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**Investment strategies and ESG scores. Empirical evidence from Food &
Beverage industry.**

RELATORE:

CH.MO PROF. Andrea Menini

LAUREANDO/A: Michele Repenti

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2. Abstract

The debate on integrating ESG aspects into portfolio management has been very lively in recent years. Furthermore, the volume of investments that take into account information regarding ESG characteristics is growing rapidly, thanks to the risk reduction and economic opportunities that a strong focus on CSR can generate.

The objective of this study is therefore to analyze the integration of ESG information in the decision-making processes of some investment styles, in particular in the strategies commonly known as Growth, Value, GARP, Index and Income investing. In this regard, the research question is the following: “within the Food and Beverage industry, which of the above types of investors consider ESG aspects in their investment decisions?”

To answer this question, a panel-type dataset was constructed containing the data of 96 large companies in the sector, in the period from 2017 to 2021. Fixed effects models were then run: as dependent variables we included the change in the percentage of ownership by investors using the different investment strategies, while as independent variables we used various ESG scores provided by Refinitiv Eikon along with some control variables.

The results obtained, analyzing both the combined score (Environment, Social and Governance) and the three separate scores, suggest that the shares of investors who follow the Value and Index investment styles are significantly correlated with ESG assessments. Growth, GARP and Income investment styles instead, after eliminating the effects of the main financial variables, do not show significant correlations with ESG scores. Analyzing the Food and Beverage sectors separately, there are no particular differences in the results obtained; dividing the sample according to geographical area, however, the shareholding structure of Western companies shows high correlations with ESG scores, while in the Eastern sample this effect is almost completely null.

3. Introduction

The debate about the role of ESG aspects has been very lively in recent years. The volume of investments that took into account ESG aspects is growing quickly, both due to the desire of investors to have a positive impact in the transition towards a more ethical and sustainable economy, but also to allocate their capital more efficiently, reducing risks and exploiting the economic opportunities that management attentive to CSR issues can generate. The Food and Beverage market is one of the sectors most interested in this transition, together with energy and transport, due to its high environmental impact and the connection with social and local aspects through the impact on rural environments.

This sustainable investing trend is supported by the increasing production of ESG information. In this sector, ESG rating agencies provide a central service, as they provide information on governance aspects, environmental impact and the ability of the firm to deal with social trends, labor and politics, but above all they provide ESG ratings of the companies analyzed. The literature has studied these ratings very deeply, highlighting both their usefulness and their shortcomings. In this regard, among other things, the academic community has deepened how markets react to ESG news, how the use of ESG ratings can yields higher profits, their relationship with the cost of capital, their influence on the business model of companies and also the ethical role of finance in the green transition.

An aspect that has been less detailed relates to the relationship between the use of ESG information and investment styles. The investment style is the method, the strategy and philosophy used by an investor or portfolio manager to identify risks and opportunities, and consequently make his own investment decisions. Since there is no extensive literature on the relationship between investment strategies and the use of ESG information, this thesis aims to answer the following question: among various investment styles, if, how and which of these take into consideration ESG information for their investment decisions within the Food and Beverage industry?

To answer this question, a Panel-type dataset was built by collecting financial data and ESG ratings of 96 food and beverage companies spanning the period between 2017-2021 (five years), then fixed-effect regression models were performed. The data is collected via the Refinitiv EIKON database. The independent variables of these models regards financial metrics

that may have an influence on investment decisions and the ESG ratings of companies, while the independent variables consist of the equity stakes held while using the various investment styles. In particular, the investment styles analyzed are: the investment style called "Growth investment", by which the investor believes in the growth of the size of the company and the improvement of its performance; the "Value" investment style, which is instead based on the hypothesis of companies' underpricing; the "GARP" (Growth At Reasonable Price) investment style which is similar to the "Growth" style but requiring to select companies already established in the market and with solid results; the "Index" investment style which is based on a passive approach which follows the performance of a reference index; and finally the style commonly known as "Income investing", which has the objective of generating a secure and stable income for the investor over time. The information regarding the investment styles used by the various investors is provided directly by the Refinitiv EIKON database, which obtains this data by investigating the investment styles declared by the investment funds within the shareholder base. The statistical analyzes were conducted using the STATA software.

The thesis is organized as follows: Chapter 3 deals with the literature review, which addresses the issues of Sustainable and Responsible Investing, ESG rating agencies, specific aspects of the Food and Beverage industry, the impact of Sustainability-based management on business performance, the relationship between ESG and corporate financial metrics and finally investment styles and their relationship with corporate sustainability aspects. Chapter 4, on the other hand, is related to the methodology and outcomes of empirical analyzes, therefore it describes the hypotheses of the research question, the sample and the regression models used to verify the hypotheses, the results obtained and finally the specification tests and regression diagnostics necessary to validate the outcomes of the models. Chapter 5 concludes the research by describing the results obtained in connection with initial hypotheses and prior literature. Finally, Chapter 6 reports all references used to accomplish this thesis.

4. Literature Review

4.1 Sustainable and Responsible Investing (SRI) and characteristics of F&B sectors

4.1.1 Sustainable and Responsible Investing

In recent years, the stock market has seen a significant development of responsible and sustainability-oriented investments (known as SRI, Sustainable and Responsible Investing): these investments take into consideration non-financial information to direct funding toward socially responsible companies engaged in CSR (Corporate Social Responsibility) activities. According to J.P Morgan, in 2021 the volume of investments that took into account ESG aspects is around \$500 billion, and it is expected to grow in 2022 and in the years to come (note 1). In this way, the trend toward an increase in sustainable business models is generated "from below", i.e. by stock market investors willing to contribute to beneficial results in addition to the usual economic remuneration (note 1). Governments and institutional investors also largely contribute to this phenomenon.

The literature has developed various theories to identify the different aspects of CSR. In order to distinguish it from ordinary compliance with regulations, CSR is defined as a voluntary attitude toward social issues (Liang, H., Renneboog, L., 2020). In particular, CSR is beyond compliance (Vogel, D., 2005), beyond what is imposed by the market or the laws (McWilliams, A., and Siegel, D., 2001), and is a form of self-regulation (Calveras, A., Ganuza, J. - J. And Llobet, G., 2007). As is often the case in the literature, the acronyms "ESG" and "CSR" will be used interchangeably in this study.

To understand the phenomenon from a corporate point of view, the literature distinguishes two different approaches: shareholder theory and stakeholder theory.

Based on the idea that the company is a nexus of contracts generated by the interests of the shareholders, the shareholder theory assesses that the company must be managed in order to maximize the interests of the shareholders and therefore the profits and the market value of the equity. Fama and Jensen in 1983 (Fama, E.F. and Jensen, M.C., 1983) support this thesis by noting that the shareholders are residual claimants of a company's cash flow, and therefore they

are the figures who care most about the well-being of the company, while the other stakeholders are protected by contracts designed by the government (this way becoming “contractual claimants”) and often have a priority in case of a settlement.

Following this reasoning Hansmann and Kraakman (Hansmann, H. and Kraakman, R., 2001) called the "end of history" for corporate law recognizing that shareholders are not protected by contracts and that therefore their only way to protect their interests is to control the firm, this way refuting other models such as the state-oriented model, labor-oriented model, manager-oriented model, and the other stakeholder models. In this sense, those who support the supremacy of the shareholders argue that without it the agency problem would worsen and the costs for the shareholders would increase in a harmful way for all the stakeholders and the society itself.

The stakeholder model, on the other hand, was born in 1984 thanks to Edward Freeman's 1984 book entitled "Strategic Management: A Stakeholder Approach" (Edward F., 1984). In this publication, the author describes the processes that bring greater well-being to the company by taking into consideration the interests of all stakeholders. In the following decades, the literature has compared how and if the stakeholder-based model can have advantages over the shareholder model, such as the study of Allen et al. (Allen, F., Carletti, E. and Marquez, R., 2015) which compares the two approaches in terms of competition under the growing globalization phenomenon, where a stakeholder approach can bring greater value. For many authors, the main problem of the stakeholder model is represented by the presence of multiple interests that can often be non-aligned, and this can create conflicts harmful to the company. To this argument, Mayer (Mayer, C., 2020) responds by noting that the interests of the various shareholders may also be non-aligned.

Going beyond these two theories, CSR activities and sustainable business practices can be analyzed both from the point of view of companies and from the point of view of investors.

As far as the corporate point of view is concerned, the literature has dealt with observing CSR from the point of view of its corporate motivations, identifying three main views on CSR (Benabou, R. and Tirole, J. 2010.).

The first is that it defines CSR as a win-win strategy, which rewards both the interests of shareholders and other stakeholders and also society in general. In this sense, the company that does good will also become more profitable by achieving superior financial performance. These financial benefits would be realized in the medium to long term, sacrificing some short-term

profits due to an initial increase in the cost of capital. A classic example is that of investments in environmental R&D which result in an increase in costs which, however, will rise reputation and attract socially responsible consumers and avoid legal problems due to excessive environmental impact. In this sense, Magill, Quinzii and Rochet (Magill, M., Quinzii, M., and Rochet, J., 2015) define CSR as the willingness of investors to internalize costs to avoid future risks.

The second view identifies CSR as a sort of delegated philanthropy (Liang, H., Renneboog, L., 2020). According to this perspective, stakeholders (in particular shareholders, customers and employees) delegate philanthropic activities to the company, sacrificing money (respectively yield, purchasing power and wage) based on the fact that companies will be able to dispose of that money in a better way because those stakeholder alone will not be able to generate the same externalities because coordination problems (Hart, O. and Zingales, L. 2017).

The third view describes the type of CSR that results from the willingness of corporate insiders and decision-makers to engage in philanthropy and promote corporate prosocial behavior. For example, directors could sponsor their favorite organizations that work for the preservation of the environment; or, simply, managers' decisions to invest in CSR activities are dictated by their personal will and do not result directly from an evaluation of the return on welfare for the company. Then it is possible to say that this type of CSR arises from the agency problem.

From the point of view of investors, instead, over time have evolved three types of responsible investment that can be identified (Liang, H., Renneboog, L., 2020). Initially, SRI investing was born as a negative screening of "sin" stocks, thus eliminating from the investment portfolio those ethically questionable industries, such as tobacco, alcohol, weapons, abortion-related medicines and still others, depending on the personal sensitivity of those who manage the investments. The second generation of SRI funds, on the other hand, takes place by applying a positive screening of those deserving companies with regard to environmental impact, personnel management, the promotion of human rights, and CSR activities in general. In this way, instead of excluding the worst titles from an ethical point of view, investors focus on the best ones. Finally, the third generation of SRI funds integrates negative screening with positive screening in order to obtain the best possible balance between profits and investment ethics (Liang, H., Renneboog, L., 2020).

4.1.2 ESG rating agencies

The growing attention to sustainability and CSR issues has contributed to the birth of ESG rating agencies, which provide aggregated data on companies' ESG practices so that the assessment of these aspects is faster and easier for investors (Escrig-Olmedo, E., et al., 2018). To do this, these entities combine public information, non-financial corporate reports, but also interviews and questionnaires, collecting hundreds of different metrics and systematically combining them to define the three ESG scores of the company.

However, each rating agency uses different assessment methods and factors. This topic has been extensively addressed in a study directed by Florian Berg (Berg, F., Kobel, J.F., Ringon, R. 2022). Their study analyzes six major ESG rating agencies finding that the correlation between various ESG scores varies between 38% and 71%. These values are not sufficient to guarantee the homogeneity of evaluation, and this phenomenon creates difficulties both for investors who want to choose securities in which to invest based on ESG evaluations and also for companies who want to invest in order to improve their ESG evaluations.

For example, CEOs may focus on improving a particular agency's ESG rating while resulting in an underperforming path in ESG ratings made by other agencies. For this reason, it is very difficult to create contracts that incentivize CEOs to optimize business processes in a more sustainable direction using ESG ratings, but these are only some examples of the drawbacks of this difference in homogeneity.

The authors of this study identify specifically three different sources of divergence: scope, measurement, and weight. Scope divergence refers to the choice of attributes to be evaluated in the measurement phase, and this phenomenon is responsible for 38% of the divergence. The difference in Measurement, instead, is the largest contributor to the divergence with 56% of the total divergence. This factor refers to the situation where agencies measure the same attributes using different indicators. Finally, the difference in Weights used (responsible for 6% of the total divergence) originates when the rating agencies have different opinions on the relative importance of the various attributes measured, and therefore their weight with respect to the overall ESG assessment or the three individual factors ESG (Environmental, Social and Governance).

Berg's study also highlights the differences with credit rating agencies. In fact, these have a correlation of around 99% (Berg, F., Kobel, J.F., Ringon, R. 2022). According to Berg, this difference is generated by three factors. The first concerns the possibility of defining what is

the measurement objective. In fact, creditworthiness is defined as the probability of default, while the definition of ESG performance is less clear. In fact, giving a definition of what is “ESG performance” is one of the services offered by rating agencies. The second important difference is that while financial reporting standards have evolved over the past centuries, ESG reporting is in its infancy, and the same consideration applies to the age of the agencies. The third and final reason according to Berg's study is remuneration. While financial rating agencies are paid by companies, ESG rating agencies are paid by investors.

4.1.3 Insight into ESG in the Food and Beverage industry

Studies regarding the ESG aspects of companies concern companies in all industrial sectors or only one or few industries. This study focuses on the Food and Beverage sector because of the inner relations between this industry and the ESG aspects.

When ESG issues are addressed, the Food and Beverage industry attracts a lot of attention due to some specific characteristics. In particular, agri-food products are very sensitive to environmental and ethical issues because they have a great impact on the environment, on people's health and on social issues (such as the use of labor force in developing countries).

In fact, the production system of the food that arrives on our tables every day is under pressure due to many factors. First of all, the global demand for food is soaring. The growth of the world population has been very strong. Starting from the end of the nineteenth century, when the population was around one billion (Roser, M., et. al. 2018), we reached the second billion in the 1930s and from 1960 to 2000 the population doubled, from 3 to 6 billion (note 2). On 15 November 2022 we reached eight billions, according to United Nations (note 3).

This growth has been sustained mainly by developing nations and is therefore expected to decrease in the coming decades thanks to the establishment of economic and social conditions that will reduce fertility in these areas (note 4). In any case, the global demand for calories will greatly increase, as greater economic prosperity in developing areas will generate an increasing availability of high-calorie foods (Frona, D., Szenderak, J., Harangi-Rakos, M. 2019).

Producing this amount of food strains the availability of limited natural resources, the production of greenhouse gases, the loss of natural ecological environments and the stability of societies that live off these natural resources. For these reasons, the development of increasingly

sustainable cultivation and breeding practices are at the center of attention by observers and stakeholders, and in this dynamic the ESG aspects of businesses can play a fundamental role.

Regarding the environmental impact of the Food and Beverage industry, the sector is one of the most polluting. Agriculture, both for the production of animal feed and human food, is the cause of 75% of global deforestation (Blaser, J., Robledo, C. 2007) and the F&B sector is responsible for 14.5% of total global greenhouse gas (GHG) emissions (Gerber PJ et al., 2013). Since 1990 nearly 1.3 million kilometers of forest were cut according to the World Bank (note 5). Taking into account changes in land use, the American diet is responsible for almost as many emissions from the use of electricity, transportation, industrial production and construction according to a study by the World Resource Institute (Ranganathan, J.).

To be able to feed the growing population and at the same time reach the goal of zero emissions by 2050 set by the Paris Agreement (note 6) it will be necessary to produce seventy percent more food and cutting emissions and preparing to eliminate them altogether (Gates, B., 2021). In order to reach these goals, it is expected that governments and regulators will push companies to improve their sustainability performance through laws and incentives, thus creating threats and opportunities for this sector. Therefore, this mechanism should be interesting also for investors of this market and ESG ratings can be a useful instrument in the process.

These environmental and social challenges generate the need for investment by private companies in the development of solutions that reduce the environmental impact, but it is possible that this commitment does not give short-term results in the financial information of the company, therefore the non-financial information underlying the assessments ESG can help reward such investments and generate a short-term return in the form of increased funding.

ESG issues in the food and beverage market are also very relevant when analyzing the issue from the point of view of consumers. The growing awareness of sustainability issues is very present in the social dialogue regarding the agri-food world, thanks to the growing availability of information on the impact of the F&B industry and on the impact of one's diet on personal health. Consumers, therefore, believe that quality and provenance are very important aspects when it comes to their diet. The demand for organic foods, "zero kilometer" products, no-GMOs and products according to sustainable practices for workers and communities, has in fact been growing strongly for many years (note 7).

According to a Forbes research (note 8) "65% of consumers look for products that can help them live a more sustainable and socially responsible life, 60% of consumers buy products and

services from companies that are socially and or environmentally responsible, 54% of consumers try to purchase products or services from brands that take a stand on social or environmental issues, 43% tend to purchase products and services from high purpose brands more than from their low purpose competitors”.

This attention, awareness and search for healthy and sustainable food is generated by the distance that the consumer perceives between himself and the producer, i.e. how and where the food was produced (Weis, T., 2007). In this sense, globalization and industrialization lead to less control and therefore to a greater perception of risk. Indeed, scandals concerning food also often have a vast resonance, as they belong to the healthcare world and therefore to the life and health of people. Furthermore, the use of pesticides, dioxins, genetically modified organisms, intensive farming and breeding practices, use of artificial ingredients, dyes and additives, have contributed to the concern and feeling of loss of information on what they are taking.

The F&B industry satisfies basic human needs, therefore it is closely monitored (Hartmann, M., 2011). In fact, companies must comply with laws regarding food safety, production of raw materials, impact on the environment, working conditions, impact on the societies in which they operate, and quality of the finished product. Either this fact increases the importance of CSR.

However, this effort was not enough to prevent that the diet that has been established in the most developed nations, rich in excess calories, had increased diseases such as diabetes and obesity, while at the same time cases of intolerances such as gluten have increased too. In this sense, companies have responded to these problems by placing on the market more and more products with less sugar, low-calorie or suitable for certain types of intolerances. These corporate decisions are certainly motivated by the acquisition of new market shares, but many F&B companies are committed to promoting a healthy lifestyle, and this kind of commitments can certainly be included in a CSR assessment and therefore influence the ESG rating.

Speaking about sustainability, one of the most important references on the subject is undoubtedly provided by the Sustainable Development Goals by the United Nations (note 9). The F&B industry is related to most of the goals, but certainly those in which food production plays a fundamental role are goal 2 "Zero Hunger" and goals 14 and 15 "Life below water" and "Life on Land".

Goal 2 focuses on access to the possibility for everyone to have an adequate and safe supply of food available, paying attention to the presence of many people who still do not have enough

available. Goals 14 and 15, on the other hand, deal with the preservation of marine and terrestrial ecosystems, and in this field the food and beverage industry is one of the main contributors to the destruction of these natural environments, both due to crops and terrestrial livestock and marine. Many companies take the SDGs as a reference for their CSR activities, and companies in the F&B sector certainly play a central role in achieving these objectives. Investments and related activities are disclosed in their non-financial reporting, and the rating agencies that synthesize these efforts can then provide the public and investors with ratings they can use to discern and reward deserving companies.

A final fundamental CSR aspect in the F&B industry is represented by food waste. According to the Food and Agriculture Organization of the United Nations (Jan, O., et al. 2013) one third of the food produced worldwide is not consumed. This loss of value increases the environmental and social impact of food production, and for each region it occurs at different levels of the value chain: production, transport, sale and consumption. Companies can act on many levels and in an integrated way to solve the problem, but to reward this effort it is once again necessary to increase and improve the use of non-financial information, and ESG ratings can be a very useful tool. In general, the F&B industry is very involved in each of the three ESG aspects, the environmental impact in primis, but also the impact on local communities and governance aspects, fundamental to ensure the good management of the production of goods that have to do with people's health.

4.2 ESG impact on Business Model

Going deeper into the relation between investments and ESG corporate behaviours, it is useful to investigate how CSR aspects can be integrated into corporate business models, i.e. through which levers investments in CSR improve the position of the company and from which points of view it can return appreciable advantages.

Sustainability-based management is defined as that management style that pays strong attention to all the three aspects of sustainability (Environment, Social and Governance), and it certainly requires an in-depth and complex commitment both by those who manage the company and by those who are part of it. It is also a transversal aspect that affects all levels of the organization, from planning to execution, corporate culture, communication etc. A commitment like that requires also economic and financial costs, and for all these reasons some executives believe that the burden and the costs together finally outweigh the benefits.

However, the literature over time has investigated this issue in depth and has identified many aspects through which ESG aspects convey benefits to the organization, often assessing that the benefits exceed the costs to be incurred. Surely both the costs and the benefits are difficult to quantify, for this reason the problem is rather complex to be able to have an unequivocal answer, but an analysis reported by McKinsey (Henisz, W., Koller, T., Nuttall, R., 2019) concerning the impact of ESG propositions on equity returns, based on more than 2000 research, asserts that 63% of these studies reported a positive effect while only 8% reported a negative effect. In particular, the literature has identified the benefits obtainable thanks to sustainability-based management in the aspects described in the following chapters.

4.2.1 Status and engagement

Stakeholder engagement

Every company is an organization highly connected with the society and the environment in which it operates. This means that a company that operates focusing only about its outcomes without paying attention to what it generates around itself, or if it creates value only for the shareholders at the expense of the other stakeholders (supply chain, employees, communities, and also the planet itself), the company is effectively damaging their assets critical to business continuity and future success. According to this perspective, many market operators believe that companies can only create long-term value by creating shared value, i.e. managing to produce economic value while acting positively on the social and environmental problems associated with their business.

To do this, regular and continuous communication between the organization and its stakeholders is required in order to be able to manage its activities by learning from them. In this way the company is better positioned to anticipate and react to social and cultural changes by satisfying the needs that emerge over time. Furthermore, a predisposition like this makes the organization always ready to anticipate and proactively react to regulatory changes that may arise.

If the organization does not adopt such approach, an attitude contrary to the needs and wishes of the stakeholders can lead to conflicts that reduce cooperation. In this regard, it could be said that a company's attention to stakeholders does not necessarily originate from an ethical or responsibility motivation, but can also come from a farsighted personal interest.

Employee engagement

One of the most important categories of stakeholders is undoubtedly represented by employees. In particular, it has been shown that greater attention to these issues improves the motivation and therefore the productivity of workers, as they feel involved in activities that pay greater attention to the externalities of their production activities (Whelan, T., Fink, C., 2016). Alex Edmans (Alex Edmans, 2012) in a study conducted in 2012 found that the companies included in Fortune's "100 Best Companies to Work For" list generated from 2.3 to 3.8 percent higher stock's returns per year than their peers if analyzed over a period of 25 years.

These greater financial results originate from a sense of satisfaction in employees that arises when the employee knows that some of the outcomes of his work will be reinvested to achieve objectives that go beyond the financial remuneration of the shareholders, but instead will be directed toward good deeds such as donations to local charities. In such a situation, the worker will feel led to producing more than he is obliged to by his contract, therefore phenomena such as absenteeism and low productivity will be also reduced.

A positive work environment will also attract more quality employees, and will also be able to exploit this talent to implement their competitive advantages. Indeed, one of the most important asset that companies have in the long term is the human capital they can retain over time.

Return of image

The image, reputation and standing of the firm are at the center of modern marketing studies and theories, as they increasingly emphasize how much consumer choices are guided by emotional factors rather than rational reasonings. Then companies know well that they must take care of this aspect in order to maintain their market shares. However, this concept also applies to relations with other stakeholders, as a well-positioned company under this perspective will find it easier to establish relations with business partners, in which mutual trust often plays a fundamental role. But also it will facilitate relations with the authorities, regulators and communities, as the image that has been managed to build over time helps dialogue and the management of any conflicts.

In recent years the issues of CSR, both from an environmental point of view which is now very pressing, and as regards the issues of social impact and inclusiveness, have greatly increased their importance as regards the image and standing of companies. Therefore an organization that does not take these aspects into consideration while working to build a good self-image is probably doomed to failure in both the long and short term.

Sales Growth

Speaking about ESG investments and increased sales thinking about marketing and effects on responsible consumers who are interested in purchasing sustainable, eco-friendly, organic, fair-trade products, etc. is immediate, as this phenomenon is immediately recognizable in the packaging of many products on the markets (both as regards the commodity market and as regards more complex and expensive products). In fact, buying a product with a clear communication about sustainability is first of all perceived as a signal of quality to the consumer. The economic benefits of this effect are so great that the regulatory bodies are highly engaged with regulating permissions to insert this kind of claims on the packaging of the products.

Moreover, the sales benefits deriving from socially responsible behavior of companies do not stop attracting responsible consumers, but these benefits act also at a higher level. When governments and authorities have good trust in a company they are more willing to give it the access, licenses and approvals that allow the organization to increase its sales by reaching new markets (for example new geographical areas where approval by the state is required) or by expanding into the markets in which they already operate. For example, many public works around the world are developed through tenders that very often take into great consideration the ESG aspects of the participating companies, and often the contractor is also willing to pay significant "green premiums" to accept sustainable proposals. This also derives from a willingness on the part of government bodies to promote a sustainable and responsible attitude on their part.

These phenomena also occur in private deals of industries at various levels of the supply chain. According to a McKinsey survey, in industries such as automotive, building, electronics, and packaging categories, 70% of respondents answered that they would be willing to accept a 5% higher price to purchase an equivalent green product (Henisz, W., Koller, T., Nuttall, R., 2019).

Customer loyalty

Sustainable products have effects on consumers not only through an increase in the number of consumers but also through their loyalty. A consumer who buys a sustainable product will be less willing to replace it with a less sustainable alternative than the other way around. In fact, buying a sustainable product is a practice that has a lot to do with ethics as well as mere personal interest, so changing one's purchasing behavior toward a less sustainable competitor could create a slight sense of guilt or at least a small dissatisfaction that prevents to do that.

Furthermore, consumers who buy sustainable products tend to feel part of a shared social movement that strengthens their identity within the community context, and also the brand can be positioned in the minds of these buyers as a gate that allows to reach that goal. Once the consumer has achieved that status he will therefore have to bear a psychological cost to give up all this. Although this phenomenon may seem insignificant, it is useful to remember how big the social movement around these issues now is, and also how much consumers' purchasing decisions can depend on minimal differences in products and brand image in the tight competitive context of recent years.

4.2.2 Investor relations

Reduction of information asymmetries

Every time a firm has to deal with raising capital from an investor, the information asymmetry between insiders and investors plays a fundamental role. Anyone wishing to invest in a company should not be interested only in financial information, as this information only tells some aspects of the picture, but future results will also mainly depend on the real trend of the business, consumer relations, partners, commercial relations and relations with suppliers. We have seen in the previous paragraphs how much the ESG aspects of companies can have an impact on the real business of companies, especially as regards long-term competitiveness, therefore investors who are interested in excellent solidity even at the expense of lower financial performance in the short term will certainly be interested in thoroughly investigating aspects of CSR.

As non-financial information increases, investors will therefore have greater knowledge of the organization, in this way the risk is reduced thanks to the better ability to investigate the weaknesses of the business. Thanks to the reduced risk for investors, companies with better disclosure of ESG aspects accompanied by good ESG management should expect a reduction in the cost of capital. Furthermore, good ESG disclosure by companies reduces investors' monitoring costs.

Investors attention

Managers and all the decision makers of the organization that are evaluating their ESG strategies should evaluate the amount of capitals that can bring in thanks to this decision. It is not an easy task to evaluate how big is the relation between ESG ratings and amounts of investments, or either to evaluate how much a single ESG news generates an effect in the capital markets, but the fact that there is a positive effect between these two aspects (ESG behavior and investments) is not accompanied by strong doubts in the recent literature.

2015 EY Global Institutional Investor Survey demonstrates that institutional investors are more and more concerned about this aspect (EY Global Institutional Investor Survey). In this survey, respondents view non-financial disclosures as “essential” or “important” for making investment decisions, while only in 2014 this data accounted for 34.8%; 62.4% of investors are also concerned about the risk of stranded assets (assets that lose value prematurely due to environmental, social, or other external factors) and over one-third of respondents declared they have cut holdings of a company in the past year because of this risk. Moreover, as reported by Harvard, “companies with superior environmental performance experienced lower cost of debt by 40-45 basis points” (Whelan, T., Fink, C., 2016, p.7).

Agency costs

One of the agency costs that companies incur comes from the conflict of interest of company managers. In particular, the latter often have a greater interest in short-term financial performance than in the long-term interest coming from shareholders and debtholders. This happens because the permanence of top managers within companies does not expand over long periods of time, then, in order to obtain status and reputation in that short term, they often leave

out the company's solidity. Compensation solutions that take this issue into account often fail to completely eliminate the problem.

However, investing in ESG aspects often has medium to long-term results, so these investments demonstrate a positive focus on long-term profitability. Thus, these commitments reduce the risk for debtholders and shareholders and consequently should also have a negative effect on the cost of capital. In summary, investments in CSR should have a signaling effect from company managers toward capital providers about their goodwill about long-term perspective.

4.2.3 Company efficiency

Promote Innovation

Investing in ESG is not only a management tool, it also promotes innovation. To meet sustainability goals, firms have to reinvent, redesign and reshape their products and services toward a more responsible way.

There are several examples of this phenomenon. 3M made a commitment in this sense with their “Pollution Prevention Pays” program thanks to which they developed the first viable, sustainable fire suppression fluids alternative to hydrofluorocarbons. Nike created the \$1 billion-plus Flyknit line, which uses a specialized yarn system, requiring minimal labor, reducing waste by 80% compared with regular cut-and-sew footwear. Proctor & Gamble in 2005 launched a U.S. and European line of cold-water detergents that require 50% less energy than warm-water washing. The Dutch flower industry instead developed a closed-loop system that grows flowers hydroponically in greenhouses, lowering the risk of infestation and reducing the use of fertilizers and pesticides. The system also improves product quality by creating regulated growing conditions (Whelan, T., Fink, C., 2016).

These are only few examples of the products that are revolutionizing the market and that were born thanks to the innovation derived from a focus toward sustainability. Often these products also allow for lower costs and higher revenues thanks to the willingness of consumers to buy sustainable products, also even with a significant increase in price.

Cost reduction

Analyzing the amount of innovation CSR can bring, it is straight forward to highlight the cost reduction that an ESG concern can drive. Firstly, environmental sustainability is strictly connected with responsible use of materials, reducing their use and waste of them, paired with an attention to the impact that these materials have on the environment. By using smaller quantities of materials, promoting recycling and the use of renewable resources, companies can drastically reduce the costs of their products. It could be said that attention to reducing costs for the planet helps to adopt practices that reduce costs for the individual company and for the economy in general.

McKinsey claims that executing ESG can affect operating profits by as much as 60 percent (Henisz, W., Koller, T., Nuttall, R., 2019). Moreover, they have found a significant correlation between resource efficiency and financial performance.

For example, FedEx aims to convert its entire 35,000-vehicle fleet to electric or hybrid engines. Until 2019 20% of the fleet has been converted, and the company reported a reduction in fuel consumption by more than 50 million gallons (Witold J. Henisz, 2016).

Asset optimization

Investments in ESG aspects are also useful for driving firms toward allocating capital to more promising and more resilient assets such as waste reduction machinery, energy-efficient plants and electric fleets. This can also permit companies to avoid stranded investments that may not pay off because of longer-term environmental issues (such as write downs in the value of oil or gas tankers)

When dealing with this issue a do-nothing approach could be the riskier, because it can usually tramutate to an eroding line, not a straight line. By continuing to rely on environmentally harmful technologies, the company will incur additional costs when regulations do not allow the use of such technologies and related assets have almost completely lost their value. This phenomenon also occurs with regard to products.

For example, from 2035 all new cars arriving on the European market must have zero emissions (note 10). This means that all assets related to the use of fuel technologies in the automotive sector will suffer large losses in value, but on the other hand companies that are in the path of electrification of their products will be able to enjoy an important competitive advantage and also been able to anticipate this delicate phase of change.

These dynamics are happening across many sectors, from consumer products to heavy industries. The building sector is also strongly influenced, as more and more sustainable technologies (substitutes for cement, innovations for the energy efficiency of structures, low-impact air conditioning systems, etc.) are conquering the market and are obtaining tax advantages from governments, while high environmental impact technologies is continuing to face substantial losses in value, and they probably will face this problem more and more as the time pass.

Risk Management

While globalization growth was steady and unstoppable during last decades, supply chains have extended around the globe. Now, climate change is increasing environmental and social risks that put this global supply chain in difficulty. Unlike traditional forms of business risks, these kinds of risks manifest themselves over a long-term period, affect the business on many levels and are difficult to avoid, mainly because they concern the whole economic and social framework. Today firms have to deal with this situation acting for long-term resilience and adaptability, and they need to fully understand which are the most critical situations around their business and what the future of their sector will be.

In the food and beverage sector this issue is already crucial. Extreme weather events, drought, destruction of ecosystems and alteration of temperatures and seasons are already getting in trouble many farmers and businesses around the world. In this situation acting to preserve the main asset of the sector (the nature itself) becomes fundamental in order to be able to defend the continuity of operations. The food and beverage company that harms the land where it operates is harming the source of all its raw materials and the fundamental origin of its supply.

In fact, many companies in this sector are highly focused on this issue. For example, companies like Mars, Unilever, and Nespresso have invested in Rainforest Alliance certification, and Coca-Cola has invested two billion dollars to reduce water use and improve water supply in the communities in which it operates, after the company in 2004 was forced to shut down one of its plants in India due to water scarcity.

Reduction of litigation and regulatory interventions

One of the most common benefits when it comes to good ESG management is the reduction of legal costs for litigations and legal actions. However, the objective of ESG management must not be limited to good compliance with existing laws, but adopt good conduct beyond laws and actual regulations. In fact, attention to CSR must have the objective of obtaining a wider freedom of action that arises from a lower regulatory pressure (i.e. avoiding adverse government actions) but also stimulating support from the government. According to an analysis by Mckinsey (Henisz, W., Koller, T., Nuttall, R., 2019) typically one-third of corporate profits are at risk from state intervention. Risks of this type can vary greatly from industry to industry, as shown in the table below, but in any case the interest at stake is always very high: it goes from 50-60% of EBITDA at stake for Banks and Automotive industries to 25-30% of Pharma and Healthcare. These data, albeit very high, do not include the image damage that is linked to state intervention against a company, which brands often lose a share of consumer trust.

4.3 ESG and financial metrics

4.3.1 Value relevance of ESG news

Wanting to analyze the relations between ESG aspects, corporate financial metrics and the capital and investment market, it is necessary to investigate the link between ESG information and the markets reactions. Some examples of this type of relation are evident, and concern ethical scandals such as damage to the environment, corporate fraud, health laws not respected or unsafe products for consumers, but also accidental damages that have caused negative impacts on the territory. Events of this type have always seriously endangered business stability and jeopardized financing and investment by capital providers. Negative consumer reactions can challenge cash flow stability and the company's ability to repay debt and/or achieve the financial results required by shareholders. Furthermore, the damage to the image can also cause problems for companies in relations with customers and suppliers, and therefore have problems in continuing their operations.

Beyond the extreme, episodic or anecdotal events, the literature has been concerned with studying this phenomenon in depth, i.e. how much news referring to ESG topics generated reactions in investors. In fact, CSR does not consist only in avoiding extreme events, but rather it should be implemented by integrating it into the daily operations of the company and at all company levels (Capelle-Blancard, G., Petit, A., 2017).

These analyzes quantify these effects by differentiating them by sector, source of information, type of news (good or bad), company characteristics and much more, thus providing in-depth analyzes of the variables that increase or decrease the effects of ESG news on the markets of the capitals.

ESG news can come from different sources, such as newspapers, corporate press reviews or non-governmental organizations. The question that many researchers have asked themselves is, therefore, related to which of these sources have a greater impact, which of the three ESG aspects the public is most sensitive to in investment decisions and finally how much and how the market is influenced by this information. These studies are therefore essential to investigate how much and how this type of non-financial information is taken into consideration, as this element has an effect on investment decisions, corporate strategies and ultimately the direction of the economy in general.

First of all, you need to ask where the value relevance of ESG news comes from. News of this type should have an impact on investment decisions as there are many reasons to think that ESG aspects could be significantly correlated with the financial performance of the stock, therefore also the investor interested only in economic remuneration should take this information into consideration. Furthermore, many investors in recent years have not used ESG information for the sole purpose of a greater economic return, but also for the purpose of directing the economy toward sustainable business models, either bearing the cost of losing some profits. Even in this case, news related to ESG issues should have a significant impact.

According to the signaling theory, the relevance of ESG news is born from the information asymmetries between insiders (managers) and outsiders (investors, lenders etc.). In fact, individuals external to the organization have much less non-financial information correlated with the company's performance, therefore any news of this type that reaches their knowledge should reduce this gap and contextually be relevant for their investment decisions (Cui, B., Docherty, P., 2020). This theory is supported by empirical evidence as most of the studies on this phenomenon show that not all companies are equally affected by the disclosure of positive or negative ESG news. In fact, companies with smaller capital (typically not S&P500 constituents) experience bigger effects of ESG news, precisely because being companies with small dimensions non-financial news is less frequent, thus one more piece of news add a relatively greater share of information.

The resource-based view integrates this perspective by defining CSR practices as an intangible asset. This asset can therefore create a competitive advantage and consequently lead to abnormal performance as it is difficult to replicate, develop or purchase from competitors (Cui, B., Docherty, P., 2020).

The effects of ESG information vary according to the type of investor who uses this information. Hartzmark and Sussman (Hartzmark, S., & Sussman, A. 2019) identify how the perception of sustainability has an impact on mutual funds, realizing that this kind of investors have a high sensitivity to ESG issues. Cheng, Green and Ko (Cheng, M., Green, W., & Ko, J. 2015), on the other hand, using a sample of graduate masters students, experimented that for this type of subject ESG aspects have an above-average relevance and analyzed in detail the relations with the business strategy. The study by Martin and Moser (Martin, P., & Moser, D. 2016) also uses university students to prove that they react positively to decisions by managers to contribute to environmental charitable funds, even if those decisions reduce the company's cash flow.

Some authors, on the other hand, wondered whether excessive attention to ESG issues could distract from the fundamentals of corporate value and therefore worsen investment decisions, as argued by Cao et al. (Cao, J., Titman, S., Zhan, X., & Zhang, W. E. 2019). Starks, Venkat, and Zhu (Starks, L.T., Venkat, P. and Zhu, Q., 2017) also support a similar thesis, namely that CSR-based funds tend to be reluctant to sell stocks with high ESG ratings, even in the case of receiving negative information about other aspects of the firm. Bias like these would first of all lead to a reduction in portfolio performance, as some information would be overestimated in their importance compared to others, and would also incentivize managers to focus more than necessary on CSR issues. Finally, phenomena of this type would lead to a mispricing of securities with high ESG values, and consequently would increase the yield of securities with low ESG values as they would be underpriced and thus leading to outperforming in the market.

Beyond the type of investor, what makes news referring to ESG issues more or less relevant in terms of its effects on the capital market concerns the characteristics of the company. Companies with a good reputation, for example, seem to suffer much more from negative news (Boon Wong, J., Zhang, Q., 2022). This is justifiable using the resource-based view as companies with a better reputation make their image a more important asset for their business model than companies with a less-than-optimal reputation. In this sense, reputation takes the form of an important intangible asset that affects investors' own valuations and decisions.

The industry to which the firm belongs is also correlated with the size of the impact of news related to CSR (Boon Wong, J., Zhang, Q., 2022). As analyzed by Hong and Kacperczyk (Hong, H., & Kacperczyk, M., 2009), the level of attention toward companies by the various stakeholders is different according to the reference industry. Jin Boon Wong and Qin Zhang (Boon Wong, J., Zhang, Q., 2022) deal with this by developing a regression that takes into account the cross-industry heterogeneity. Their results suggest that companies that are part of the "sin industries" (tobacco, alcohol, weapons etc..) get almost no reaction to adverse ESG-related media news. This occurs both thanks to the fact that this type of industry does not pay much attention to news related to CSR by their stakeholders, but also thanks to the fact that their business models are not dependent on this type of image damage, therefore shareholders interested in the performance of the stock have no reason to consider this information in their investment decisions.

Furthermore, it is reasonable that this news does not affect those who have already decided to invest in this kind of industries, but rather could only affect those who have not yet purchased these shares and are undecided about doing so, as further negative news regarding CSR issues can lead them to give up the investment even in the face of good financial results, leading to a situation of underprice of the securities in question. However, this would not be highlighted by an analysis of disinvestment, but rather this phenomenon would materialize itself with a systematic underpricing that has already been highlighted by the literature (Fauver, L., & McDonald IV, M. B., 2014)

Again in the publication by Jin Boon Wong and Qin Zhang Lee (Boon Wong, J., Zhang, Q., 2022) the regression analyzes suggest that the financial sector is particularly affected by negative news. In particular, the sectors analyzed were the banking and insurance sectors. The banking sector indeed may shows this kind of sensitivity because it has been prone to scandals in the past that have had particularly negative effects on large sections of the economy, thus the ethical aspects are therefore very important to continuity within this sector. A similar argument also applies to the insurance sector, as these entities have the responsibility that comes from the management of large amount of capitals and also their business is based on the trust that customers give them, if not they will not be able to sell their services.

Capelle-Blancard and Aurélien Petit (Capelle-Blancard, G., Petit, A., 2017) investigated also the different impact of the source of ESG news, finding that the nature of the media has very little importance in the magnitude of the market reaction to ESG news, and they also found that

positive news has little or no impact on the markets while negative ESG news has a significant impact (around 0.1% on a window of three days around the announcement, on average).

4.3.2 How CSR influences financial performance

In recent years, the descriptions of corporate missions have significantly changed. While in the past the focus was only on the key for generating profits, recently the focus has shifted to the creation of sustainable business models that can create long-term value. At the same time, even the fundamental assets for companies have shifted toward a greater importance of intangible assets such as reputation, customer loyalty, relationships with commercial partners or corporate culture. This is demonstrated by the fact that in 2019 the 84% of the value of companies in the S&P500 consisted of intangible assets (note 11)

These elements signal an ongoing change in corporate strategies and in the business in general, but how is this change reflected in the financial results? Approaches that focus on the ESG aspects of companies will achieve long-term benefits that are difficult to quantify and often escape financial analyses, but many researchers have tried to statistically analyze the relations between CSR engagement (measured in most cases by various ESG ratings provided by rating agencies such as MSCI, ISS, Sustainalytics, Refinitiv, etc) and profits.

Most of these researches affirm that there is a positive relation between these two variables, but many researchers affirm that these results are “ambiguous, inconclusive, or contradictory” (Friede, G., Bush, T., Bassen, A., 2015, p.3). These doubts originate from the methodology for measuring the commitment to CSR and the durability of the effects of these investments, which is why the debate is still very open. To put order and give meaning to the many analyzes on the topic, Gunnar Friede, Timo Busch and Alexander Bassen (Friede, G., Bush, T., Bassen, A., 2015) have aggregated the results of more than 2000 analyzes conducted from 1970 to 2015. For each research analyzed, the analysis by Friede et al. takes into account the following characteristics: the focus (E, S or G), the number of observations used, the average correlation "r", and finally the results obtained (positive, neutral, negative or mixed correlation). In this way they were able to calculate the share of positive and negative findings using both the meta-analysis and the vote-count method, i.e. counting the number of negative and positive studies.

Through the meta-analysis, 62.6% of the results confirm the hypothesis that the relation is positive, while only 8% of the results indicate a negative relation between ESG and financial

results. Even using the vote-count method, the proportion does not vary much, in fact the positive results concern 47.9% compared to a percentage of studies that support the negative hypothesis settle around 7%.

Then, the authors used a similar analysis process to investigate the differences between the three factors (E, S or G) on financial performance. In this way, the "Governance" element turned out to be the one that most positively impacts the financial results, with 62.3% of the studies supporting this thesis. Counter-intuitively, however, the "G" component is also the one that obtains the largest share of negative results with 9.2%. Therefore, observing the greater ratio between positive and negative results, the "Environmental" component obtains the primacy, with a ratio of 58.7-4.3%. The "Social" aspect, on the other hand, seems to have the weakest relation with financial results, with values of 55.1% (5.1%) of positive (negative) outcomes.

Another interesting question is about the difference that the geographical area could have on this relation. Nations with a greater orientation toward human rights and land conservation should show a stronger and more positive relation between CSR and financial results. Friede et al. instead they observed that the percentage of studies that affirm a positive relation arises when it comes to studies conducted on emerging markets. The authors do not provide a reading of these data, but it is possible to imagine that in emerging markets the commitment to CSR activities is possible only for those companies that manage to have a high financial performance, and that therefore CSR is seen and used more as a "luxury" that only companies that have good and stable profits can afford, while other companies do not consider ESG aspects to be a priority and therefore these kinds of investments remain low for this type of companies.

A final aspect to analyze is whether the relation between CSR and financial results has evolved over time. In fact, it can be imagined that if there had been a positive relation between these two variables, through the learning effect even companies that in the past did not leverage ESG factors to improve their performance, would have learned over time to do so and this way neutralizing CSR as a tool to create a competitive advantage, eliminating or reducing the relation between ESG and profits over time. Friede et al. in the same study also address this problem, but find no indication in the data that this effect has occurred. While the dispersion of negative and positive effects has indeed increased, the overall effect appears to have remained the same since the 1990s at the time they conducted the study (2015).

4.3.3 ESG impact on Cost of Capital

Continuing to analyze how ESG aspects can influence the value of a company, many scholars have observed that there may be a relation between CSR and the cost of capital, in particular the cost of equity. In general, the hypothesis most supported in the literature is that CSR practices can reduce the cost of equity. This theoretically occurs thanks to some advantages already mentioned, such as better financial performance, firm specific factors such as employee engagement and reduced risk and finally external factors such as stakeholder relations, customer loyalty and reputation (Aguinis, H.; Glavas, A 2012). Dhaliwal et al. for example claims that increased CSR disclosure activities lowered the cost of equity in subsequent years (Dhaliwal, D.S.; Li, O.Z.; Tsang, A.; Yang, Y.G., 2011). Ng and Rezaee (Ng, A.C.; Rezaee, Z 2015) also find similar results, but only for what concern Environmental and Social pillars.

Raimo et al. (Raimo, N., et al., 2020) investigated this issue in the context of the food and beverage market, underlining how sensitive this industry is to the relation between ESG issues, corporate risk and financial performance. In fact, this industry not only has a strong environmental impact, but being the source of products that satisfy basic human needs connected with health, it is an industry subject to strong regulation as regards non-financial issues. The information asymmetry between companies and investors frequently concerns these issues, as the financial disclosure is unable to deliver this kind of information. All these factors should generate a significant effect of ESG aspects on the cost of equity. In fact, the variable representing the ESG value is negative and statistically significant at the 1% level.

A lower cost of equity allows the firm to obtain more capital, and above all because attention to non-financial issues and the disclosure of the same is essential to inform the investor on key issues for the dynamics of the business such as traceability, quality of raw materials and product safety.

For this reason, companies operating in this sector should not limit themselves to disclosing such non-financial information only in sustainability reports and annual financial statements, but also integrate more direct information channels such as the corporate website or press releases, without neglecting the importance that social channels can have in conveying this information not only to investors, but also to other interested stakeholders such as consumers. In fact, the beneficial effects of non-financial disclosure are not obtained only thanks to the accurate analysis of technical data as can be the case with regard to financial information, but rather often the advantages of good ESG disclosure are obtained thanks to a multi-level information campaign channel which aims to give a positive impression of the company.

4.4 ESG integration in asset management

4.4.1 ESG and investment behaviour

According to the Global Sustainable Investment Review (Global Sustainable Investment Review 2018) over the world the amount of capital invested following responsible investment criteria across the world was over US\$ 30 trillion in 2018, and this kind of investments are more common in Europe, while the US market was showing an higher growth. The United States Forum on Sustainable and Responsible Investment Foundation (SIF) instead shows that assets under management (AUM) based on ESG strategies amount to US\$ 12 trillion in the same year, but the Principles of Responsible Investing (the largest global network of institutional investors committed to considering ESG issues in their investment processes) amounted to US\$ 85 trillion in AUM at the end of 2019. Those numbers show that is arguable the dimension of the responsible investing movement around the world and that it is difficult to have a common definition of which is a responsible investment and which is not, but one statement is doubtless: many investors and analysts believe in the potential of ESG aspects and this opinion is growing. The question is then how can these aspects be integrated into an investment strategy and which investment strategies can be more interested in this type of analysis.

First of all, the investor interested in the performance of a stock will ask himself whether the integration of an ESG strategy has a positive or negative impact. In fact, by limiting the universe of possible investments there is a reduction of optimal diversification that induces a cost and hence lower portfolio returns. Furthermore, we have already seen how underpricing "sin" stocks can generate above-average returns by investing in such stocks, so excluding these companies from your portfolio can reduce returns. On the other hand, it is reasonable to think that higher returns of "sin" stocks may derive from the greater social and legal risks that these companies bear. Bolton and Kacperczyk (Bolton, P., and Kacperczyk, M., 2020) found the same phenomenon with CO2 emissions: stocks with higher emissions show higher returns. One reason why these phenomena occur is divestment by institutional investors in such environmentally-unfriendly firms.

On the other hand, socially responsible funds may show abnormal returns if the positive impact of corporate ESG policies is temporarily underestimated by the market. Furthermore, even if the integration of these assessments does not lead to higher returns or even leads to lower

returns, a positive ESG assessment brings capital inflows from socially conscious investors. Hartzmark and Sussman (Hartzmark, S.M. and Sussman, A.B., 2019) demonstrated this correlation by analyzing the effect of the introduction of Morningstar ESG ratings in 2016, when funds with high ESG ratings showed subsequently capital inflows while low ESG ratings stocks showed significant money outflows. A similar effect was evidenced by Renneboog, Ter Horst and Zhang (Renneboog, L., ter Horst, J., and Zhang, C., 2011) who stated that even in the case of returns lower than expected, investors in SRI funds do not withdraw their investments. This behavior is defined by the authors as an “ethical dividend” that these investors receive when investing in a responsible way. Also inspecting the personal reasons why investors follow those kinds of strategies Riedl and Smeets (Riedl, A. and Smeets, P., 2017) found that the most important driver for investors to hold socially responsible mutual funds is the social preference rather than financial goals.

In another research conducted by Florian Berg (Berg, F., Heeb, F., Kolbel, J., 2022) it is analyzed the effects of ESG ratings on the capital markets, in particular for what regards mutual funds. Using ratings by MSCI as data source, it is shown that a downgrade in the ESG rating results in a significant investment loss by mutual funds with a dedicated ESG focus, while an upgrade results in the opposite. However, the downgrade has a stronger effect than the upgrade, which for companies would mean a greater concern in not suffering a downgrade rather than an incentive to reach for an upgrade. As far as the reaction to these downgrades is concerned, however, companies react significantly only with regard to the Governance dimension, and without an increase in capital expenditure being paid.

In addition, another effect of ESG ratings that influences the capital market has been studied in depth in the literature. "Green" companies with excellent ESG practices and good ratings from rating agencies on average obtain a preference from investors compared to "grey" companies that do not or little deal with these issues. This phenomenon drives up the asset prices of Green companies, causing their expected returns to decrease. Conversely, “Grey” companies or even more so “sin stocks” receive fewer equity investments and therefore their expected return increases, making the advantages of investing in companies that engage in CSR practices extensively less strong.

The ethical purpose is not the only or the main reason of pursuing a deep ESG analysis of the investment portfolio. Krueger, Sautner and Starks (Krueger, P., Sautner, Z. and Starks, L.T., 201) find that 40% of respondents believe climate risks have financial implications for their portfolio firms, using a survey of over 400 large institutional investors. Most of respondents

had the opinion that the best way of dealing with climate change and risks generated by the rising of economic activity around the world will not be the underinvestment when and where problems arise, but instead proactively manage the risks by choosing a forward-looking investment strategy that rewards positive corporate behaviors.

It is common to see in the literature about ESG investing that institutional investors are the ones more concerned about companies' ESG practices. One reason for this is the higher long-term investment horizon that those investors typically have. The results of Gibson and Krueger (Gibson, R., and Krueger, P., 2018) support this opinion: investors with higher ESG portfolio footprints have higher risk-adjusted returns in the long-term, especially for what regards environmental issues.

Currently, there is no consensus as to whether an ESG-based investment strategy hurts or improves performance. The spectrum of opinions ranges from strongly negative positions (Albuquerque, R., Koskinen, Y. and Zhang, C., 2019) to other opinions that exalt the performance of ESG aspects to the point of saying that “the outperformance of ESG strategies is beyond doubt” (James, K. 2017).

In order to make order in this field, Pedersen, Fitzgibbons, and Pomorski (Pedersen, L.H., Fitzgibbons, S. and Pomorski, L., 2019) defined three kinds of investors: (i) the ones who do not even consider the ESG aspects of firms and they have the only goal of maximizing their return/risk utility considering all the universe of assets; (ii) the ones who are aware of ESG scores and use them to help evaluate risks and expected returns; and (iii) the ones that have strong preferences for high ESG stocks in their investment decisions. The question is whether the higher assets universe of (i) investors and their possibility to makes use of “sin” stocks can counterbalance the advantages of a possible underprice of ESG benefits in business operations that (iii) investors may face. In this view, type (ii) investors suffer the limitation the assets universe while not making full advantage of ESG benefits.

In order to develop an investment strategy that make extended use of ESG data, investment funds have to attract and retain the necessary talent, and, in addition to this, they also have to bear the costs associated with acquiring o producing relevant ESG data, as well as the friction costs of reevaluating and changing the investment process. These costs could be offset by incremental returns generated by these improvements. In the worst case, instead, in addition to increasing costs, ineffective ESG integration may slow down, confuse or impede the investment process, further negatively impacting performance (Cappucci, M., 2018). Michael Barnett and

Robert Salomon (Michael L. Barnett, Robert M. Salomon, 2006) in a study conducted in 2006 stated that the relation between financial and social performance of certain ESG strategies is curvilinear. This means that at the beginning of the integration of the ESG evaluation process (i.e. intensity of sustainability efforts ramp up), financial performance at first shows a decline before it returns to the initial level and then eventually improves.

They used SRI funds data from 1972 to 2000. Funds that used a limited number of ethical screens showed the worst performance, meaning that these funds was “stuck in the middle”, because they was bearing the costs of ESG integration process while not taking full advantage of this strategy, that is finding the best-in-class companies from this perspective. Indeed, the authors found that as the number of screens increased, financial returns improved. The authors also explain this pattern by hypothesizing that the enhanced data set created by the layered process enables managers to pick from an increasingly rich pool of well-managed companies. These results led them to assert that investment managers should either commit to a fully integrated and broad ESG strategy or only adopt measures that do not interfere with their ability to diversify risk.

In other words, integrating ESG valuations in the investment process is not a strategy for the half-committed (Cappucci, M., 2018). Approaching ESG integration only from a risk management perspective, investors may well find themselves underperforming their peers (Kotsantonis, S., Pinney, C., Serafeim, G., 2016). Yet, there are several studies that support the thesis that the overwhelming majority of investment managers have not implemented a strategy of full ESG integration, while taking in consideration ESG aspects in an effortless way is common.

One of the most representative of them is made by a trio of European researchers, Emiel van Durren, Auke Plantinga and Bert Scholtens (Emiel van Duuren, Auke Plantinga, and Bert Scholtens, 2015) that found that on a scale from one (no integration) to four (full integration), the average self-reported ESG integration score was 2.33, with a standard deviation of 0.77. To get this information, they used an online questionnaire to survey more than one hundred portfolio managers. Moreover, voluntary surveys like these likely overstate the ESG integration of the investment managers, because ESG underperformers and skeptics are less apt to respond.

Going deeper into the analysis of how investors make use of ESG data, it is important to note that not only ratings are useful information provided by rating agencies, but also the underlying data sometimes is used more than ratings themselves. Ratings in fact are often used as a starting

point to help them understand specific assets, or either for excluding worsts assets or highlighting best-in-class firms. This phenomenon is well described in a publication made by SustainAbility: “Rate the Raters: Investors Survey and Interview Results” (Wong, C., et al. 2020).

In their survey, 71% of respondents said that the reason of their use of ESG ratings comes from investment performance, while 35% assert that it comes from the growing demand by key stakeholders. The reputational effect of using ESG ratings in their investment decisions is declared by only 6% of respondents, and this supports the idea that there are concrete reasons for using them apart from improving their image.

The average respondent of this survey takes in serious consideration of ESG aspects in their investment decisions, because “almost all investors interviewed described sophisticated approaches to ESG analysis, where ratings inform rather than drive investment decision-making”. Interestingly, active managers claim the importance of which ESG factors are most important in a specific sector, and thus developing their own evaluation method. In order to do that, they use their own tools, KPIs, processes and scores to find their own answers about sell or hold decisions. Making the decision to sell a share just because it has been downgraded by a rating agency would mean using ESG information too effortlessly and finding yourself fully in the lower part of the yield curve described above. Using the reasoning of a respondent, in order to build the correct set of tools for investment decisions it is required to use the correct question: “what things will change due to climate change?” And how will they affect regulations and companies’ performance?

For most of respondents ESG scores are not the end of the ESG process, instead they are used at the beginning of a more sophisticated process. They can be used for identifying outliers, or for benchmarking a company against their peers, or to get rapidly a general impression of a sector. Specific ESG scores (environmental, social and governance) could be also useful for signaling the necessity of deepening a particular aspect of a company by searching for more detailed information, for example in the case of good scores overall but low score on a single score. The most adopted use of scores is building an alarming system that informs investment teams on a periodical basis, so they can analyze further when necessary.

Moreover, investors claim that a very useful service provided by rating agencies is the underlying data other than scores. Indeed, agencies provide detailed data such as CO₂, use of water or human capital data in a standardized way, so that the investor can compare this data in

an easier way than searching for the same information on his own. These data could be used also for creating specific KPIs and internal scoring methodologies, this way the ESG data are collected and analyzed in an efficient way. For these reasons, some investors are more interested about the quality of the underlying data than the quality of the scores. Sometimes, investors buy multiple data providers and then throw out the scores. This is an important reason why coverage and granularity of data are critical features for the quality of an ESG data provider

Another important aspect analyzed in the survey by SustainAbility is how the ESG analysis is embedded in the organization of an organization that manages big equity capital, such as institutional investors. Today, many large assets managers have specific teams responsible for ESG assessment and decision-making. How these teams are structured and used by the organizations influences the way ESG aspects contribute to buy or sell decisions. The survey revealed three types of structures:

Independent ESG team: it is built as a separate team that conducts ESG analyzes in order to convey information already processed to the main investment functions. In this case, these people have the access to ESG data provider and are the only experts about these aspects. In this way, people of this team have a deep knowledge of ESG but are not very well integrated in investment questions, problems and critical issues.

Partial Integration and Internal ESG Expert Team: the most common structure is based on having ESG research spread across the organization, built into the training and day-to-day work of investment teams and portfolio managers. This way everyone shares common processes, templates and scorecard that help them in their investment decisions. For supporting this process there are often some ESG experts that can be used by the teams for solving or improving specific needs.

Full ESG Integration: the most sophisticated structure is the full ESG integration. Similar to partial integration, full integration expects that each analyst, product manager or portfolio manager have a deep understanding of ESG and has his own tailored tools for integrating ESG in their job function.

Different from using ESG data for buy-sell decisions, another category of green investments is ESG activism. Some of institutional investors concerned about ESG aspects actively engage with companies they have in their portfolios. In particular, these investors make use of large

shares in companies in order to have the power to effectively push managers and decision-makers of these firms toward improvements in their environmental, social and governance aspects.

These funds are commonly called “fourth generation funds”. This strategy combined the benefits of sustainable investing approach (third generation funds) with shareholders activism. This strategy recalls the ones used by other active investors such as hedge funds that leverage firms’ value through asset and financial restructuring and business improvements, but instead of doing so, it leverages the redirection of the business toward a sustainable future and taking advantage of a strong position in the market in the long term. This kind of investment behaviour trust a top-down model of reshaping the landscape of social responsibility, namely instead on relying on changes in customers behaviours that drive changes in firms’ behaviour, it rely in a proactive switch that will find a competitive advantage when the market conditions will change. In a few words, it’s not about reacting to change but creating the change.

Barko, Cremers and Renneboog (Barko, T., Cremers, M., and Renneboog, L., 2018) analyzed ESG activism in an international context and found that the firms chosen by these funds had typically low ex-ante ESG ratings, high market shares and are followed by a high number of analysts than their peers. As expected, they found that the ESG ratings raise during the activism, but this is not true for high ex-ante ESG rated firms, which show negative corrections of their ratings during the period. This effect is probably caused by an increase of CSR information disclosure that was not previously incorporated in their ratings. Apart from ESG ratings, the authors didn’t find any increase in accounting performance after the engagement, but curiously there was an increase in sales growth. This confirms that an increase in corporate responsibility appeals to a broader share of customers.

An important type of investor are Sovereign Wealth Funds (SWFs). Because of their big size and liquidity, they are potentially able to have a strong impact on the economy only using their investment decisions. These funds have a significant interest in returns for sure, but because they should aim to an increase in shared value of the communities they represent, they should strongly evaluate ESG aspects in their investment decisions. Moreover, nearly 200 countries committed to enforce and promote green finance following the 2015 Paris Agreement on climate change.

Liang and Renneboog (Liang, H., Renneboog, L., 2020) stated that SWFs consider ESG ratings in their portfolios, but the results are mixed and represent those funds that have an ESG policy

(such as the Norwegian oil fund). The authors also stated that ESG scores do not vary significantly more for those firms in which SWFs have interests in. This means that those funds do not actively engage with companies, but only drive for sustainability through their investment decisions and consequent capital inflows.

Another important trend in the green finance landscape is the so-called “impact investing”, namely private equity funds that seek financial returns alongside positive environmental and social impact, such as generating access to education, energy, water or healthcare, renewable energy, affordable housing etc. According to Global Impact Investing Network (*Annual Impact Investor Survey*, 2019) the size of the global impact investing market has grown from US\$ 114 billion in 2017 to US\$ 228 billion in 2018, up to more than US\$ 500 billion by April 2019, thus doubling its size every year.

Barber, Morse and Yasuda (Barber, B.M., Morse, A. and Yasuda, A., 2020) examine the performance of this kind of funds comparing them to traditional funds, finding that impact investing show lower returns. Therefore, the success of the formula relies on the appeal of realizing positive returns while doing something good, so it is similar to a form of charity but without planning to lose money.

4.4.2 Investment styles

In this section, we will dive into some investment styles and how ESG information can relate to them. An investment style is the method, the strategy and philosophy used by an investor or portfolio manager to identify risks and opportunities, and consequently make his own investment decisions. Many investment styles have been identified over time using factors such as risk tolerance, time horizon or company size. Financial ratios such as price/earnings or market-to-book ratio are also used to identify a style. Those styles are also used by institutional investors for marketing activities, i.e. to inform investors about the specific type of market exposure.

Investment styles, therefore, do not concern the type of investor (pension funds, mutual funds, insurance companies, etc.) but his conduct and his beliefs with respect to what maximizes the return/risk ratio, always taking into account his time horizon. However, an individual investor may use various investment styles to differentiate his portfolio also in this respect, as the

performance of securities held using a single investment style has a greater correlation than a portfolio that differentiates the various investment styles (Fidelity Investments, 2022).

The most common investment styles, i.e. growth, value, momentum, index, income, quality, buy and hold etc, do not explicitly take into account ESG aspects. At least, the literature does not consider ESG factors as determining factors in defining an investment style, even if building a portfolio on the basis of CSR information can be considered an investment style itself. For this reason, investigating how and if ESG aspects are taken into consideration by the various investment styles contributes to updating their definition and deepens their characteristics, allowing them to be better understood.

In the following, the literature concerning the investment styles that are part of this study and which will therefore be used in the experimental part will be deepened.

Growth Investing

The aim of growth investing strategy is to increase the investor's capital. This objective is achieved through the purchase of shares whose value is expected to grow, namely by choosing those companies whose earnings will increase at a higher rate than their peers or the market overall. This strategy could be interesting because if successful, the return on investment can be very high. On the other hand, if the company finds it difficult to grow it can put the investor in a rather risky situation.

Indeed, growth stocks are being traded at a high price/earnings ratio most of the time, because they are often young and expanding, with high level of investments for growth, low earnings and high prices because of their potential. They also may have access to patents that put them ahead of other in their industry, or rather they operate in high-growth industries where new technologies and services are being developed. Beyond individual interpretation and subjective factors, there are a few criteria that investors commonly use to identify growth stocks (Segal, T., Mansa, J., 2021):

3. **Historical earnings per share growth:** showing solid and strong earnings growth over the past five or ten years signals a promising trend for the future. Moreover, the minimum

amount of growth needed to be identified as a growing stock decreases as the size of the company increases.

4. **Earnings announcements:** this information disclosed by companies is strongly taken into account by those who follow this strategy. However, this information only concerns the near future.
5. **Profit margins:** in order to identify promising stocks it is necessary to look for strong profit margins, because sales growth cannot generate high earnings growth without good profit margins. Furthermore, margins do not vary too much during the growth of a company, except in the presence of strong economies of scale.
6. **ROE performance:** beyond a high ROE, for growth investments a stable or increasing ROE is crucial because it means that the company is able to maintain returns from shareholder's investments as the size of operations increases.
5. **Stock value performance:** last, but probably foremost is the growth of the share price.

While price isn't always a perfect measure of value, a stock that shows no price growth should alarm the investor who believes it will in the future.

The risk of those who invest in growth is to pay a high price in terms of PE ratio without then realizing a price surplus in the future because the earnings of the firm didn't grow, and therefore essentially to run into an overpricing situation. In order to avoid that, the PE ratio should decrease over time.

Value Investing

This investment strategy is focused on picking those stocks that are apparently traded at a price lower than their intrinsic value. This happens when the stock market underestimates stocks because of overreaction to bad news or low attention, non-headline-grabbing industry sectors (such as waste management). In this case, investors search for low P/E and high dividends, most of times high capitalization stocks with a long history of being listed. A particular version of value investing, called "deep value", is focused on very low-rated companies (sometimes cheapest stocks on the market) with fluctuating profits and poor performance overall. This

particular behavior works if the stock rise again in the future and returns to have good performance, and when it doesn't, the price paid for buying it was low thus the loss is limited.

The value investor looks for fluctuations in price in order to buy when the price is low and there are no sufficient reasons that justify it. The typical value investor analyzes the free cash flow of the company and try to buy those companies whose cash flows are good compared to the price paid for the stock. Value investors don't believe in the efficient-market hypothesis (Hayes, A., Boyle, M. Perez, Y., 2022) which claims that every piece of information is already taken into account by the prices. By contrast, they believe that stocks could be undervalued because of a variety of reasons: overreaction to market crashes or bad news, cyclicity of the businesses not taken into consideration or unglamorous stocks that are not adequately observed by media and analysts.

A crucial aspect of value investing is that despite growth investing seems to be more long-term oriented because it relies on the future growth of the company, value investing often takes more time to realize solid returns. Indeed, growth investing is most of the time used for picking those stocks that show a rapid growth and then selling them when the price reaches the apex. Value investing, instead, relies on the inner value of a company, namely its capacity to show consistency over the years; so it will pay when this inner value will be recognized by the market with a price increase (note 11). For this reason, investors who use this strategy is concerned about the capacity of the company to maintain the performance in the long run, without losing market share or margins erosion.

GARP Investing

Growth At Reasonable Price (GARP) investing was developed by Peter Lynch, manager of Magellan Fund at Fidelity Investments (note 12). This style uses the same philosophy of Growth investing, but it tries to use some of the principles of value investing for choosing those company which growth is paired with well founded price valuations, in order to reduce the risk of underpricing. In order to do that, this strategy requires to avoid too high price/earnings situations. This caution also helps escaping from following financial bubbles.

The ultimate goal of GARP investing is to avoid the extremes of growth and value investing, leading GARP investors in good positions not far from normal market conditions in terms of risks (Chen, J., Drury, A., Perez, Y., 2022). This mixing strategy also decreases correlation of

returns of a portfolio built this way, because GARP investors will experience a combination of returns, either from the growth of companies or sectors but also because of strong cash flows and intrinsic value. The downside is that this way is difficult to beat the market, because it excludes risks and going against the norm.

For example, when markets face downturns, on average value investors will do better than growth investors, but on the contrary growth investors experience higher returns when markets rise. In both cases, GARP investors will be somewhere in between (note 13). However, this strategy is not about deeming that any stock is a worthy investment, but instead it aims to identify companies with very specific characteristics (note 14). Furthermore, a GARP portfolio is distant from having equal amounts of both value and growth stocks, but on the contrary is about selecting stocks that have neither pure value nor pure growth characteristics.

Peter Lynch is considered one of the best fund managers, with 29% of average annual return in the period that goes from 1977 to 1990 (note 18). This means that GARP strategy requires deep knowledge about stocks and businesses, in order to highlight those companies that have good future perspective but they are not already recognized by the market.

Index Investing

Index Investing is an investment strategy whose objective is to replicate the composition of a chosen market index. In order to do that, the investor must use a buy-and-hold behavior by purchasing the securities composing the specific index. This index could be either an equity index or a fixed-income index that generally consists of government or corporate bonds.

Contrary to the active strategies analyzed so far, Index Investing is defined as a passive investment strategy as it relies on a buy-and-hold approach. A founding assumption of this strategy is that after taking into account all the costs required by active portfolio management, Index Investing tend to outperform them in the long run. In this perspective, those who invest following this approach believe that the market is efficient and it is difficult to beat it systematically (Chen, J., Scott, G., Logan, M., 2022).

Moreover, this strategy is an efficient method of diversifying risks. Indexes in fact contain a large and broad group of securities and these often have low correlation for what regards performance and value. This way, the unsystematic risk is cut down because of the presence of a multitude of industries/sectors and price dynamics.

Since Index Investing relies on a passive process, these funds face lower fees and other administrative and operating expenses than active strategies. Moreover, as it requires few trades it is very tax-efficient. The most replicated indexes, such as S&P 500, Dow 30, Nasdaq, Euronext 100 etc, allow investors to reflect the wealth generated by the geographical area reflected by the index. However, replicating an index could be problematic sometimes. For example, the Russell 2000 needs two thousand of positions acquired, and depending on the fees of the broker used, it could become cost-prohibitive.

Sometimes, to overcome this problem, investors buy only the most important securities of the index, this way replicating a proportion of the index while maintaining the advantages of index investing. In this case, accurate attention to the securities chosen is primary for avoiding performance correlation and thus systematic risks.

Lastly, some indexes are built on a weighted basis, using as a weight the capitalization of the companies that form the index. This way, firms with huge capitalization such as Apple Inc., Meta Platform Inc., Amazon.com Inc. etc, could have a significant impact on the entire index, this way neutralizing the risk advantages of the strategy. In addition, firms just mentioned are all closely linked to the information technology and internet sector, therefore the risk correlation is very high.

Income Investing

Income Investing is an investment style whose central aim is to generate a regular income from a portfolio that is specifically structured for that (note 15). This income can be produced from bond yields, interest payments or dividends. For the purpose of this study, the important stream of income comes from dividends, as the impact of ESG information will be analyzed on equity investment decisions.

Important factors for building this type of portfolio are risk and constancy of the stream, because the investor's goal is to be able to rely on his portfolio for the expenses of daily life, exactly as he would with a normal salary (Taylor, M., 2022). Most income portfolio contains the so-called “blue chips stocks” (Kennon, J., Stapleton, C., Binder, J., 2022). These stocks are referred to companies with solid track record of dividend payments. Examples of blue chips stocks could be Walmart and Disney (Mehta, S. 2021).

Time span of the investment is not so crucial for this investment style, as companies held in the portfolio should pay dividends in the short-medium term, because if they stop doing that, it would be easy for the investor to divest and buy other stocks. In the meanwhile, it is important that the stock price didn't decrease, otherwise the loss will affect the performance of the portfolio. However, this strategy is not about long-term value growth, it's mainly concerned about the dimension and consistency of dividends distributed relative to the price paid for the stock.

4.4.3 ESG and Investment Styles

The relation between ESG information and different investment styles has not been extensively analyzed in the literature. In fact, the impact of CSR on companies and on the yield of securities is often analysed, but this debate is often unrelated to the analysis of traditional investment strategies (Kaiser, L., 2020).

In an article published by Lars Kaiser in the "Journal of Asset Management" in 2020 (Kaiser, L., 2020), however, the relation between ESG aspects and the returns of various stocks is analyzed in relation to three famous investment styles: value, growth and momentum. For building these analyses were used financial information and ESG scores from Thomson Reuters Assets4.

In addition to having observed that the dynamics regarding ESG aspects vary greatly according to the sector, the geographical area and the size of the company, the author of this study hypothesizes that investors who use the "value" investment style should be the most interested in the ESG aspects of companies. This should happen because this style of investment requires a long-term attitude, and to obtain financial results deriving from the improvement of the aspects of CSR, initial investments are required (such as investments in innovation) which usually take effect over an extended period of time.

Through the analyzes carried out, the author states that companies with high ESG values show slightly lower returns, but at the same time a substantial decrease in portfolio risk. Overall, risk-adjusted returns are therefore higher in portfolios that use ESG information. This is true both for investments that use a "growth" style and a "value" style: for this reason both types of investors should take into account companies' CSR. Finally, firms with a suitable profile for

“value” investors show higher average values of ESG scores than “growth” and “momentum” investors, in line with the hypothesis made.

5. Research Methodology and Empirical Findings

5.1 Hypotheses Development

The literature that tries to relate the integration of ESG information with the various investment styles is not very extensive, so there are no already established hypotheses on this topic around which the debate is centered. For this reason, the assumptions for this study have been formulated mainly by assuming logical reasons why ESG information should or should not be considered by different investment styles in their buying or selling decisions.

As regards investors using the "Growth" investment style, it is hypothesized that ESG information may not be particularly influential on their investment decisions. CSR aspects, indeed, are mainly oriented towards greater stability of the business (i.e. a lower long-term risk) while "Growth" type investors should be interested about investments in business growth rather than the consolidation of the same, therefore the following hypothesis is formulated:

H1: Growth investing is not related to ESG scores.

Investors using the "Value" strategy, on the other hand, buy shares of companies when they believe there is an underpricing situation, thus making a profit when in the long term they can sell them at a higher price or by earning substantial dividends in the years ahead. These investors therefore trust in the long-term value of the company, for this reason they should see the growth of ESG scores as a positive aspect while the decrease of the same as a signal of risk, therefore pushing them to divest.

H2: Value investing is positively related to ESG scores.

Similarly to what has been said for Growth investors, even investors who use the GARP (Growth At Reasonable Price) strategy trust in investments oriented towards business growth rather than long-term risk reduction, therefore the following hypothesis should be confirmed:

H3: GARP investing style is not related to ESG scores.

Those who invest using the Index investment style, on the other hand, could find ESG information a good match with their investment strategy. These investors use a passive investment style by using indices to allocate capital efficiently, and in the same way they can benefit from integrating ESG performance as useful indicators for increasing the performance

of their portfolio, while maintaining a passive behavior. ESG score, indeed, can be a signal for stock performance without requiring deep evaluations of the business and financial statements of the companies in which they invest (note 17), therefore:

H4: Index investing is positively related to ESG scores.

Income investors are interested in the risk and consistency of the dividends issued by the companies they invest in, and, in the meantime, they want to avoid the decline of their stock prices. Then, if a company loses ESG performance these investors should see it as a negative signal and sell their shares, interpreting this as an increase in the risk of their portfolio. For this reason, the last hypothesis to be tested empirically is:

H5: Income investing is positively related to ESG scores.

5.2 Sample Selection

In order to test the aforementioned hypotheses, we collected a balanced panel dataset regarding 96 publicly-traded companies operating in the Food and Beverage industries. The sample was obtained using Refinitiv Eikon Datastream software.

Initially, searching for "Equities" the number of units available in the software amounted to 322,437; but after eliminating the instruments without the Reuters Identification Code and those no longer active, the population was reduced to 127,491. Subsequently, were chosen those shares belonging to the wording "equity", traded on the primary market and defined by Eikon as "major" shares, so as to have greater availability of data. Then, the companies belonging to the "Beverage" and "Food Producers" markets were selected. Finally, in order to have a geographical identification and reducing the complexity given by the presence of dozens of currencies, the seven most represented geographical areas were chosen. These markets together constituted 49% of the population obtained up to that point. The nations used are: United States, China, Europe, Japan, Hong Kong, India, Malaysia. At this point, the sample is made of 1364 companies, but due to the availability of data necessary to build a balanced panel including all the necessary variables, the companies result to be 96 (Table 1).

Table 1: Sample selection

Total Equities on Eikon	522.437
RIC coded (Reuters Identification Codes)	203.587
Active	127.491
Equity	93.983
Primary Market	62.102
Major	58.607
Beverage and Food producers	2783
Seven most represented areas	1364
Less: missing values	-1268
Sample size	96

After the selection of the companies, the sample result to be quite balanced and representative of both the different geographical areas (which are present in a proportional manner with respect to their size, Figure 1 and Figure 3) and of the two sectors (since both are present in significant amounts, Figure 2):

Figure 2: Number of Firms by Geographical Area

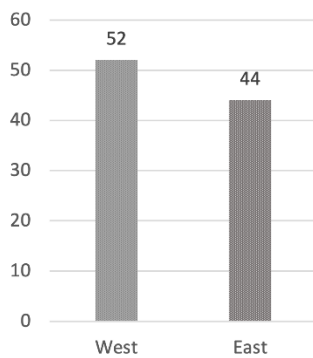


Figure 1: Number of Firms by sector

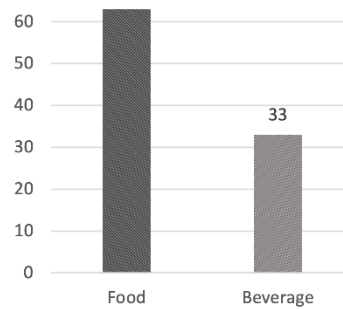
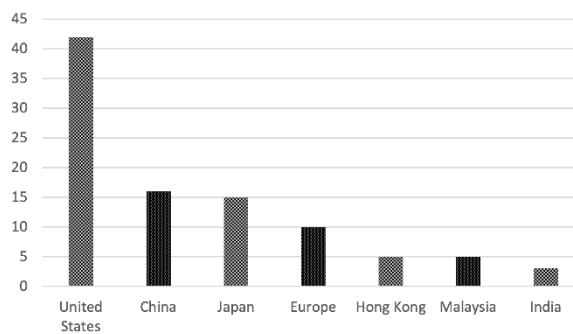


Figure 3: Number of Firms by Country



5.3 Research Design

5.3.1 Description and Measurement of Key Variables

The key variables of the analysis can be divided in two types: the first group of variables concerns the ESG scores, while the second group concerns the ownership shares held across the various investment styles. The first group (ESG) provides the dependent variables of interest, while the second group (styles) provides the independent variables of the regression models.

1. ESG Variables

The ESG variables used are the ESG scores provided by Refinitiv Eikon. In particular, the four key variables are: ESG score, Environmental score, Social score and Governance score. The analyzes conducted for this study were also performed using the score relating to CO2 emissions and the amount of emissions emitted compared to the size of the company, but these two variables, being strongly correlated with the environmental score, did not add much information, therefore the results reported to them will not be displayed.

The process by which Refinitiv Eikon's ESG scores are calculated is described in the relevant information document (note 16). The ESG scores are obtained from 630 corporate measures, integrated with each other in different ways depending on the score to be assessed. Namely, these measures are divided into ten categories which will then compose the three pillars Environment, Social and Governance (Table 2):

Table 2: Description of ESG measures

Environmental:		Social:		Governance:	
Categories:	Definitions:	Categories:	Definitions:	Categories:	Definitions:
Resource use	The resources whose use is assessed are water and energy, but an assessment of product packaging and supply chain sustainability is also integrated to build the resource use score	Workforce	For this score the key aspects are: diversity and inclusion, working conditions, health and safety, and career development and training	Management	This category assesses the management structure in terms of independence, safety and committees, as well as management compensation
Emissions	This category summarize the amount of CO2 emitted compared to peers, waste generated, waste generated and its management, impact and conservation of biodiversity and environmental management system	Human Rights	One of the four categories of the social pillar refers to respect for human rights, i.e. the attention that the company reserves to the violation of human rights	Shareholders	This aspect concerns the presence and quality of defenses against possible takeovers and the rights of shareholders in general
Innovation	To evaluate the sustainability of the business model, Refinitiv analyze the investment in R&D for product innovation and the revenues deriving from sustainable products	Community	This factor refers to the management of the communities in which the company operates, in particular to the positive role that they should have	CSR strategy	This score evaluates the presence of particular CSR practices and transparency in this respect, i.e. the quantity and depth of the ESG information reported
		Product Responsibility	This last factor summarizes the safety of data privacy, product quality and responsible marketing		

Each metric used to evaluate the score of each category is numeric or boolean (i.e. assigning "one" when the value is positive and "zero" when it is negative). In the case of numerical metrics, percentiles are then constructed with respect to the industry to which they belong, while in the case of boolean measures, the percentile varies depending on the percentage of companies that obtained the value "one".

After that, the value of the ten categories, obtained through the average of the percentiles, contributes to determine the score of the three pillars with different weights according to the reference industry. For the "Beverage" and "Food" industries, the weights used are as follows (Table 3):

Table 3: Weights of ESG measures

	Environmental			Social				Governance		
	<i>Emissions</i>	<i>Innovation</i>	<i>Resource use</i>	<i>Human rights</i>	<i>Product responsibility</i>	<i>Workforce</i>	<i>Community</i>	<i>Management</i>	<i>Shareholders</i>	<i>CSR strategy</i>
Food	8	2	8	7	8	6	5	10	3	2
Beverage	8	3	8	9	7	6	5	10	3	2

2. Shares held using various Investment Styles

For each company, Eikon provides data relating to the various investment styles that are present in the shareholding structure. To obtain this information, Asset4 analyzes the investment style used by large investors, investment funds and investment advisors present in the shareholding sector, also analyzing in which cases the investor uses a certain style and when he uses others. In this way, through Eikon, it is possible to know the percentage of shares acquired using the various investment styles.

To reduce the problem of outlier values and to make the variables homogeneous in terms of size (so as to make the results more significant and comparable with each other), all the variables used in the regression models were transformed using percentiles (except those referring to ESG scores, as these are already distributed in values ranging from 1 to 100). In practice, each variable assumes values ranging from 1 to 100 depending on the percentile to which the reference value belongs. For example, if in a particular company the percentage of investors using a "value" investment style is 7% (value: 0.07) and this value corresponds to the fiftieth percentile, then the value 0.07 will be transformed into 50.

Given that Eikon does not disclose other considerations through which it defines whether a certain investor is using a certain investment style rather than another, but simply derives these conclusions by observing the investment strategy declared by the investor, it is not possible to define precisely which are the parameters and metrics characteristic of the various investment styles. To specify the five dependent variables ("Growth", "Value", "Garp", "Index" and "Income") we can therefore only use the classic definitions of the various styles used by the relevant literature and described in the last chapter of the literature review.

5.3.2 Control Variables

The control variables used in the models derived from the literature about investment and ESG scores and the theory about investment styles. In particular, the most used parameters to define the various styles are Market to Book ratio and Price to Earnings ratio.

All the monetary variables that was available on Eikon database in local currencies were then converted in US dollars. As already described in the chapter concerning the key variables, all the variables were then transformed into values ranging from 1 to 100 using the percentiles.

The control variables (Table 4) used are the following:

Table 4: Control variables

	Variables	Descriptions
1)	Market to Book Ratio	This ratio is obtained dividing the market value of all outstanding shares by the book value of the assets of the company minus the liabilities.
2)	Price to Earnings Ratio	This measure is the result of the ratio between the stock price and its Earnings Per Share (EPS).
3)	Total Assets	Total assets is the sum of all the book value of the assets owned by the firm.
4)	Financial leverage	Financial leverage in this case is calculated as Debt over Debt plus Equity.
5)	GDP	Gross Domestic Product is the sum of the monetary values of all the goods traded in a specific country. In the panel dataset used, this variable is country-invariant.
6)	Historical Beta	There are many ways to calculate Beta. Datastream derive Beta from performing a least squares regression between adjusted price of the stock and the corresponding market index.

Full list of theoretical reasons why each control variable used was chosen for this analysis is reported below:

Market to Book Ratio: as described in the literature review, Growth investing aims for growing companies; therefore, given that the market expects these companies to grow, it is natural that the ratio between the price paid and the company's book value will be high. It is therefore expected that as this ratio grows, the number of Growth investors will grow.

Price to Earnings Ratio: Value investors typically dig deep in the analysis of the company's strength and health to evaluate its real value, but often also try not to pay too much for the companies they invest in, therefore the P/E ratio is not expected to be high for these types of investors, whereas it should be in Growth investors. The growth of this ratio, on the other hand, should be a positive sign because it means that the market expects growth in earnings, and this should attract Growth-type investors.

Total Asset: this measure is often used in the literature that aim to study investment dynamics, because it capture the dimension component of the firm, so its magnitude is relevant. An increase or decrease of this figure instead is not a very important aspect for an investment or divestment decision.

Financial Leverage: leverage is measure of risk, because the greater the debts, the greater the probability of not being able to repay them at a time when the business may have some problems. At the same time, increasing the leverage makes it possible to increase the Return On Equity because with the same equity the capital invested able to generate returns increases. However, this only happens if the profits are greater than the interest rate.

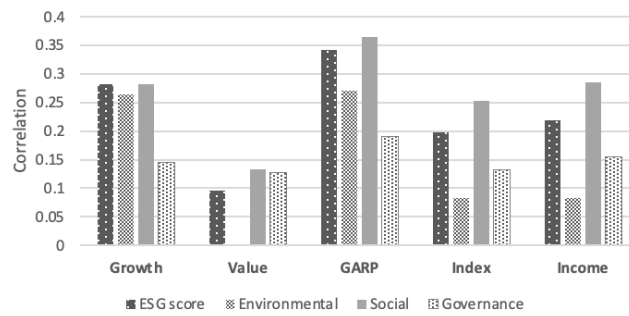
GDP: the Gross Domestic Product absorbs the general trend of the economy of the state to which the company belongs, so as to absorb in the financial models those investment behaviors that seek to exploit the dynamics of the economies of the various countries rather than a precise interest in the specific company.

Historical Beta: as for leverage, beta is a measure of risk, but it does this quite differently, thus the two measures should coexist within our regression models. In fact, the Beta measures how similar the change in the firm's prices is to the changes in the reference index. In fact, price volatility is synonymous with general uncertainty about the true value of the company, therefore greater risk on its future price.

5.4 Descriptive Statistics

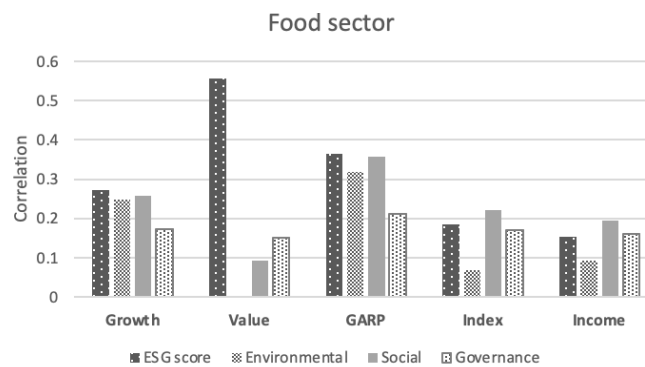
This graph (Figure 4) shows the correlations between the various ESG scores (ESG score, Environmental, Social and Governance) and the shares held by the various investment styles. In addition to noting that these correlations are all positive, we observe that the Social score shows the greatest correlations when analyzing the entire sample.

Figure 4: Correlations between ESG scores and Investment Styles



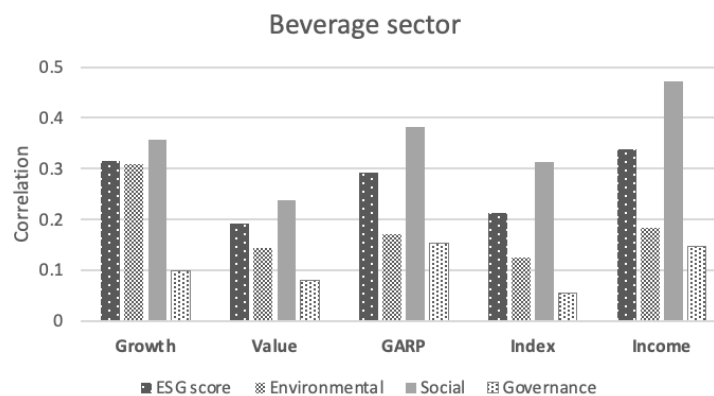
In the Food sector, we see a particular dynamic with regard to value investors (Figure 5), as the correlation with the ESG score increases while the correlation with the Environmental score decreases.

Figure 5: Correlation between ESG scores and Investment Styles (Food)



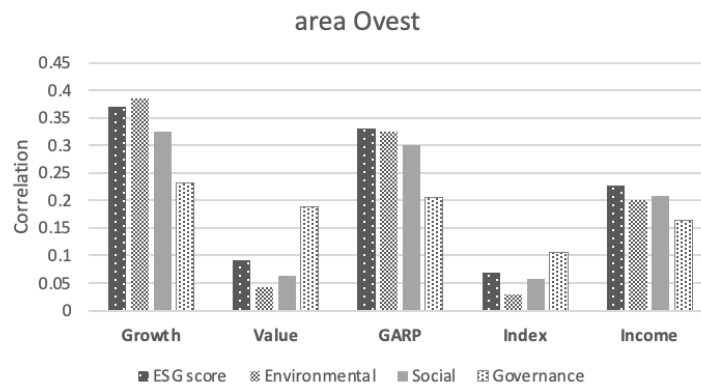
In the Beverage sector (Figure 6), on the other hand, the correlations return to resemble those of the entire sample, where the Social component maintains leadership in all the styles analysed.

Figure 6: Correlation between ESG scores and Investment Styles (Beverage)



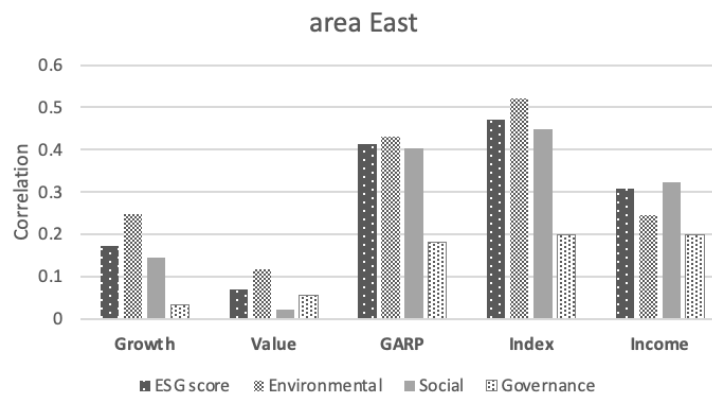
Analyzing only the western market, i.e. United States and Europe, Index investors and Value investors show lower correlations (Figure 7), while Environmental scores seem to matter more than in the complete sample.

Figure 7: Correlation between ESG scores and Investment Styles (Ovest)



On the other hand, analyzing the Eastern market (Figure 8), Value and Growth investors reduce their correlation with ESG scores, while they always remain positive. GARP and Index styles, instead, see their correlations grow except in the Governance component, which still remains rather low.

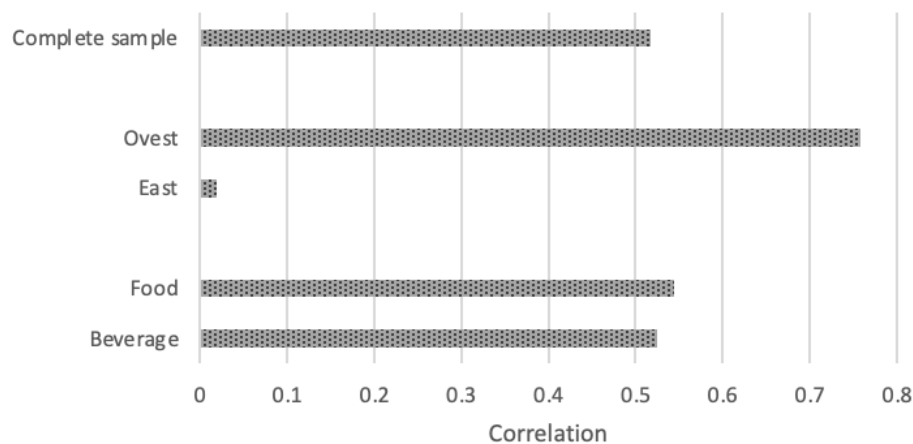
Figure 8: Correlation between ESG scores and Investment Styles (East)



The correlation between size and ESG scores is well documented in the literature. In general, larger companies can afford greater investments in research and development to improve their business model and above all they can devote more capital to communicate their CSR programs. This is evident in the data, as the correlation between ESG and size is always positive and it is around 50% for the whole sample (Figure 9).

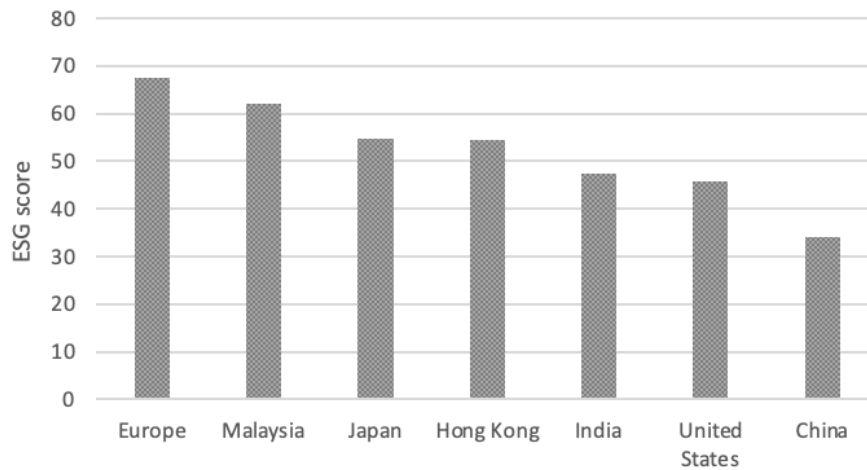
However, it is interesting to note that in the western sample this correlation rises to 75%, while in the eastern sample it is reduced to almost zero, perhaps because in the east region large companies do not feel high pressure with respect to CSR issues and only a few particular companies deal with them, beyond their size. Dividing the sample by sector, on the other hand, no significant differences are noted.

Figure 9: Correlation between ESG scores and firm size



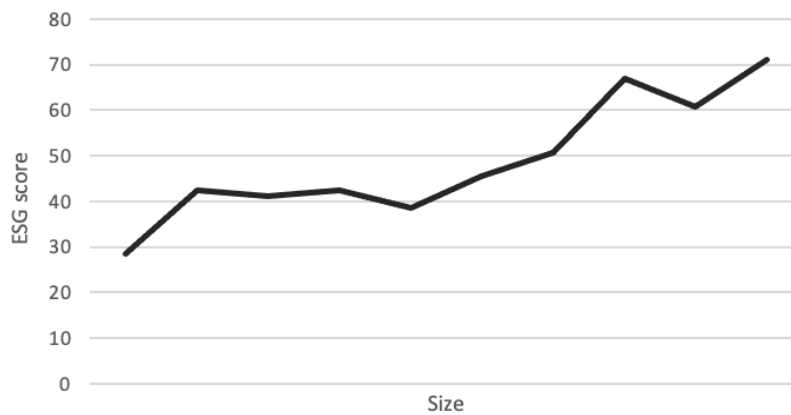
Analyzing the average ESG values with respect to the various countries (Figure 10), we observe that European companies show the highest ESG values. Considering that Malaysia, Hong Kong and India are underrepresented in the sample (5, 5 and 3 firms respectively), we observe that Japan precedes the United States in this list, while China is in last place with an ESG average of 34.16.

Figure 10: ESG means by states



The next graph (Figure 11) analyzes the relationship between the ESG score and the size of the company (calculated using total assets) by observing the entire sample. We note that the positive relationship is evident and rather linear, as it does not show any U-shaped curve.

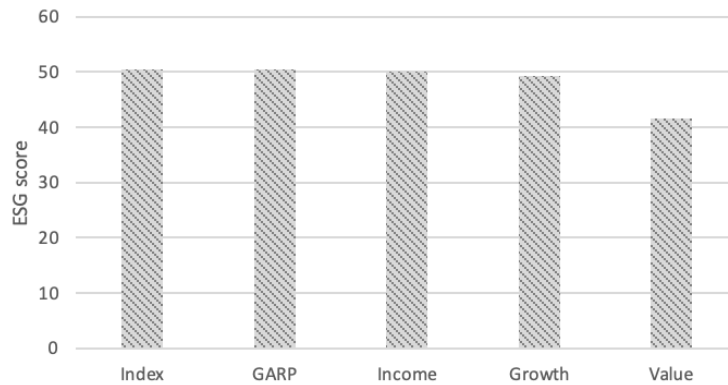
Figure 11: ESG score increasing size



This graph (Figure 12) shows the ESG averages of companies according to whether they show the highest number of Growth, Value, GARP, Index and Income investors. These data do not refer to the average ESG over the five years of observation, but instead report the average ESG of companies in the years in which a certain type of investor was the most numerous. The observations that generate these graphs are therefore referred to every year for all the companies of the sample, thus amounting to 480 observations in total. The observations in which Growth investors are the most numerous are 213, while for the other types of investor (Value, GARP, Index and Income) the number of observations are: 61, 39, 164 and 3 respectively. The data in these graphs referring to Income investors have therefore little significance. Observing the

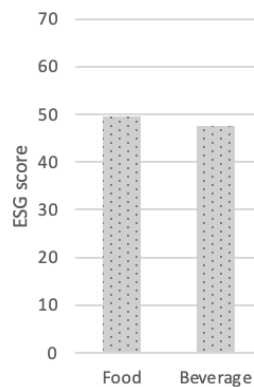
sample as a whole, we observe that when Value investors are the most numerous, the ESG average is slightly lower:

Figure 12: ESG means by Investment Styles



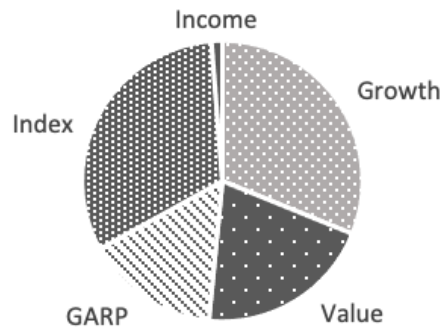
Looking at the ESG average by sector (Figure 13), there are no particular differences, as both averages settle at around fifty percent:

Figure 13: ESG means by industry sectors



This graph (Figure 14) shows the proportion between the average shares held by the various investors. It is possible to note that compared to the others, investors using the Income style have on average smaller shares, while Growth and Index investors are the most numerous in terms of shares held:

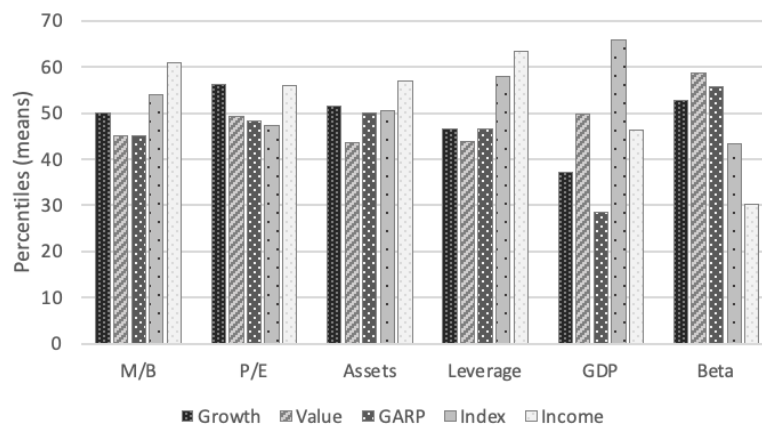
Figure 14: Average shares held by Investment Styles



The following graph (Figure 15), instead, shows the average values of the control variables with respect to the various investment styles. No particular patterns are noted, probably due to the fact that Eikon assigns the investment style based on what is declared by the investment fund and not based on company parameters. The values of the Price to Book ratio and Price to Earnings ratio are however in line with the theory concerning the Value and Growth investment styles.

Overall, this graph reminds us that the results presented in this study specifically describe the relationships between ESG and the investment styles declared by the funds (and reported by Refinitiv Asset4), rather than the financial parameters of the various styles and ESG scores:

Figure 15: Variables' means by Investment Style



5.5 Main Findings

This section will show the results obtained through the regressions carried out to empirically verify the validity of the hypotheses set out in the "Hypotheses Development" section. All regressions are fixed effects models performed on the previously described strongly balanced panel dataset.

The results of 40 models are reported, of which the first twenty (tables 1-4) also report the results referring to the control variables, while the remaining 20 models are presented reporting only the variable of interest (i.e. ESG scores) and therefore they are summarized in a single table (table 5). There are therefore five tables in total: the first four tables show the complete models referring to the four ESG scores ("ESG score", "Environmental", "Social" and "Governance") and each of these tables is made up of five models, how many investment styles are to be analysed. The last table instead summarizes only the results of the "ESG score" variable but analyzes the five investment styles by dissecting the sample according to the geographical area ("West" and "East") and according to the sector ("Food" and "Beverage"), thus reporting the results of the other 20 models.

All models use a dependent variable, referring to the specific investment style, and a single variable of interest, which each time can be the ESG score or one of the three scores referring to the three pillars that constitute the ESG score: Environment, Social or Governance. Finally, the control variables are always all present in the models. For each firm j and fiscal year t , the models used are therefore defined as follows:

$$\text{Inv. Style equity stake}_{j,t} = \beta_0 + \beta_1 * \text{ESG variable}_{j,t} + \beta_2 * \text{Market to Book ratio}_{j,t} + \beta_3 * \text{Price to Earnings ratio}_{j,t} + \beta_4 * \text{Tot. Assets}_{j,t} + \beta_5 * \text{Leverage}_{j,t} + \beta_6 * \text{GDP}_{j,t} + \beta_7 * \text{Beta}_{j,t} + \epsilon_{j,t}$$

The first table (Table 5) analyzes the effect of the "ESG score" variable on the various investment strategies.

Table 5: ESG score models results

	Model 1	Model 2	Model 3	Model 4	Model 5
	(1)	(2)	(3)	(4)	(5)
VARIABLES	% share of Growth investments	% share of Value investments	% share of GARP investments	% share of Index investments	% share of Income investments
ESG score	0.0288 (0.0637)	0.2889*** (0.0720)	0.0494 (0.0707)	0.1944*** (0.0467)	0.0311 (0.0756)
Market to Book ratio	0.2194*** (0.0447)	0.7750 (0.0505)	0.0179 (0.0496)	0.1198*** (0.0328)	0.1510*** (0.0530)
Price to Earnings ratio	-0.0141 (0.0219)	0.0511** (0.0247)	-0.0081 (0.0243)	-0.0209 (0.0160)	0.0830*** (0.0259)
Total assets	0.2427* (0.1304)	-0.1342 (0.1473)	-0.1468 (0.1448)	-0.0551 (0.0957)	0.3903** (0.1547)
Leverage	-0.1873*** (0.0580)	-0.0462 (0.0655)	-0.0414 (0.0644)	0.0206 (0.0425)	-0.1281* (0.0688)
GDP	-0.0417 (0.0540)	-0.0336 (0.0618)	-0.1354** (0.0607)	0.2127*** (0.0401)	-0.0055 (0.0649)
Beta	0.0307 (0.0254)	0.0699** (0.0286)	-0.0230 (0.0281)	0.0619*** (0.0186)	0.0891*** (0.0301)
<i>Constant</i>	36.3730*** (5.8436)	36.9828*** (6.6049)	64.5864*** (6.4888)	24.3618*** (4.2898)	19.1601*** (6.9345)
Prob > F	0.0000	0.0001	0.1009	0.0000	0.0000
Observations	480	480	480	480	480
Number of firms	96	96	96	96	96

Standard errors in parentheses:

*** p<0.01, ** p<0.05, * p<0.10

First of all, we observe that the variable of interest "ESG score" is significant at a confidence level of 99% in two models, those referring to the investment styles "Value" and "Index"; the sign is also positive as expected. For Value investors the impact of ESG score is a bit higher than for Index investors: a one-point increase in the ESG score generates a 0.289 percentile increase in the equity share of value investors, while for Index investors the average increase is 0.194 percentile, ceteris paribus. Having transformed the dependent variables using percentiles makes reading the coefficients slightly more complex, but allows us to compare the coefficients of different models without having to take into account the different average size of the dependent variables. In fact, a one percentage point increase in the total share ownership held by Income investors is much more difficult to achieve than the same increase in the total share

ownership held by Growth investors, as the total shares held by Growth investors are on average very larger than the total shares held by Income investors.

The "Growth", "GARP" and "Income" investment styles, on the other hand, show no significant relationship with the "ESG score" variable after eliminating the effect of the control variables. These results lead us to conclude that the hypotheses H1, H2, H3 and H4 are confirmed by the data, while the hypothesis H5 should instead be rejected, at least as regards the effect of the ESG score analyzed in the entire sample.

Control variables are significant in about half of the cases.

The F-test returns highly significant values in all models, except in the third model, probably because the GARP investment style is the most difficult to identify from the point of view of financial variables.

The other three tables (Table 6, 7, 8) using as independent variables Environmental score, Social score and Governance score respectively (Table 2, Table 3 and Table 4) show similar results.

The share of Value and Index investors is always correlated with ESG variables; noteworthy is the fact that the Governance variable shows lower correlations than the other two pillars, both in terms of the size of the correlation and in terms of significance, since using the Environmental and Social variables the significance is 99% for Value investors and Index, while for the Governance variable the significance drops to 95% for both types of investors. Moreover, in all the three ESG components, Value investors show a higher correlation than Index investors, exactly as happened in the first table where was used the ESG score.

Besides, the Environmental variable is significant at a 90% confidence level in the model referring to GARP investors, but being such a sporadic and not particularly significant result, it is probably just due to a coincidence.

Table 6: Environmental score models results

	Model 6	Model 7	Model 8	Model 9	Model 10
VARIABLES	(1) % share of Growth investments	(2) % share of Value investments	(3) % share of GARP investments	(4) % share of Index investments	(5) % share of Income investments
Environmental score	0.0534 (0.05151)	0.2124*** (0.0585)	0.1101* (0.0570)	0.1257*** (0.0381)	0.0032 (0.0612)
Market to Book ratio	0.2198*** (0.0445)	0.0888* (0.0505)	0.0183 (0.0492)	0.1278*** (0.0329)	0.1526*** (0.0528)
Price to Earnings ratio	-0.0138 (0.0218)	0.0510** (0.0248)	-0.0074 (0.0242)	-0.0211 (0.0162)	0.0828*** (0.0260)
Total assets	0.2121 (0.1330)	-0.1557 (0.1510)	-0.2155 (0.1472)	-0.0544 (0.0985)	0.4053** (0.1580)
Leverage	-0.1849*** (0.0579)	-0.3660 (0.0658)	-0.0365 (0.0641)	0.0262 (0.0429)	-0.1279* (0.0688)
GDP	-0.0484 (0.0537)	-0.0141 (0.0610)	-0.1519** (0.0595)	0.2305*** (0.0398)	0.0019 (0.0639)
Beta	0.315 (0.0253)	0.0685** (0.0287)	-0.0211 (0.0280)	0.0605*** (0.0187)	0.0884*** (0.0301)
<i>Constant</i>	37.0023*** (5.8392)	40.5801*** (6.6321)	65.8210*** (6.4637)	26.6382*** (4.3269)	19.3827*** (6.9388)
Prob > F	0.0000	0.0002	0.0330	0.0000	0.0000
Observations	480	480	480	480	480
Number of firms	96	96	96	96	96

Standard errors in parentheses:
*** p<0.01, ** p<0.05, * p<0.10

Table 7: Social score models results

	Model 11	Model 12	Model 13	Model 14	Model 15
VARIABLES	(1) % share of Growth investments	(2) % share of Value investments	(3) % share of GARP investments	(4) % share of Index investments	(5) % share of Income investments
Social score	0.0244 (0.0567)	0.2057*** (0.0646)	0.0278 (0.0630)	0.1502*** (0.0419)	-0.0306 (0.0612)
Market to Book ratio	0.2005*** (0.0446)	0.0871* (0.0507)	0.0198 (0.0495)	0.1259*** (0.0329)	0.1536*** (0.0528)
Price to Earnings ratio	-0.0138 (0.0219)	0.0528** (0.0249)	-0.0080 (0.0243)	-0.0195 (0.0161)	0.0822*** (0.0260)
Total assets	0.2426* (0.1309)	-0.1077 (0.1491)	-0.1373 (0.1454)	-0.0453 (0.0966)	0.4289*** (0.1580)
Leverage	-0.1857*** (0.0581)	-0.0332 (0.0661)	-0.0396 (0.0645)	0.0300 (0.0428)	-0.1300* (0.0688)
GDP	-0.0398 (0.0537)	-0.0056 (0.0611)	-0.1289** (0.0596)	0.2287*** (0.0398)	0.0100 (0.0639)
Beta	0.0309 (0.0254)	0.0707** (0.0289)	-0.0232 (0.0282)	0.0629*** (0.0187)	0.0871*** (0.0301)
<i>Constant</i>	36.3672*** (5.8464)	37.2231*** (6.6584)	64.6833*** (6.4945)	24.4336*** (4.3157)	19.59*** (6.9388)
Prob > F	0.0000	0.0006	0.1110	0.0000	0.0000
Observations	480	480	480	480	480
Number of firms	96	96	96	96	96

Standard errors in parentheses:
*** p<0.01, ** p<0.05, * p<0.10

Table 8: Governance score models results

	Model 16	Model 17	Model 18	Model 19	Model 20
VARIABLES	(1)	(2)	(3)	(4)	(5)
	% share of Growth investments	% share of Value investments	% share of GARP investments	% share of Index investments	% share of Income investments
Governance score	-0.0306 (0.0388)	0.1013** (0.0445)	-0.0398 (0.0431)	0.0572** (0.0290)	0.0462 (0.0460)
Market to Book ratio	0.2248*** (0.0447)	0.0805 (0.0513)	0.0257 (0.0497)	0.1232*** (0.0334)	0.1468*** (0.0536)
Price to Earnings ratio	-0.0139 (0.0218)	0.0476* (0.0251)	-0.0085 (0.0243)	-0.0231 (0.0163)	0.0821*** (0.0259)
Total assets	0.2597** (0.1251)	0.0295 (0.1435)	-0.1177 (0.1389)	0.0552 (0.0935)	0.4073*** (0.1483)
Leverage	-0.1821*** (0.0583)	-0.0629 (0.0669)	-0.0347 (0.0647)	0.0111 (0.0435)	-0.1358** (0.0691)
GDP	-0.0247 (0.0533)	0.0121 (0.0611)	-0.1101* (0.0592)	0.2468*** (0.0398)	0.0113 (0.0632)
Beta	0.0298 (0.0253)	0.0627** (0.0290)	-0.0245 (0.0281)	0.0570*** (0.0189)	0.0885*** (0.0300)
<i>Constant</i>	37.2482*** (5.8925)	36.5003*** (6.7586)	65.7995*** (6.5439)	24.2846*** (4.4037)	18.3069*** (6.9895)
Prob > F	0.0000	0.0041	0.0894	0.0000	0.0000
Observations	480	480	480	480	480
Number of firms	96	96	96	96	96

Standard errors in parentheses:

*** p<0.01, ** p<0.05, * p<0.10

Analyzing the complete sample in these first four tables, however, investors using the "Growth" and "Income" styles never show significant correlations with the ESG variables. Therefore, as was the case for the ESG score variable, also using these other three ESG variables hypotheses H1, H2, H3 and H4 are confirmed by the data, while hypothesis H5 is always rejected.

The last table (Table 9) reports the results of the remaining 20 models, but excludes the results referring to the control variables, as they are similar to those shown in tables 1-4 and for reasons of space. In this table, the results are obtained by dividing the sample first by geographical area (West and East) and then by sector (Food and Beverage).

Table 9: Results of the remaining models

		ESG scores					Number of firms:
Models number:	Sample:	(1) % share of Growth investments	(2) % share of Value investments	(3) % share of GARP investments	(4) % share of Index investments	(5) % share of Income investments	
21, 22, 23, 24, 25	Ovest	-0.0572 (0.3109)	0.4135*** (0.1004)	0.0751 (0.478)	0.3598*** (0.0813)	0.1427 (0.1005)	52
26, 27, 28, 29, 30	East	0.0195 (0.0780)	0.1394 (0.1104)	-0.0180 (0.0992)	0.0635 (0.0421)	-0.0402 (0.1251)	44
31, 32, 33, 34, 35	Food	0.0283 (0.0786)	0.2154*** (0.0756)	0.0396 (0.0852)	0.1441*** (0.0557)	-0.0422 (0.0879)	63
36, 37, 38, 39, 40	Beverage	0.0097 (0.1216)	0.3095* (0.1737)	0.0124 (0.1413)	0.1457* (0.0825)	0.1524 (0.1593)	33

Standard errors in parentheses:
 *** p<0.01, ** p<0.05, * p<0.10

First of all, we note that once again the only investment styles that show a significant correlation with the ESG score variable are "Value" and "Index", however it is interesting to note how these correlations show a great increase in the Western sample (from 0.29 to 0.41 for Value investors and from 0.19 to 0.36 for Index investors), while they are almost completely canceled out in the East sample, losing significance. This could be due to a greater consideration of ESG aspects in the West than in the East, where perhaps ESG aspects are less considered for investment decisions.

Dividing the sample according to the sector, on the other hand, no great differences are noticed, except for the loss of significance that goes from 99% in the food sector to 90% in the beverage sector, both for the investment style Value and the Index investment style. Once again, we can underline that the hypotheses H1, H2, H3 and H4 are always supported by the data except by analyzing only the beverage sector, while the hypothesis H5 is always rejected by the models.

5.6 Specification Tests and Regression Diagnostics

5.6.1 Specification Tests: Fixed vs Random Effect Models

In order to verify that there is no significant difference between our fixed effects and the specular random effects models, so as to confirm that fixed effect models are the best predictor of our models, Hausmann tests were performed for each of the 40 models.

In all 40 tests the result of "Prob > chi2" was always equal or close to 0.0000. Therefore, rejecting in all 40 cases the null hypothesis that the fixed and random parameters were equal, we were able to conclude that the models described fixed effects in the sample rather than random effects.

5.6.2 Normality Tests

Parametric t-test of regression coefficients requires the hypothesis that residuals are normally distributed. Therefore, we used a normal probability plot of residuals vs fitted values for all 40 models in order to tests to test residuals' normality.

We can conclude that in all cases the residuals follow the normal distribution rather well (Figure 16, 17, 18, 19, 20). For reasons of size it is not possible to show the graphs of all 40 models. The following are therefore the graphs of the first five most representative models, which concern the entire sample. In particular, the first five models are the ones that analyze the five investment styles and the total ESG score.

Figure 16: Residuals' normality - Growth investors model (n.1)

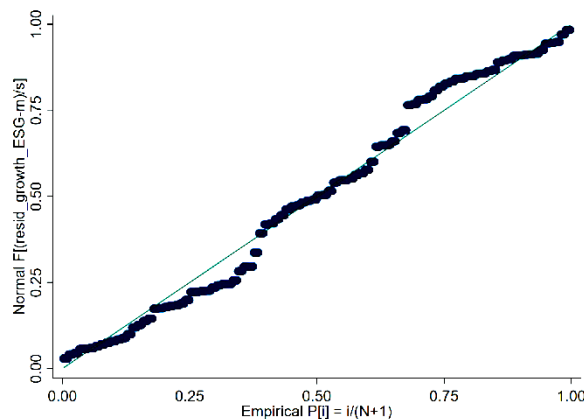


Figure 17: Residuals' normality - Value investors model (n.2)

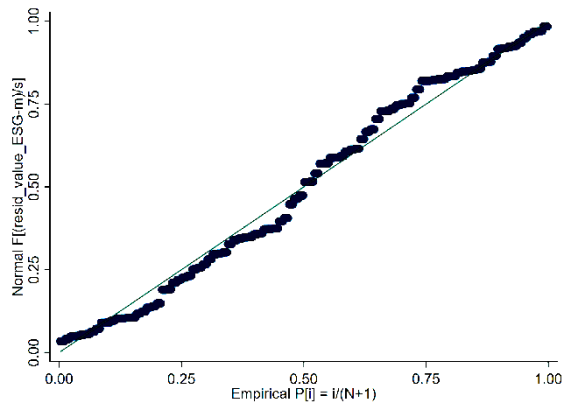


Figure 18: Residuals' normality - GARP investors model (n.3)

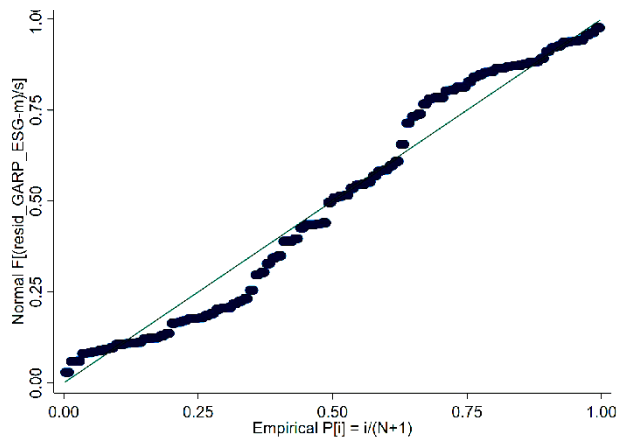


Figure 19: Residuals' normality - Index investors model (n.4)

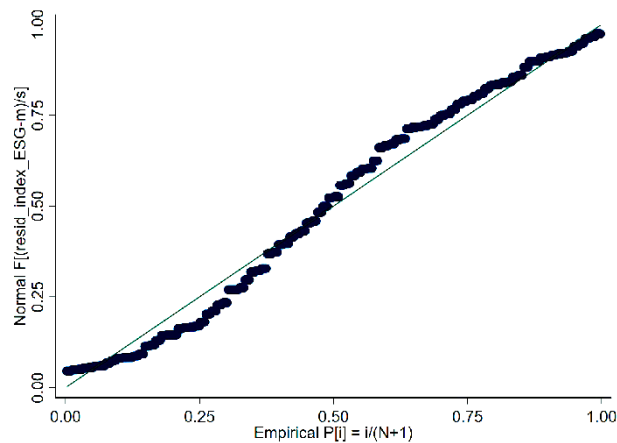
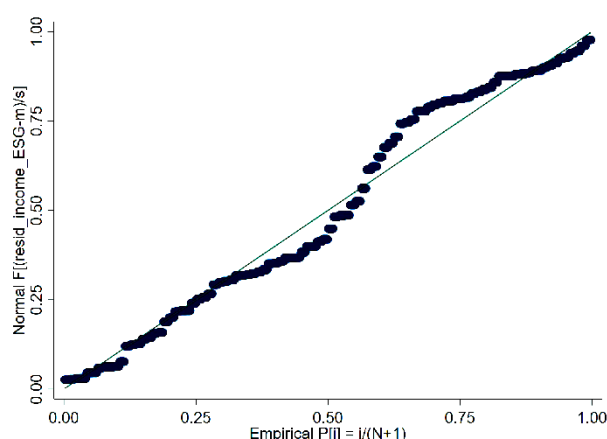


Figure 20: Residuals' normality - Income investors model (n.5)



5.6.3 Collinearity and Multicollinearity

In order to check for collinearity problems in the variables used for our models, the following correlation matrix was built (Table 10):

Table 10: Variables correlation matrix

	ESG_score	Env. Score	Soc. score	Gov. Score	M/B ratio	P/E ratio	Total assets	Leverage	GDP	Beta
M/B ratio	-0.0135	0.0076	0.0333	-0.0135	1					
P/E ratio	-0.2235*	-0.2181*	-0.1769	-0.2235*	0.2954*	1				
Total assets	0.5171**	0.5588**	0.4581**	0.5171**	-0.0523	-0.2773*	1			
Leverage	0.4652**	0.4340**	0.4530**	0.4652**	-0.1152	-0.1366	0.5285**	1		
GDP	-0.0812	-0.2140*	-0.0083	-0.0812	0.0285	-0.0303	-0.0206	0.0999	1	
Beta	-0.2618*	-0.2450*	-0.2943*	-0.2618*	0.0664	0.2176*	-0.1211	-0.1141	-0.079	1

The ESG score variables, Env. score, Soc. score and Gov. score never appear together in the same model, therefore the matrix does not report the correlations between them, but instead it reports only the results of the correlations between these variables and the control variables (in the left part of the matrix) next to the correlations between the control variables themselves (right side of the matrix).

Furthermore, to make it easier to read, asterisks have been added depending on how high the absolute value of the correlation is (Table 11). The asterisks therefore do not refer to the significance of the correlation, as regression models do not have serious problems if the

correlation is statistically significant, but instead they require that these correlations does not exceed certain size thresholds.

Table 11: Legend of correlation matrix asterisks

Absolute value:	Simbol associated:
Between 0 and 0.2	-
Between 0.2 and 0.4	*
Between 0.4 and 0.6	**
Between 0.6 and 0.8	***
Between 0.8 and 1.0	****

Analyzing the matrix we note that 23% of the correlations are between 0.4 and 0.6. This mainly happens between the ESG variables, the Total assets variable and the Leverage variable. In fact, these three variables show positive correlations between them, i.e. they tend to increase or decrease simultaneously. There is no established theory in the literature that defines when a correlation is too high, but a correlation as high as 60% is acceptable under certain conditions. In fact, in fixed-effect panel models, the Variance Inflation Factors are also often considered to define whether there are any collinearity problems.

Therefore, we report also the VIF values (Table 12) of five models that use the four different ESG variables used (ESG score, Environmental score, Social score and Governance score).

Table 12: VIF factors

VIF factors		VIF factors	
ESG Score	1.60	Environmental score	1.76
Market to Book ratio	1.12	Market to Book ratio	1.13
Price to Earnings ratio	1.24	Price to Earnings ratio	1.24
Total assets	1.67	Total assets	1.78
Leverage	1.56	Leverage	1.53
GDP	1.05	GDP	1.13
Beta	1.12	Beta	1.12
VIF factors		VIF factors	
Social score	1.51	Governance score	1.12
Market to Book ratio	1.13	Market to Book ratio	1.12
Price to Earnings ratio	1.24	Price to Earnings ratio	1.25
Total assets	1.61	Total assets	1.53
Leverage	1.57	Leverage	1.46
GDP	1.03	GDP	1.03
Beta	1.14	Beta	1.06

Observing the Variance Inflation Factors, which take into account the possible presence of multicollinearity, we note very low values which indicate a certain independence between the variables, for this reason it was decided to include the aforementioned variables in the models.

6. Conclusions

This thesis investigated the relationship between investment styles and ESG information. To reach this, a strongly balanced Panel dataset was built including financial metrics, ESG ratings and equity shares held using various investment styles. The companies analyzed are 96 firms belonging to the food and beverage industries, and the data used pertain to the period that goes from 2017 to 2021.

Subsequently, 40 fixed-effect regression models were performed, combining five investment styles with the four ESG ratings (Environment, Social, Governance and ESG combined score), then also splitting the sample by geographical area (East and West of the world) and by sector (Food and Beverage). Finally, statistical tests were performed to verify the validity of the obtained results.

The hypotheses formulated envisaged a positive correlation between ESG ratings and the share of investors using the Value, Index and Income styles (H2, H4 and H5), while for investors using the Growth and GARP styles has been hypothesized the absence of this correlation (H1 and H3). Both the descriptive statistics and the results of the model have highlighted the greater use of ESG information in the western area of the world (United States and Europe), while no differences are noted when dividing the sample by sector. As regards the relationship between ESG ratings and investment styles in the regression models, the positive correlations between ESG ratings and the shares of Value and Index investors were found to be statistically significant, with a confidence level almost always above 99%, while there was no significant correlation between ESG ratings and shares held by Growth and GARP investors. The hypotheses H1, H2, H3 and H4 are thus supported by the data, while for the hypothesis H5 the null hypothesis of absence of correlation cannot be rejected.

Models results therefore suggest that investors using an Index investing style take ESG values into consideration. This was hypothesized because the use of ESG indices fits well with the passive attitude of this investment style (note 17), furthermore the inclusion of parameters that measure corporate ESG performance can improve the efficiency of the capital allocation, in line with the theories stating that better ESG rating values are correlated with better portfolio performance. Equity shares held by investors using a Value investment style also show positive and statistically significant correlations with ESG ratings, in line with the results of Kaiser (Kaiser, L., 2020), which claims the greatest use of ESG rating by Value investors versus Growth investors. This confirms what was assumed, and the reason for this could be that

investors using the "Value" style of investing have a long investment time horizon, and ESG aspects often give long-term results. Furthermore, Value investors are interested in companies whose true value is not recognized by the market, thus an increase in ESG ratings could be seen as a positive signal for the company's intrinsic value. In companies whose majority of shareholding is held by Value investors, average ESG ratings are slightly lower than in other investment styles. This is probably also related to the reason why the same companies are underpriced (according to Value investors). Therefore, these investors seem not to be looking for companies with high ESG values, but interpret the growth of those ratings as a positive sign.

Models results referring to Growth and GARP investors correspond to the assumptions and are in line with the results of Kaiser (Kaiser, L., 2020). Indeed, Growth investors have a short investment time horizon and also they are interested in companies that invest in business growth more than in risk reduction and business consolidation, while the GARP investment style is similar to the Growth one and is more difficult to identify. The results referring to Income investors, on the other hand, are contrary to the formulated hypothesis, but this can be due to the investment time-span of these investors that is not necessarily long. Moreover, there was not as many reasons to expect their use of ESG information as there were for Value and Index investors.

Finally, dividing the sample by geographical area, the correlations between ESG and the investment styles Value and Index decrease in the East sample to almost zero, losing their significance. Dividing the sample by sector, on the other hand, no particular differences are noted, as it is for the difference between the results concerning the three ESG scores separately (Environmental score, Social score and Governance score) in which there is only a slight decrease in the results pertaining the Governance pillar.

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