor RMW

CMA_t = investment factor at month t

$\beta_{j,CMA}$ = sensitivity of portfolio j to the risk factor CMA

All further variables have already been described in Equation 4.

The beta factors again represent the slope in the regression measuring the extent to which a security is exposed to the respective risk. They are also estimated using a linear regression (Vorfeld 2008).

Expanding the FF3 with profitability and investment activity factors, the risk factor HML becomes redundant when describing the average return (Fama and French 2015). It no longer provides any additional information, as Fama and French themselves proved for US stocks. The HML factor is not abdicated, since a globally valid statement could not be provided yet beyond US stocks (Baron 2020).

3.3.4 Fama-French Five-Factor Model + Momentum

Even though the FF5 is well developed and widely accepted in academia (Blitz and van Vliet 2022), it encounters criticism especially in regard to neglecting the momentum risk factor. For

this research, the momentum factor is added as a sixth factor to the FF5 (Dirkx and Peter 2020) to be able to estimate expected returns even more precisely.

The Fama and French (2015) five-factor model combined with the momentum factor of the four-factor model of Carhart (1997) can be represented as follows:

$$(7) \quad R_{j,t} - R_{f,t} = \alpha_{j,t} + \beta_{j,M} \cdot (R_{M,t} - R_{f,t}) + \beta_{j,SMB} \cdot SMB_t + \beta_{j,HML} \cdot HML_t + \beta_{j,RMW} \cdot RMW_t + \beta_{j,CMA} \cdot CMA_t + \beta_{j,WML} \cdot WML_t + \varepsilon_{j,t}$$

All above-mentioned variables have already been described in Equation 5 and Equation 6.

4 Analysis

The following section describes and evaluates the results of the analysis using the model explained in the previous chapter. This thesis focuses on the apparel manufacturers and retailers industry to give a broader impression of the impact of ESG scores on stock performance.

4.1 The impact of ESG performance on stock returns in the Apparel Manufacturers and Retailers industry

This chapter examines the impact of ESG ratings on the stock performance of companies in the global retail industry focusing on apparel, sportswear, and accessories. First, an overview of the retail sector will be given including the relevance of ESG. Then, the processing of the data set as a basis for the analysis is elaborated. After analyzing the results of the regression models described in chapter 3.3, the key indications are presented in a summary.

4.1.1 ESG in the Apparel Manufacturers and Retailers industry

The apparel manufacturer and retailers industry consists of companies that design, manufacture, and sell apparel, textiles, accessories, and footwear. Short product life cycles, quick response times, a wide range of products, and a volatile, rigid, and complicated supply chain structure

are the distinguishing features of this sector (Bloomberg 2022a). The largest players in the industry are companies like Nike, Inditex, Kering, LVMH (including Tiffany) and Hermes. In the fashion industry specifically, Hennes & Mauritz (H&M), Ralph Lauren and Abercrombie and Fitch are among the best-known competitors in the market (Balchandani et al. 2021; Coyne 2020). Globally, the apparel and footwear industry generated USD 1.7tn in sales in 2021 (measured by retail selling prices (RSP) in US dollars) (Euromonitor 2022). Furthermore, the industry contributes around 2 % of the world's gross domestic product (GDP) (Modani 2021).

Currently, the industry's business is being shaped by two major trends: Internet retailing and the competition to attract new customers in emerging markets. In these markets, the physical retailing continues to decline due to the growing middle class. Other developments such as social media platforms, robust supply chains, sustainability and fiber technologies are also difficulties faced by the apparel manufacturers and retailers industry (Bloomberg 2022a).

Over time, many apparel manufacturers and retailers have expanded their online presence. Subsequently, the ongoing digitization of the industry requires greater attention to data security risks, such as payment processing and the storage of customers' financial data. Several brands, like Hugo Boss in 2016, have experienced data breaches in recent years (Bloomberg 2022a). This is directly related to the ESG pillar "Governance".

The apparel industry is among the world's top five polluters and one of the strongest drivers of climate change (United Nations 2022). The apparel industry is responsible for about 10 % of annual global carbon dioxide emissions, more than all international flights and maritime transport combined (Bloomberg 2022a). Due to government pressure and changing consumer behavior, where consumers are increasingly willing to pay more for sustainable products, the trend in the industry is increasingly toward sustainability (Gatzer and Magnin 2021). Although high price premiums are always associated with sustainable products, the increasing importance of sustainability, environment, ESG, safety and natural products and ethical sourcing can be

observed worldwide. By maintaining the momentum, greenhouse gas emissions from the fashion industry will increase to more than 50 % by 2030. Consequently, global apparel consumption will increase from 62m tons to 102tons within the next ten years (Worldbank 2019). As a result, pressure will continue to increase on the industry to create high value for society and secure its long-term viability gains.

The Boston Consulting Group (BCG 2017) revealed in a study that sustainability is still barely represented in this industry. Although many organizations are improving their business practices, a considerable proportion are still lagging far behind in terms of sustainability. If these companies would improve their business models, they can expect a positive increase in the EBIT margin up to 2 % points (base year 2015) (Seara et al. 2018; BCG 2017). This is where sustainable supply chains take on a key role, encompassing design, materials sourcing, processing and production, transportation, distribution, end-of-life, and understanding of corporate initiatives, as well as waste management (Morgan Stanley 2022). By addressing these major issues, the industry has the potential to generate EUR 160bn in annual value to the global economy by 2030 (BCG 2016). Thus, further investigations from an investor perspective become interesting. Pioneers of the ESG trend, such as that of outdoor fashion brand Patagonia, have re-tuned the investment community worldwide and potentially introduced a new era of sustainable development. The company uses every dollar it earns to protect nature and biodiversity (Karadima 2022). Additionally, investors are increasingly taking a significant role as they are more likely to hold companies accountable. However, excessive pressure on brands and the industry creates new challenges for investors and consumers, namely greenwashing. As a result, misleading information is being published about a company's ESG action plans and actual results (Horton 2022).

Poor working conditions in factories, wages that are below subsistence level, and child labor remain other problems in the garment industry (Pai 2022). Therefore, the consumption of natural resources is assessed, and it must be ensured that fair working conditions prevail (Morgan Stanley 2022). In several countries, there are labor unions and labor rights groups that fight for the rights of workers in the factories and for the improvement of the working conditions (Kelly 2021). A company's internal controls, which are designed to control and make business decisions, comply with laws, and fulfill moral obligations to all stakeholders, therefore play a key role. However, more consumers and investors question the rapid pace of production, labor practices, and pollution, in addition to the impact on global warming (Morgan Stanley 2022). ESG addresses the sustainability aspects along the supply chain and involves people and their rights. Therefore, it will be interesting to investigate whether companies that incorporate ESG more into their business model will perform better on the stock market.

4.1.2 Dataset Description

The following chapter first describes the base dataset and the portfolio dataset, followed by the validation of the data used.

4.1.2.1 ESG Dataset

In this thesis, the data collection was focused on finding data based on the performance of companies on both variables of ESG and stock price performance. As already described in section 3.1, the data for this analysis was obtained from Bloomberg. Thereby, the data set was composed of two parts: First, the data includes metrics that summarize the performance of the three ESG factors in a score for each apparel manufacturer and retailer, and second, stock prices and market capitalizations to measure the performance on the stock market. All underlying data represents worldwide companies in terms of their ESG engagement and perceived stock market

performance that can be categorized as design, manufacture, and sell apparel, textiles, accessories and jewelry, and footwear companies.

Looking at the database for the global apparel and retail sector provided by Bloomberg, a total of 190 (N= 190) companies can be found. Due to missing or flawed data within the ESG pillars or the stock prices and market capitalization, the set of companies originally collected were consolidated, and were later cleaned to a quantity of 76. Most of the adjusted dataset is made up specifically of apparel and sportswear as well as footwear companies.

Geographically, most of the companies in the dataset are listed on the capital market in the United States (28 companies; 36.84 %), China (7 companies; 9.21 %) and Japan (6 companies; 7.89 %). The data, representing the various worldwide apparel manufacturers and retailers, shows a representative overall picture of the global distribution across the industry's capital markets, as shown in Appendix C.

4.1.2.2 Portfolio Dataset

Portfolios were formed to further explore the data and examine not only the overall impact of ESG scores but also the impact of individual environmental, social and governance aspects. The annually re-ranked ESG score was used, and the best and worst performing companies were filtered out to create an upper (UP) and lower portfolio (LP) for each year. Accordingly, of the 76 companies, the upper 35 % and the lower 35 % of the companies were included. In total, eight different portfolios with 27 companies were created per year – four portfolios with the upper companies and four portfolios containing lower ranked companies.

Looking at the ESG portfolios, especially for the top 35 % of ESG performing companies, 14 of the companies are represented in the upper portfolio for the entire period under consideration. An additional eight companies are found to be in the upper ESG portfolio for at least four years. On the other hand, 32 companies did not even make it to the top 35 % of the ESGs portfolio.

Particularly in the top 35 % of ESG performance over the observation period, half (50 %) comes from NA (North America) or LATAM (Latin America), and 29.5 % from EMEA (Europe, the Middle East and Africa), only 18.2 % originate from APAC (Asia-Pacific). Consequently, Western countries are more concerned with sustainability, social, and governance issues. Such an observation may be explained by the fact that Western countries have much stricter and more extensive regulations in place (MSCI 2022b).

Looking at the ESG portfolio that represents the 35 % of companies with the worst ESG performance, it is noticeable that ten companies are represented in portfolio over the entire period. It should also be noted that most of these companies belong to the APAC hub. Nevertheless, the distribution across the portfolio is more balanced than in the upper portfolio, with EMEA accounting for the largest share (38.98 %), APAC for 33.90 % and NA and LATAM for 27.12 % of the companies included in the lower portfolio at least once over the observation period. However, this can no longer be attributed solely to the fact that apparel companies produce primarily in Asia. Additionally, the industry is undergoing a profound transformation, resulting in more benefits from nearshoring and automation. Although apparel manufacturers are not moving production to their countries of origin, at least some production is being shifted from Asia back to nearshore production (Andersson et al. 2018). The Boston Consulting Group (BCG) and the Sustainable Apparel Coalition (SAC) conclude that companies risk up to three percentage points of their EBIT margin by 2030 if they keep managing their suppliers as they do now (Seara et al. 2018; Martinez-Pardo et al. 2020).

Considering the single pillars of E, S, and G and the comparison between the UP and LP for each, the distribution from the ESG portfolio is confirmed. Companies from NA and LATAM especially form the largest part of the portfolios, which can be attributed not only to the awareness of ESG of Western states but also to the large representation of American companies in the data set.

4.1.3 Descriptive Analysis

After initial observations of the ESG data and the portfolios for each pillar, it can be observed that there is a large heterogeneity of the companies investigated in terms of company size measured by market capitalization. Table 7 provides an overview of the descriptive statistical values on the average values for market capitalization, as well as the ESG data over the given period.

	ESG	Environment	Social	Governance	Market Capitalization (in mio. USD)
Descriptive Statistics					
<i>Mean</i>	2.97	1.27	1.94	5.69	15,076.64
<i>Median</i>	2.76	0.60	1.54	5.81	4,245.69
<i>Standard Deviation</i>	0.92	1.43	1.40	1.35	28,843.15
<i>Sample Variance</i>	0.87	2.16	2.00	1.86	901,047,791.85
<i>Kurtosis</i>	0.68	2.84	2.89	2.16	13.57
<i>Skewness</i>	0.74	1.86	1.59	-1.00	3.38
<i>Min</i>	0.21	0.33	0.31	2.05	140.75
<i>Max</i>	6.44	8.55	8.57	8.49	297,461.47
<i>Range</i>	6.22	8.22	8.26	6.44	297,320.71

Table 1: Descriptive statistics on ESG data for the apparel manufacturers and retailers industry

The average market capitalization amounts to approx. USD 15.01bn. Therefore, the available data set contains well-established companies, and the industry can generally be considered well-established. Companies are focusing on growth strategies such as internationalization, the development of new product categories and ESG innovations to further expand their business. Consequently, the industry offers investors a lucrative investment opportunity (Deloitte 2022). The distance between the minimum and maximum ESG score remains constant with slight fluctuations, whereas for E and S score, the distances increase with time. This implies that companies are increasingly moving up the ESG trend. However, some companies have missed the point of addressing the issue (Gatzer and Magnin 2021). The variance for the environment

pillar is significantly higher than that of ESG rating and the individual ratings of the other pillars. The greater the variance, the greater the deviation of the data from the mean, which can be attributed to the data set and the calculation of the ESG scores. Within the three individual ESG pillars, environment has the highest variance, with the scores settling at the same level across the board.

The data shows positive skewness values, indicating a right sided tail of the distribution, except for governance, indicating that there are more lower yields than higher yields.

Looking at the overall data over the years, the average ESG scores increase each year, indicating that companies are increasingly addressing the issues. This pattern is consistent across the three individual pillars of environment, social, and governance. Despite this, it should be noted that the greatest increase in the annual means can be seen in the environmental scores, implying a trend in the development of the industry towards sustainability. The value at the end of the period under review is 2.5 times as high as at the beginning. For governance, the increase is the smallest, which suggests that the regulations here are already the most mature (Morck 2005). This is significant compared to the overall ESG score, which is about 1.4 times higher at the end of the observation period.

Differentiating between the ESG LP and the UP, it is noticeable that on average a similar return could be achieved over the years. However, the maximum return of the UP is about 5 % higher than the LP (see in Table 8). Also, the range of LP and UP differ by more than 10 %. Additionally, the variances in the UP and LP are also significantly lower than when comparing the variance of the ESG score. For investors, high kurtosis in capital market returns means that extreme returns (either positive or negative) can occur more frequently than would be expected under a normal distribution (Engelkamp 2022).

	ESG		Environment		Social		Governance	
	Upper Portfolio	Lower Portfolio	Upper Portfolio	Lower Portfolio	Upper Portfolio	Lower Portfolio	Upper Portfolio	Lower Portfolio
Descriptive Statistics								
<i>Mean</i>	1.09	1.36	1.26	1.55	0.82	0.27	1.78	2.81
<i>Median</i>	0.58	0.98	0.91	0.96	1.11	0.16	1.13	1.65
<i>Standard Deviation</i>	5.28	4.11	5.44	4.79	4.40	1.31	6.21	9.15
<i>Sample Variance</i>	0.28	0.17	0.30	0.23	0.19	0.02	0.39	0.84
<i>Kurtosis</i>	175.28	83.97	89.40	52.45	312.38	190.06	113.33	134.76
<i>Skewness</i>	-2.77	27.79	3.94	13.74	51.29	-49.75	35.90	31.01
<i>Min</i>	-16.17	-9.95	-14.73	-11.16	-11.34	-4.48	-16.26	-21.59
<i>Max</i>	17.02	11.77	16.76	12.99	18.32	3.81	18.76	34.29
<i>Range</i>	33.19	21.72	31.49	24.15	29.66	8.28	35.03	55.88

Table 2: Descriptive statistics on monthly portfolio returns for the apparel manufacturers and retailer industry

The assumption that data are stationary is crucial for time series inference. Non-stationary data can lead to estimators that are biased or inconsistent (Hashem Pesaran 2015). To test whether stationarity of the data exists, the Augmented Dickey-Fuller test was used. The test confirmed that the portfolio data used in the analysis were stationary.

4.1.4 Presentation of Results

The following chapter focuses on the analysis of the portfolio returns and the regression results for the four different portfolios ESG, E, S, and G to answer the hypotheses raised in chapter 2.4.. In the first stage, the results of the four models are presented and then interpreted in the next stage to determine whether there is a correlation between the ESG score and the performance of the stock market for the apparel manufacturers and retailers industry.

4.1.4.1 Validation of Regression Models

The validity of the models is tested using various indicators to ensure a correct interpretation of the results of the applied models.

After the regression, R^2 factor is higher for the UP than for the LP across all models. Here, R^2 ranges between 0.52 and 0.67 for both portfolios, considering the magnitude of the factors to be acceptable. As more risk factors are included in each model, the R^2 factors for LP and UP, respectively, increase.

In addition, the Akaike information criterion (AIC) and Bayesian information criterion (BIC) are used to test and verify the validity of the models for the apparel and retail sector. The BIC provides guidance in selecting the optimal model, while the AIC is better suited to determine the model that provides the best predictions for future observations (Chakrabarti and Ghosh 2011). The lower these values are, the better the model and the results obtained from the regression. Specifically, this means that the best predictive power and the least expected information loss is determined by a model (Aikake 1973).

When evaluating the indicators, it is noticeable that all values across all models reach far into the negative range, which means that all four models are well suited for further analysis.

Evidently, in terms of BIC values, FF3 outperforms all other models. Nevertheless, it remains to be mentioned that the Carhart model also achieves similar BIC values across all portfolios and can thus also be used as a good basis for further analyses. Also, for the AIC for all portfolios, the other models are outperformed first by FF3 and then by Carhart (see Appendix D).

It can therefore be deduced that the inclusion of additional factors in the further development of the models has no improving effect on the significance of the results. Furthermore, to justify the results of the regression model, the regression residuals must not exhibit autocorrelation. Hence, the Durbin-Watson test was used to investigate autocorrelation (Fomby and Guilkey 1978). The test results with values below 1.5 for the ESG LP indicate a possible autocorrelation. To evaluate the impact on the model results, the residuals were plotted. Within the plot, almost no meaningful lags can be seen. Accordingly, the autocorrelation does not distort the results.

4.1.4.2 Evaluation of the ESG Portfolios

In Table 9 below, the results for the ESG portfolio are presented using FF3, Carhart, FF5, and FF5 + MOM. The corresponding dependent variable here is the monthly return of the respective

UP or LP, sorted by ESG score. All statistically significant results are marked with asterisks for the 10 %, 5 %, and 1 % levels, with the associated standard error below.

The regression results show that the abnormal returns of companies with lower ESG ratings (lower) are significant at the 10 % significance level across all model specifications. FF3 and the Carhart show significant results at the 5 % significance levels. This indicates that there is a correlation between companies with a low ESG score and a higher stock performance with investors achieving higher returns. For the FF5, the UP is also significant (5 % level). However, the returns show a higher return of 0.0002 % to 0.0077 %.

The market risk factor is statistically significant for all models at the 1 % level, implying that firms are exposed to market risk but are not as volatile to events as the market itself. In addition, the SMB factors are exclusively negative except for the UP in FF5 and in FF5 + MOM. Accordingly, there is a trend that firm size does not seem to matter here, as no significant result can be found for the SMB factor across all models. Moreover, HML and MOM show significant results (10 % level) for the UP in Carhart. For FF5 + MOM, significant results (5 % level) for MOM can be found.

	Dependent variable:							
	Portfolio Returns							
	FF3		Carhart		FF5		FF5 + MOM	
	upper	lower	upper	lower	upper	lower	upper	lower
α	0.0009 (0.004)	0.0075** (0.004)	0.0013 (0.004)	0.0077** (0.004)	0.0002** (0.004)	0.0071* (0.004)	0.0006 (0.004)	0.0073* (0.004)
Mkt-RF	0.9799*** (0.093)	0.6862*** (0.083)	0.8889*** (0.104)	0.6374*** (0.094)	0.9880*** (0.103)	0.6378*** (0.092)	0.9004*** (0.110)	0.5983*** (0.100)
SMB	-0.0842 (0.281)	-0.1126 (0.249)	-0.0682 (0.276)	-0.1040 (0.248)	0.0642 (0.289)	-0.0833 (0.258)	0.0993 (0.283)	-0.0675 (0.258)
HML	-0.1508 (0.163)	0.0593 (0.144)	-0.4418* (0.224)	-0.0969 (0.202)	-0.0225 (0.310)	0.3603 (0.277)	-0.3911 (0.354)	0.1941 (0.323)
MOM			-0.3676* (0.198)	-0.1973 (0.178)			-0.4014** (0.199)	-0.1809 (0.181)
RMW					0.6645 (0.457)	0.3559 (0.408)	0.6763 (0.447)	0.3613 (0.408)
CMA					0.1910 (0.513)	-0.4937 (0.458)	0.3289 (0.506)	-0.4315 (0.462)
Observations	72	72	72	72	72	72	72	72
R ²	0.632	0.523	0.650	0.532	0.646	0.534	0.667	0.541
Adjusted R ²	0.616	0.502	0.629	0.504	0.619	0.498	0.636	0.498

Standard errors in parentheses
 *p<0.1; **p<0.05; ***p<0.01

Table 3: Regression results of the ESG UP and LP for the apparel manufacturers and retailers industry

4.1.4.3 Evaluation of the Environmental Portfolios

This section presents the results for the environmental Pillar of ESG. Accordingly, the dependent variable shows the return for UP and LP ranked by E-score (see Appendix E).

As with the ESG portfolio, the results for the abnormal returns are consistent, with all alphas being significant for LPs across all four models, with a 5 % significance level. The exception is FF5, where the alpha is significant at the 10 % level. Investors investing in companies with a worse E-scores, therefore, generate abnormal returns. Also, across all portfolios and models, systematic market risk is significant at the 1 % significance level, meaning companies are exposed to market risk. However, they are not as sensitive as the market due to the smaller factor

than one. Analyzing the trend of the stock returns in the short term, the momentum is seen to have a significant (10 % level) impact in FF5 + MOM on the stock returns.

4.1.4.4 Evaluation of the Social Portfolios

Appendix F contains the regression results for social of the ESG pillars. The corresponding dependent variable is thus the monthly return of the respective UP or LP, sorted by social score. In the social column, it is noticeable that it is not as consistent as in the previous regression results. However, again for Carhart, there is a significant return for the LP at a 5 % level, suggesting that investors can earn a higher return here. The market risk factor is also significant at the 1 % level for all LPs and UPs and, moreover, positive among all models. Interestingly, the HML factor, which represents the value premium of a stock, is significant only for the LP within FF5, unlike the influencing variables considered so far. The positive factor indicates that the portfolio contains several companies with a high book-to-market ratio.

4.1.4.5 Evaluation of the Governance Portfolios

For the final consideration of the dependent variables, the LP and UP were considered after sorting by the governance score. A similar picture emerges for the governance portfolios as for the significant alphas of ESG, environmental and social for the LP (see Appendix G).

However, only the alphas for FF5 and FF5 + MOM factor are significant at a significant level of 10 %. Thus, companies with lower G scores seem to generate higher returns. As before for market risk, there is a significant result above the 1 % level for all models. However, it is remarkable that the values are higher than for the previously observed pillars and are above one. This implies that the portfolios have higher volatility than the market.

4.1.5 Discussion of Results

This section summarizes the findings on the apparel manufacturers and retailer industry and discusses the analysis results, particularly regarding the impact on investment. Subsequently, through the extracted findings, an attempt is made to answer the research question.

4.1.5.1 Summary

At this point, the individual observations from the previous chapters on various indications provide a foundation helping to answer the research question of this study. Based on the preceding analysis, an impact of ESG performance on stock performance can be determined. However, a correlation between a high ESG performance and abnormal returns could not be found, lacking a significant result. Therefore, the original hypothesis (H1) could not be confirmed for the apparel manufacturer and retail industry. Neither can the other three sub-hypotheses be substantiated by significant results.

On the other hand, this analysis finds that lower ESG performance of companies has a positive significant impact and enables abnormal returns. Reflected across all three pillars, all indicators deliver a significant result for the LP. Therefore, companies that lack sustainability, social, or governance perform better on the stock market. Despite the significant results obtained, meaning that coincidence is excluded (Gallo 2016), it should be emphasized that the impact on returns is extremely small, approaching zero. In recent years, more Western companies have invested in ESG, introducing programs such as recycling (Morgan Stanley 2022), since they are more frequently represented in UP. As a result, companies that do not invest as much in ESG may have higher corporate performance (Xu et al. 2022), which in turn has a positive impact on stock market performance.

No matter how, this contradicts the findings of Tsai and Wu (2022), who examined corporate social performance and financial performance. They found an improvement that overall CSR

is positively associated with future stock performance (Tsai and Wu 2022). Further research also indicates a positive relationship between ESG and financial performance. The findings of positive significant correlation seem to exceed the negative significant and neutral correlations (Giannopoulos et al. 2022; Wu et al. 2020; Ahmad, Mobarek, and Roni 2021; Lin, Chang, and Dang 2015).

However, different time periods and particular focus on impacts on industries other than apparel manufacturers and retailers may lead to different results. All regression results should be interpreted considering the specific characteristics and limitations (see chapter 5.2). In addition, the apparel manufacturer and retailers industry is highly globalized and spread across different markets that develop faster than other industries, as it is strongly influenced by trends (Berg, Fusaro, and Rahilly 2022). Currently, the apparel manufacturer and retailers industry is facing major changes due to the Covid 19 pandemic, as well as the war in Ukraine (Robinson 2022). Changing consumer behavior will also continue to shape the sector in the future (Berg and Jablonska 2021). New challenges as employers, in meeting consumer needs and as better corporate citizens will play a significant role (Sides and Skelly 2022; Milewska 2022) and it remains to be seen how this will affect stock market performance. Due to the lack of research on stock performance in the apparel manufacturer and retailers industry in the literature, future research results should be considered as the industry is in transition and further developments are expected. While investors can use the findings of this study as a guide, they should still monitor current political and economic developments in the apparel manufacturers and retailers industry and incorporate them into their investment decisions.

4.1.5.2 Theoretical and Practical Implications

Through this study, not only the scientific benefit but also the practical benefit becomes clear, and therefore is of interest to various parties. In research, the apparel manufacturers and retailers industry and the industry's impact and change through ESG has been discussed but lacks a more

specific analysis from an investor perspective. Investigating the stock performance with FF3, Carhart, FF5, and FF5 + MOM, this study gives more guidance and includes the stock market perspective. The results do not answer the question of whether there is a significant correlation between extraordinary returns and good ESG performance. However, a significant result for poorly performing companies in ESG is elaborated. Investors can thus achieve above-average returns by investing in these companies with poor environmental, social, and governance scores. The findings can help portfolio managers and investors consider the ESG performance of companies before making an investment decision and align their investment strategy. At the end, it is important to highlight, that the apparel manufacturer and retailers industry is about to develop in a more sustainable direction. In the long-term, current indications are that investors could still likely earn above-average returns by investing in companies that perform well in ESG.

5 Conclusion

The following chapter concludes the overall findings of the impact of ESG performance on stock returns in the apparel manufacturers and retailers industry. The findings are presented in the light of applicable limitations from which ultimately further research recommendations are derived.

5.1 Summary

This thesis analyzes the impact of ESG performance on stock returns in capital markets. For the industry two portfolios with globally listed companies were built. One consisting of companies with the highest ESG performance of the respective industry and one consisting of companies with the lowest ESG performance. Bloomberg's ESG rating was used to measure the companies' ESG performance within the period from 2015 to 2020. To determine abnormal portfolio returns of the constructed portfolios, the multiple linear regression models FF3, Carhart, FF5, and FF5 + MOM were applied. Ordinary least square regressions in Python were used to obtain the coefficients of the respective factors and intercepts. Using the market as performance benchmark, the models reveal if the market values ESG scores accordingly so that companies with high/low ESG scores can achieve excess returns on the capital market. Additionally, the three underlying dimensions of ESG are evaluated individually in the same way as the ESG score for further insights.

Based on theoretical frameworks and previous academic research in this field, a positive relationship between ESG performance and stock returns was expected. However, this thesis finds no significant results for the positive influence of ESG on stock returns for the apparel manufacturers and retailers industry. Furthermore, there is no evidence of a positive relationship between any of the three individual dimensions environment, social, and governance and abnormal stock returns.

Nevertheless, the apparel manufacturers and retailers industry demonstrates a significant relationship between poor ESG performance and abnormal returns. The same result was also observed in the lower portfolios of the environment, social, and governance pillars.

Although the results do not confirm the initially expected outcome, the highly complex nature of investment decision requires the incorporation of a broader perspective. Due to current economic and regulatory developments and increased stakeholder awareness, ESG is expected to be the next major disruption in the investment context. Therefore, ESG will be inevitable in the future and redefine the investment landscape. Until then, investors need to distinguish short-term and long-term goals and adapt their investment strategy accordingly. “Ultimately, purpose is the engine of long-term profitability” (Fink 2020).

5.2 Limitations and Further Research

The overall findings for this study should be interpreted in the light of some fundamental limitations that apply, especially with ESG being a relatively new trend in investment decisions.

First, there are limitations towards the ESG rating scores and their informative value. Several studies show a low convergence in and agreement between different ESG ratings (Abhayawansa and Mooneapen 2021), with minimal correlation between ESG scores from different rating agencies (Dimson, Marsh, and Staunton 2020). This indicates that the same company with a high rating from one agency could get a middle or low score from another rating provider, with the effect being even higher when just comparing individual dimensions. This can be attributed to problems associated with different dimensionalities and weightings of the sub-categories, as well as validity and reliability problems in measurement frameworks.

Secondly, the size bias should be considered. This originates in rating agency’s reliance on publicly disclosed data, towards which larger and multi-national companies have more resources allocated. Therefore, larger companies have higher data availability and increased

transparency, ultimately often resulting in better ESG ratings (Drempetic, Klein, and Zwergel 2020).

Furthermore, the scope of the examined industry is limited. All datasets only cover the period from 2015 to 2020, reflecting a relatively short period of six years. In addition, only publicly traded companies that are listed in Bloomberg's ESG rating with complete data series are considered. This creates the risk of an unbalanced overall impression of the sectors, as poorly performing companies, for example, are not included due to missing data points.

To examine the relationship between ESG performance and stock returns in the apparel manufacturers and retailers industry in more detail, further research can be conducted. One can focus on individual markets, since geographically separated capital markets do not value sustainability efforts equally yet. For example, the European and Asian capital market have a different perception and appreciation of sustainability efforts. In addition, the same analyses could be conducted with scores from an alternative rating agency. The limited correlation between ESG rating providers may cause different results. Finally, the use of a different portfolio construction approach could also lead to diverging results. Literature proposes a zero-investment long-short strategy, where companies with a high ESG score take a long position and companies with a low ESG score take a short position.

With the ongoing adoption of ESG, more and more investors will be attracted to ESG aware investing. However, the investment dynamics in this emerging market remain largely unknown. Nevertheless, the results of this thesis raise public awareness of this still largely unexplored field and provide a foundation for further studies.

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Appendix

Appendix A

Score structure of Bloomberg's ESG dimensions

ENVIRONMENTAL	SOCIAL	GOVERNANCE
Air Quality Air Emissions Air Emissions Policies Climate Exposure Transition Risk Ecological Impact Ecosystem Protection Environmental Fines Environmental Incidents Energy Management Energy Consumption Renewable Energy Use Environmental Supply Chain Management Sustainable Sourcing GHG Emissions Management GHG Emissions GHG Emissions Policies GHG Regulation GHG Target Sustainable Product Green Product Waste Management Hazardous Waste Generation Hazardous Waste Recycling Waste Generation Waste Recycling Water Management Wastewater Water Use Water Use Policies	Community Rights & Relation Community & Human Rights Community Relations Ethics & Compliance Business Ethics Competitive Behavior Legal & Regulatory Management Labor & Employment Practices Labor Actions Organized Labor Training Occupational Health & Safety Management Fatalities Health & Safety Fines Health & Safety Policies Safety Incidents Operational Risk Management Operational Incidents Operational Preparedness Product Quality Management Product Quality & Safety Social Supply Chain Management Supplier Social Compliance	BOARD COMPOSITION Director Roles CEO Roles Chair Roles Board Roles Diversity Age Diversity Gender Diversity Independence Board Leadership Independence Board Independence Refreshment Board Refreshment Chair Refreshment EXECUTIVE COMPENSATION Incentive Structure CEO Incentive Plan Design Executive Incentive Plan Design Executive Pay Equity Executive Pay Linkages Pay Governance Compensation Board Oversight Gender Diversity Say on Pay Pay Policies Pay for Performance Fixed Pay Alignment Variable Pay Performance SHAREHOLDER RIGHTS Shareholder Policies Takeover Defense Voting Rights Director Election Policies Director Voting Director Terms Director Support

Source: Own representation based on Bloomberg (2022).

Appendix B

Example of Python code for FF3 of UP ESG

```

pip install pandas-datareader

import pandas_datareader.data as reader

import pandas as pd

import numpy as np

import datetime as dt

import statsmodels.api as sm

import matplotlib.pyplot as plt

%matplotlib inline

#time horizon of the research

start = dt.date(2015,1,1)

end = dt.date(2020,12,31)

#importing ESG data from pre-cleaned excel sheet

df = pd.read_excel(r"/Users/patricia/Documents/NOVA SBE/Work Project/ESG-Portfolio upper 20% 2015-2020.xlsx", sheet_name='ESG_lower_PF')

#Data preperation

df["Date"] = pd.to_datetime(df["Date"])

df["Date"] = df["Date"].dt.to_period("M")

df.set_index('Date')

#getting the farma french 3 factors for the regression via online request

factors = reader.DataReader('Developed_3_Factors', 'famafrench', start, end)[0]

```

#look into data structure to make sure that return frame and factors frame have the same size for easy merging

factors.shape

df.shape

#merging the two data frames

merge = pd.merge(df, factors, on = 'Date')

#set Date as index

merge = merge.set_index("Date")

#divide factors by 100 because they are displayed in percent

merge[['Mkt-RF', 'SMB', 'HML', 'RF']] = merge[['Mkt-RF', 'SMB', 'HML', 'RF']]/100

merge['PF return - RF'] = merge['upper_PF_return']- merge['RF']

#Regression

y = merge['PF return - RF'] *#dependent variable*

x = merge[['Mkt-RF', 'SMB', 'HML']]

X_sm = sm.add_constant(x) *#adding a constant to the model*

model = sm.OLS(y,X_sm)

results = model.fit()

print(results.summary())

Source: Own code based on Teo (2021) and modified.

Appendix C

Geographical distribution by listing stock exchange of companies in the apparel manufacturers and retailers industry

Country	N	%	Country	N	%
United States	28	36.84%	Brazil	2	2.63%
China	7	9.21%	Switzerland	2	2.63%
Japan	6	7.89%	Canada	1	1.32%
Germany	4	5.26%	Netherlands	1	1.32%
France	4	5.26%	Sweden	1	1.32%
Taiwan	4	5.26%	Spain	1	1.32%
Italy	3	3.95%	Greece	1	1.32%
United Kingdom	3	3.95%	Poland	1	1.32%
Korea, Republic Of (South)	3	3.95%	India	1	1.32%
South Africa	3	3.95%			

Source: Own representation

Appendix D

AIC and BIC values for UP and LP of apparel manufacturers and retailers industry in different model configurations

Model		Portfolio							
		ESG_upper	ESG_lower	E_upper	E_lower	S_upper	S_lower	G_upper	G_lower
FF3									
	AIC	-284.3	-301.8	-274.3	-272.8	-298.4	-475.1	-243.0	-190.5
	BIC	-275.2	-292.7	-265.2	-263.7	-289.3	-466.0	-233.9	-181.4
Carhart									
	AIC	-285.9	-301.1	-275.2	-271.7	-296.8	-473.4	-244.5	-190.1
	BIC	-274.5	-289.7	-263.8	-260.3	-285.5	-462.0	-233.1	-178.7
FF5									
	AIC	-283.0	-299.3	-270.8	-270.2	-294.6	-473.4	-239.7	-187.9
	BIC	-269.3	-285.7	-257.1	-256.5	-280.9	-459.7	-226.0	-174.2
FF5 + MOM									
	AIC	-285.4	-298.4	-271.8	-268.9	-293.1	-471.6	-241.2	-187.2
	BIC	-269.4	-282.5	-255.9	-253.0	-277.1	-455.7	-225.3	-171.3

Source: Own representation

Appendix E

Regression results of the environmental UP and LP for the apparel manufacturers and retailers industry

	Dependent variable:							
	Portfolio Returns							
	FF3		Carhart		FF5		FF5 + MOM	
	upper	lower	upper	lower	upper	lower	upper	lower
α	0.0029 (0.004)	0.0093** (0.004)	0.0032 (0.004)	0.0095** (0.004)	0.0025 (0.005)	0.0090* (0.005)	0.0028 (0.004)	0.0092** (0.005)
Mkt-RF	0.9877*** (0.100)	0.7621*** (0.101)	0.9004*** (0.112)	0.7116*** (0.115)	0.9778*** (0.112)	0.6969*** (0.113)	0.8978*** (0.121)	0.6587*** (0.123)
SMB	-0.1555 (0.301)	-0.2098 (0.304)	-0.1402 (0.297)	-0.2009 (0.304)	-0.0680 (0.314)	-0.1997 (0.316)	-0.0360 (0.311)	-0.1844 (0.317)
HML	-0.1074 (0.175)	0.1204 (0.177)	-0.3867 (0.242)	-0.0411 (0.248)	0.0312 (0.337)	0.4471 (0.339)	-0.3055 (0.388)	0.3162 (0.396)
MOM			-0.3528 (0.214)	-0.2040 (0.219)			-0.3667* (0.218)	-0.1752 (0.223)
RMW					0.3780 (0.498)	0.2714 (0.500)	0.3888 (0.491)	0.2766 (0.501)
CMA					-0.0392 (0.558)	-0.6822 (0.561)	0.0869 (0.556)	-0.6220 (0.567)
Observations	72	72	72	72	72	72	72	72
R ²	0.602	0.476	0.617	0.482	0.604	0.486	0.621	0.491
Adjusted R ²	0.584	0.452	0.594	0.451	0.574	0.447	0.586	0.444

Standard errors in parentheses
*p<0.1; **p<0.05; ***p<0.01

Source: Own representation

Appendix F

Regression results of the social UP and LP for the apparel manufacturers and retailers industry

	Dependent variable:							
	Portfolio Returns							
	FF3		Carhart		FF5		FF5 + MOM	
	upper	lower	upper	lower	upper	lower	upper	lower
α	0.0018 (0.004)	0.0006 (0.001)	0.0020 (0.004)	0.0006** (0.001)	0.0017 (0.004)	0.0004 (0.001)	0.0018 (0.004)	0.0004 (0.001)
Mkt-RF	0.7557*** (0.085)	0.2243*** (0.025)	0.7261*** (0.096)	0.2173*** (0.028)	0.7509*** (0.095)	0.2119*** (0.027)	0.7234*** (0.104)	0.2063*** (0.030)
SMB	0.0071 (0.254)	-0.0077 (0.075)	0.0123 (0.256)	-0.0065 (0.075)	0.0669 (0.267)	0.0124 (0.077)	0.0779 (0.268)	0.0147 (0.078)
HML	0.0964 (0.148)	0.0709 (0.075)	0.0016 (0.208)	0.0484 (0.061)	0.1344 (0.286)	0.1641* (0.083)	0.0185 (0.335)	0.1404 (0.097)
MOM			-0.1198 (0.184)	-0.0284 (0.054)			-0.1262 (0.188)	-0.0258 (0.054)
RMW					0.1426 (0.422)	0.1641 (0.122)	0.1463 (0.424)	0.1649 (0.123)
CMA					-0.0031 (0.473)	-0.1188 (0.137)	0.0403 (0.480)	-0.1099 (0.054)
Observations	72	72	72	72	72	72	72	72
R ²	0.568	0.585	0.571	0.587	0.569	0.598	0.572	0.600
Adjusted R ²	0.549	0.567	0.545	0.562	0.537	0.568	0.533	0.563

Standard errors in parentheses
 *p<0.1; **p<0.05; ***p<0.01

Source: Own representation

Appendix G

Regression results of the governance UP and LP for the apparel manufacturers and retailers industry

	Dependent variable:							
	Portfolio Returns							
	FF3		Carhart		FF5		FF5 + MOM	
	upper	lower	upper	lower	upper	lower	upper	lower
α	0.0074 (0.005)	0.0156 (0.008)	0.0078 (0.005)	0.0160 (0.008)	0.0068 (0.006)	0.0148* (0.008)	0.0072 (0.006)	0.0152* (0.008)
Mkt-RF	1.0542*** (0.124)	1.5457*** (0.179)	0.9349*** (0.139)	1.4306*** (0.202)	1.0269*** (0.139)	1.4490*** (0.200)	0.9200*** (0.149)	1.3543*** (0.217)
SMB	-0.1256 (0.374)	-0.0248 (0.538)	-0.1047 (0.368)	-0.0046 (0.537)	-0.0405 (0.390)	0.0474 (0.559)	0.0023 (0.384)	0.0853 (0.559)
HML	-0.1318 (0.217)	0.1730 (0.313)	-0.5133 (0.299)	-0.1951 (0.436)	0.1092 (0.419)	0.7264 (0.600)	-0.3409 (0.480)	0.3278 (0.699)
MOM			-0.4820 (0.264)	-0.4650 (0.386)			-0.4901 (0.270)	-0.4341 (0.393)
RMW					0.4929 (0.618)	0.6446 (0.885)	0.5074 (0.607)	0.6574 (0.883)
CMA					-0.2285 (0.693)	-0.9743 (0.993)	-0.0600 (0.688)	-0.8251 (1.001)
Observations	72	72	72	72	72	72	72	72
R ²	0.528	0.550	0.550	0.559	0.532	0.558	0.555	0.566
Adjusted R ²	0.507	0.530	0.524	0.533	0.497	0.525	0.514	0.526

Standard errors in parentheses
 *p<0.1; **p<0.05; ***p<0.01

Source: Own representation