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Equity Market & Alternative Investments

The impact of ESG scores on stock performances: a study on the S&P 500 index

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1.0 ABSTRACT

Popularity in sustainability and social responsibility has exponentially risen over the last years. Governments, instances and people have become more affiliated with the principles in commonly trying to save our planet from environmental and social destruction. The market demand for ESG-ratings in corporate sectors have steadily grown with these social developments, where firms are nowadays expected to be aware of environmental, social and governance contribution. Under asset management, we also note growing interest from investors that are becoming more willing to invest in companies that attain high ESG scores, although there is still no real evidence that there is any financial relevance attached to these strategies. Various recent studies have found that ESG does have effect, but that it still cannot be stated whether high ESG firms can outperformance lower ESG firms.

A dataset consisting six S&P 500 sectors, corresponding both top and lowest 15% ESG scoring firms, have been regressed to test three different hypotheses. For one of the three we have found convincing evidence that the hypothesis stated can be justified. It has proven higher ESG firms to outperform lower ESG firms on volatility, meaning that stocks tend to be generally spoken of safer nature in respect to risk.

In regard to the other two hypotheses presented, the conducted Fama French 5 Factor regression did not result in convincing evidence to whether high ESG firms outplay lower ESG firms in increased excess returns (1) or higher risk-adjusted returns (2).

2.0 INTRODUCTION

Over the past decades, the phenomenon *sustainability* have experienced enormous growth in size and popularity among worldwide societies. Despite the COVID-19 pandemic causing a slower rate in world population growth, the UN expects that the world will consist of 8.5± billion people by 2030 moving up to 9.7± billion by 2050 (United Nations, 2022). Logically, the more people live on this planet, the more we globally are about to consume in primary life necessities such as food, water, electricity and clothes. This calls, according to the world we now live in, for direct global action. For this reason, in 2015 the United Nations presented an agenda with a

collection of objectives to be reached by 2030. These include 17 so called *Sustainable Development Goals*, SDGs, with the aim to balance global economy and build a better world based on sustainability principles that form a blueprint for global peace and prosperity in today's world, but also for next generations. Some SDGs include a) no poverty b) no hunger c) clean water d) affordable and clean energy e) climate action, and twelve other future goals that form the pillars of the global UN agenda. Relative to these SDG goals set, are positive and negative externalities in international business. Externalities in economy are the consequences of industrial or commercial activities that potentially affect third parties, not being incurred in prices or earning/cost models. Under positive economic externalities we understand a benefit for society whereas negative externalities, whose are most frequently a consequence of economic actions, are harmful most likely to society or environment. The classic example, identified by (Ivan Montiel et al., 2021), is pollution and waste generation because of large scale manufacturing. Societal pressure on these activities are likely to grow year by year, and governments are expected to more and more increase the cost, or punish, the causing of these negative externalities by large multinationals. The economy is nowadays aware of the fact that causing negative externalities not only higher cost of production, but goes beyond that in weakened corporate reputations and negatively affected competitive positions.

Extra drivers behind the increased awareness have been the multiple environmental scandals that came out last decades. One of the most well-known was the in 2015 "Volkswagen Dieselgate", a large scale manipulation of pollution emission tests by equipping millions of diesel cars with systems, so called "defeat devices", to let these polluting vehicles pass the *Clean Air Act* tests. The aftermath of this scandal for Volkswagen was ruthless by a) paying large compensations to car owners b) a total amount of 4.3\$ billion in penalties c) heavily damaged corporate reputation d) record-high fall in stock price (75%) e) several jail sentences for high placed Volkswagen executives. A study by (Mačaitytė, 2018) concluded that, referring to the VW Dieselgate and its aftermath, the risks of any type of fraud or manipulation in regard to sustainable practices will be fiercely punished, not only jurisdictive but also society not accepting mismanagement in sustainable purposes.

These happenings have let to extreme awareness and social pressure on practicing environmental focused initiatives. Among these, corporate social responsibility is the ethical sustainable pillar for corporates to pay high attention to.

In the sector of investing, socially-responsible investing has equally gained much interest. Socially-responsible investing aims to ‘screen’ companies on the societal and environmental impact they make, and exclude ones who do not comply to the these standards being imposed. This means that watchers of SRI performers select firms that pollute less to zero, pay attention to firm diversity, enhance employee satisfaction, etcetera. These types of activities are all examples of social and environmental issues that in the world of 2022 heavily puts pressure on organizations and other important instances that somehow have a stake in investments. The integration of ethical values, protection of nature and planet, high standard social conditions and human governance are main pillars of SRI.

The so called ESG is a more specific set of terms that gives a broader and better perspective of respectively environmental, social and governance impacts in a company’s performance and consequently to the investment performance of a long-term portfolio. Yet after we will be explaining their broader significance and importance, we do not know whether these corporate objectives and initiatives lead to concrete higher corporate financial performances. What we do know is that ESG are interesting terms in the world of asset management. Many fund investors like to put their money in companies with high ESG standards, knowing that these are recognized as SRI market enables in where their corporate activities contribute to sustainable social development. Accountability is an important term in what Asset Management Companies (AMCs) want to eventually get to with the ESG attempts they make. Trustworthy firms are likely to perform better whereas profit-maximizing firms do not anymore enjoy the social popularity anymore.

2.1 PURPOSE OF THE STUDY

The purpose of this paper is to create broader understanding upon the principles of ESG, the added value may have and the importance of integrating these principles in corporate institutions. Consequently, after having understood the principles and value, the report intends to test hypotheses on possible effects that ESG may or may not have on stock performances in different returns. ESG theories are aligned with corporate activities and the effect that eventual “scores” may have on a firm. These scores are measured and presented by indexes or agencies that gather important information and data that together make up a final report, reflecting upon a company

its seriousness and actual attempts to promote and integrate ESG in their business model. This report seeks to further investigate whether a higher score in ESG in corporate activities leads to higher excess returns, risk and volatility on stocks. In this light the paper thus intends to draw conclusions whether higher or lower scores in ESG most likely lead to better or worse stock performance, or if there is no effect at all to be recognized.

The set of ESG standards are especially governed in investment portfolios intending to hedge risk and positively impact performances on stock indexes. This paper wants to analyze how the issuances of ratings involving ESG is influencing financial performances. Therefore an empirical analysis by investigating relationships among ESG dimensions and stocks performances of the S&P 500 index will be of leading to measure the probable effects they may have. A regression will be conducted in the paper by applying a five factor Fama French model to test stock performances and in what intensity they are changed if ESG variables play a role. The Fama French model takes into consideration a variety of important factors that can forecast price fluctuations, consequently linking these to the ESG scores that will be derived from an ESG database where scores will provide us our base. The Fama French will be, in its meaning, factors and usage, be explained later in this paper.

3.0 LITERATURE REVIEW

Sustainable investing

Sustainable investing is not something new. The term was first used millennia ago, but experienced its first slight growth during the 80s/90s, according to (Townsend, 2020). The article states that sustainable investing has been driven by societal issues such as climate change and corporate governance, but also society itself responding to global problems such as nuclear energy, waste pollution, gender wage gaps, and many other forces. The article quoted Warren Buffett by saying that one should not be investing in a company he does not believe in. The values and things one stands for, need to rhyme and correlate with that what the company you are planning to invest in, is sharing with you. We have in this way found the definition of the concept sustainable investing.

Over the past decades, more and more investors have embraced the concept of social responsible investment. Sustainable investing under assets is on the rise and currently netting plus/minus \$35.3 trillion dollar globally, according to a report by (GSIA, 2021). In this outlook are presented the numbers for years 2016-2018-2020, where a continuous growth in sustainable investment assets can be remarked globally, and can be expected for the future.

The increase of % in total sustainable investing assets has surpassed the 36 and will most likely continue to grow. Under sustainable investing the article addresses seven core approaches that make up the total. The biggest of these is the integration of ESG, and most popular in the U.S. since this region covers 64% of the total. The second most used term is negative/exclusionary screening, under which we understand exclusion from a fund or portfolio of certain companies or sectors that are being considered not investible based on practices or activities. Under these we can present an example where a company with a negative reputation in human rights and high level of employee conflict may be considered not investible because of potential harm that it might cause a fund. Public reputations play a big role in this negative screening, and is according to the article much used in Europe (+- 61% of the total). The last term that concludes the top 3 biggest strategies in sustainable investing is corporate engagement and shareholder action. Under this term we understand the degree of voice that a shareholder from all layers has in influencing the higher bodies within a company. This can be perceived important since it gives an indication in how much a company is open to opinions and initiatives of other, most lower ranked, employees. This term is a classic corporate social responsibility example to ensure that the company you want to invest in have adequate corporate governance mechanisms (GSIA, 2021).

Stakeholder and social pressure on sustainable practices

(Khan, 2019) found that over the past decades, different external forces have increased attention in environmental, social and governance issues. Growing awareness among society, the customer, producers, sellers and politics have led to several initiatives to improve company performances based on these principles. The importance of a good reputation on your ecological footprint, social activity and contribution, and governance have put pressure on companies complying to these

standards. It has become so important, that reputations are shared with the bigger public, translated in scores and ratings. Efforts to implement sustainability practices, either CSR and ESG, are according to several studies mainly triggered by social pressure that demands these initiatives to be taken.

A study written at the University of Aalborg (Haleem, F., Farooq, S., & Boer, H., 2014) tested two hypotheses on the matter of social pressure; H1. Stakeholder environmental and social pressures on company efforts to adopt CSR practices, and, H2. Context (size, location) affecting the relationship between stakeholder pressure and company efforts on CSR. Final conclusions of this study were that both hypotheses were confirmed by their presented regressions where environmental and social pressure had significant (translated in p-value < 0.001) effect on company adoptions of CSR enhancing activity. Furthermore it was found that companies operating in developing countries, both large or mid-size scale, present higher number in line with effort to practice CSR in operations.

ESG Investing

Diving deeper into the concept of ESG, (Iain MacNeil, 2021) shed in their article light on how ESG can be distinct from the themes sustainability and CSR. Both ESG, standing for economic, social and governance, and CSR, corporate social responsibility are to be called subsets that both fall under the overlapping term sustainability. The article explains that the goal of ESG integration is to mitigate risks concerning the three associated factors on a financial perspective, whereas CSR is more concerned with the ethical principles in social responsibilities. ESG specifically needs to ensure that risk is mitigated and return on the investment profile is considerably secure. This is according to the text mainly executed through the screening of companies in their performances relative to the ESG factors mentioned. Good or bad final scores will be decisive in the course of whether to accept or decline a company in a fund. The study also highlights the several overlap between CSR and ESG, most visible in strategies of implementation. The part where one differs from the other are the final objectives that it has with the approaches of sustainable activity.

As a result of the societal developments regarding sustainability expectations and its spread to corporate industries, companies have begun to make ESG-oriented

investments. (Henisz et al., 2019) came up with several ways of value creation through ESG activity. According to the article, a strong ESG proposition should at least cover all three pillars on where you individually can create value for your business for. Cost reductions are mainly the parts where you “earn” money, by for example lowering energy consumption and pushing to conduct meetings or business activity digitally, on-demand. This logically saves unnecessary waste on emission and as a results companies will enjoy positive attention for it. (Henisz et al., 2019) found out that, together with the fair usage of water and raw-materials, operational costs can be cut up to 60%.

Other principles presented by the article may include a “productivity uplift” where a company periodically organizes meetings with employees from all layers to “boost employee motivation”. The sharing of opinions, attracting new talent and creating higher social credibility are important initiatives that leads to higher employee satisfaction among all sectors of a company.

A research by (Kim & Li, 2021) found that a positive ESG in respect to lower rated ones enjoy greater positive impacts on business and eventual performances. The article is stating that it is hard to determine the actual impacts that a positive ESG has on business performances. What can be ascertained is that some variables clearly respond positively to an hypothesis where ESG components play a role, in comparison to hypotheses where they do not. The study states that their regression showed clear evidence of ESG positively impacting the performances of a company, though it cannot always state where these effects come from. According to (Kim & Li, 2021) disclosure of company data is enormously important to better analyze the effects of ESG. Furthermore, market dependent variables also play big roles in how a company performs, and if ESG are really needed in specific sectors yes or no. Market size, history, corporate reputation, are external factors that may heavily influence the outcome of a ESG component regression on corporate performances.

A study by (Camilleri, 2018) outlines how the European Union and certain Member States deal with ESG and what they started to require of their national instances and corporate agencies. The article principally refers to an in 2014 adopted EU directive *2014/95/EU* on non-financing reporting by companies and organizations active in EU Member State countries.

It entails further disclosure of company information with reference to ESG activity with the aim to create broader transparency among their ESG footprint. In specific

detail the article speaks of national “Codes” introduced by a country its government in disclosing non-financial information by its national organizations that are of public interest. The study mentions three European banks and shed its light on how they pursue ways to disclose internal information. In all these three banks, ING Group NED, Deutsche Bank GER and Uni Credit ITA, we see exact similarity in how they intend to control these activities. Each of them have introduced bodies of control that have a responsibility in checking whether information is being disclosed in compliance with the national code of data disclosure. These examples are illustrative in how far a single company is ought to take measures in disclosure credibility for the good of, eventually, ESG performance measures. It once again underlines the size of societal pressure on firms that are expected to comply to these responsibilities, driven by earlier mentioned factors in respect to environment, society and governance.

In a more specific view, (Torre, 2020) investigates whether sustainable companies that score better on their ESG rating, potentially enjoy higher excess returns on their stock price values. The article states that ESG has become a popular term in financial markets, and that investors tend to closely monitor and select companies with better ESG scores. Since stock exchange indexes themselves most of the time present ESG scores of firms, it is not difficult to find this data about the company you consider to invest in. Without convincing proof, assumption are made that ESG scores are automatically an indicator of better financial stock performances; e.g. that the price will be positively affected. From an investors’ perspective, the article (Torre, 2020) expresses that companies with higher ESG scores are less sensible to risk and better able to deal with ESG principles. Based upon the article we can thus only state that a better ESG score indicates the ability of an organization to better impose operational policies in respect to ESG principles, and that it increases the corporate reputations. Though it does not prove nor expresses any impact on the value of stock prices triggered by a good/bad ratings.

A last very detailed study by (Samama et al., 2020) even expresses sincere doubt with its critical analysis in how these earlier mentioned climate-related initiatives, together heavily promoted and pushed in the worlds’ economy, potentially can bring risk and harm to the financial stability of our economy. It questions whether the new perceived climate-related business models cover external risks rather those meant for environment. The article highlights that financially

disruptive events may be a cause behind future financial crises, since exhibiting these disruptive movements in favor of the ecosystem, society and economy may provoke an economy to fail. This, according to the article, because of the enormous but also increasing socioeconomic- and political pressure on government institutions, NGOs and (both private and public) banks. According to the study, the accountability on climate friendly topics will grow to excessive and mistaken proportions, beyond the extend of what many organizations are perhaps capable of. The ESG principles have also been mentioned as a phenomenon that positively impacts society by shedding light on serious environmental issues, but also present downsides that potentially can bring additional problems by harming the economy.

3.1 PRINCIPLES OF ESG

The term ESG is being derived from its three pillars that makes up the word: Environmental, Social and Governance (ESG). This set of standards are used to measure company's behavior by their social consciousness in investing. Each of these criteria considers individually in how environmentally, socially and in governance they are behaving. The final ESG score provides clearance to what degree a company is acting to these ESG standards. The importance of ESG in investing and corporate performances are increasingly popular since it helps investors to find companies with certain values that match their own. On the other side, it helps recognizing and consequently filtering companies whose practices in respect to ESG are low and take some kind of substantial risk. Prior to the current situation of how people look and value ESG, the term was debatable and not of high urgency to companies and their values. Climate changes and growing customer demands to a better green footprint has risen public interest in these three pillars. Companies have been confronted with it in its daily activities, which have placed the term somehow higher on their corporate agenda.

Pillar one, environment, has become a very popular term in today's world. Not only in the corporate sector, but in every inch of our society we see back the heavy importance that it has. Examples of several environmental objectives are to lower/zero emission of the mobility sector, lowering households energy consumption, and in the bigger picture governments that subsidize energy-replacing initiatives such as electric vehicles. In portfolio investing, the environmental criteria

refers to how a certain company is concerned with nature. Their ecological footprint may be measured based on their usage of energy, waste policies, pollution and natural resource conservation. The environment pillar is said to be an important one, since we can assume that if companies do not have one single policy in this respect imposed, negative screening and public opinion are likely to arise. Social unrest and dissatisfaction of society on government, but also powerful and big sized corporations, policies regarding the planet and its nature have had serious impact and reconsideration on introducing new eco-minded incentives in daily operations.

The environmental pillar is associated with the cutting of costs, whereas the creation of new value is not very applicable in this area. The reason for this, is that ESG corporate activities in environmental usually mean a better and more efficient usage of resources. The most simple example of that client meetings are more frequently held online, what consequently means that unnecessary use of a car has been avoided. Firms hereby benefit from the idea of cutting the cost of capital in corporate activities. Other examples in this respect are that companies impose in-house rules on reducing the printing of paper, product recycling, meat-free lunches, etcetera. These “going green” initiatives are steadily becoming more popular and already became a widespread phenomenon among all types of corporations.

The second pillar covers the principle of social awareness. With this is meant the relationship management that companies have with its employees, customers, communities and other relevant parties. This may include their way of communication, and taking proper responsibility for possible issues or problems that may happen during corporate events. This pillar is mainly driven by society and their increasing interest in positive social responsibility. The ethical values previously mentioned seek to provide stability and improve conditions under with employees work.

Another important aspect of this pillar is that increased connectivity with other parties have substantial positive effect on social capital. Higher valued social capital means that relationships are strengthened and creation better environments in terms of trust, information disclosure and financial transactions. This is obviously very beneficial since it eventually will lead to cost reductions as company reputation is getting stronger while external parties are happier to conduct business with the firm.

The third and last pillar talks about governance, and deals with how an organization is structured and governed. Under governance we understand how a company's board is structured, the interdependences among company positions, internal control, engagement etcetera. Underlying practices may include frequent HR management meetings, bottom-up approach in opinion sharing, salary division, working conditions, etcetera. All these different activities are important to be taken together and form a general score about a company its governance. It is believed that companies with stable and well-organized governance enjoy greater attention among potential investors and thus are perceived to be valued higher.

3.2 SRI VERSUS ESG

In order to create clear understanding upon definitions, it is for this subject important to break-down SRI. The term SRI stands for social responsible investing and aims to ensure that companies invest in accordance with social moral objectives that are important to them. With these objectives, companies need to deal with environmental issues that arise in their business or daily activities, such as reducing pollution or active corporate citizenship. Pressure from society on these objectives are big, so big that people expect these anti-pollution, zero-emission policy measures to be taken. The question though is, if negative screening only makes that if a corporation does not comply to these SRI activities, can expect negative direct effects in their business. Lower general interest in the firm, their public image and eventual financial records can be expected. In a worst case scenario, companies can even be excluded by others, though this is not preferred by SRI minded investors.

A more holistic and bright view to how SRI measures can lead to a better and positive effect on business is much more favorable and optimistic. Though the question being stated in this report is if this is really the case. ESG is brought into life to closely judge companies on their environmental and sustainable responsibilities. ESG is solely used in investing and dealt with through stock screening in negative fund screening by any interested party. Parties with interest may include fund managers, companies or regions. The subcategories mentioned are to be individually judged by their competences and results, of which these we eventually make or break the final rating.

3.3 ESG AND RATINGS

As mentioned earlier, ESG ratings give investors strong indications in relation to potential risks that could impact the financial performances of a company. There is not one leading type of rating system. Many rating agencies that measure the scores of by client requested companies have introduced their own systems of rating. Besides agencies, also indexed itself such as S&P or FTSE Russell calculate ESG scores for their users. Generally a lower or failing ESG rate is perceived as a negative screening, meaning that potential risks are higher, volatility is stronger, and so dealing with higher unpredictable stability. In order to give a sense of how a rating system could look like, we take Morgan Stanley CI Inc. (MSCI) as example. Morgan Stanley is notable for providing equity, fixed income, stock indexes, portfolio risk and performance analytics, etcetera. Clients of Morgan Stanley are asset owners, asset managers, banks and more. Morgan Stanley provides their clients with ratings for any company they desire, identifying the “leaders and laggards” of a particular type of industry.

According to their ESG rate system brochure, (Moen, 2020), MSCI clients can use ESG ratings for fundamental analysis, risk management and index-based benchmarking. MSCI uses several methods in regard to the build-up and eventual rating that will be constructed after a period of research and analysis. The MSCI approach is based upon four steps; Data, Metrics, Evaluation and Rating. The collection of data is carried out through already existing high-ranked datasets, that are that mainly include of government, regulatory or NGO ones. Metrics is the part where the assessment of collected data will be conducted, measuring company risks, management of risk, and sensibility to risks. Outcomes will later be benchmarked with comparable organizations in the same industry. Based on these metric results, each key element in the analyses will be given their own rating/scores, respectively on a scale from 0 to 10. Eventually, these end-scores will be re-assessed and weighted to the standards of the industry and its benchmarked industry average. All weights and key scores will be merged into one which will be subjected to the MSCI ESG ratings. The final ESG ratings are of a AAA-CCC nature, where AAA is the highest you can get meanwhile a CCC rating is lowest possible.



Figure 1 MSCI ratings

The figure above are official rating classifications of MCSI in which one of them companies will be categorized (Moen, 2020). The better the rating, the better an organization, according to the MSCI index, is able to manage ESG related risks. Low ratings can be caused by poor organization of energy resources such as water, emission and energy waste. The specific weights are influenced and based upon the industry and the exact product/service it offers. Some industries simply depend heavier on natural resources than others do, in for examples producers that rely on these raw materials versus resellers whose are more subjected to import and exploitation of sales. Ratings thus provide fierce indication whether a firms comply to its responsibilities in respect to what the industry is expecting and needs. Same volumes of, let us say, water spilling can have for one organization heavier consequences compared to another of a different industry, as highlighted by the article. The terms leaders and laggards will be used in this report to describe companies falling under the higher or lower section of a sector.

Rating system skepticism

Possible difficulties in relation to the rating of companies are the availability of information, so the degree to which a company discloses their information. Up to a certain degree you cannot fully rely on the legitimacy of ratings. In general, agencies are continuously updating and reinventing their tools of measuring ESG pillars, though transparency in actual truth behind such factors and information can sometimes be questionable. Since each company is different than one another in structure, characteristics and governance, it is quite complex to benchmark information and empirical data with comparable alike competitors. Another complexity is that each rating agency is using its own methodology in measuring the ESG valuation of a certain company.

The complexity of especially the different key indicators and metrics used by rating agencies in their approaches, has been analyzed in an article by (Boffo &

Patalano, 2020) comparing several rating methodologies from big agencies in its “R²”; the correlation coefficient. Study results have shown significant deviations in eventual ESG scores for the same type of company. Underlying reasons for the variances in scores are mainly said to be the different metrics that are used by agencies, since they all suffer from a lack of transparency in data. This essentially means that weightings to certain aspects of ESG in assessing a score, heavily differ per rating provider. In an ideal situation, each credit rating agency would use the same instruments in assessing how well a company they are examining in ESG activity would perform in certain levels.

Different variables in rating methods mean that potential outcome of multiple rating techniques lead to other outcomes, naturally that one present more favorable results than another. Companies can thus make a selection and consequently choose their preferred, the one with the best ESG outcome, rating report and present this as definitive company ESG report. We can thus assume that each rating system is automatically covering each and every variable that is needed to form a final ESG score, or that, at least, there is a certain subjectivity in method selection based on the variables that are better served than others presented in alternative reports. In the past we have seen that highly rated firms were dragged into public scandals because of recalculations by other, let us assume the more “independent” ones, agencies where their actual ESG outcomes did not for a single percentage correlated with the ones previously published. We concluded already that there is a serious lack of rating system homogeneity in the methods of measuring ESG activity, but for this reason we can thus assume that these huge differences between reports may create room for issuers’ influences on results. Mutual standards or minimum guidelines on how to legitimate calculate ESG scores are needed to create more reliability and accuracy.

3.4 ESG AND IMPACT INVESTING

The impact that ESG has on daily activities within firms are acknowledgeable. Practices of ESG entail serious considerations of each and every pillar. No matter what a firm principally produces or does, ESG will require of its organizational board and corporate bodies to be aware of the responsibilities they have on this principle. The general feeling of people with companies that invest in ESG, is that

their effect on society and planet is very positive. For this reason, popularity and public interest in these types of ESG-minded organizations may rise heavily. ESG investments by companies are considered to be of lower risk and of safer nature than other conventional investments. Several studies also state that ESG investments nowadays even have the potential to outperform previous non-ESG investments, because of the longer term orientation that sustainable wise investments have. Though under the term sustainable investing, we understand that there are a variety of different kinds of investment strategies. For this report we compare ESG investing with impact investing by outline their differences, because they seem at first sight the same.

The definition of impact investing, also known as social investing, are investments made with the following two objectives; (i) generate positive social and environmental impact alongside the potential (ii) financial returns. Investors generally see these types of investments as an opportunity of dual profit, based upon both financial and non-financial returns that can be made. The non-financial return refers to the effect that a certain investment potentially has on society, in which it could favor or support certain activities of climate goals with the investment made. As they have many similarities, ESG and impact investing can be clearly distinguished from each other. In both its considerations, ESG investing tends to look more at the effects that social and environmental can have on investment risk and return, according to (Crifo, 2015). In contrast, impact investment tends to be more pro-active in terms of engagement and creation of social and commercial value, as (Cojoianu, 2021) points out in their article.

In comparing both types of investing, the article found that impact investing is significantly more concerned with the actual outcome of benefitting the environment or society in its objective. In these processes, the party that invests tries to play a bigger role in its responsibility to provide positive externalities in the sector it is investing in, and tends to positively influence this development. The study expresses that it is very common for impact investors to be get in touch with policymakers and other important stakeholders in order to together push for a sustainable incentives and regimes. It is said that impact investors tend to be younger, but also larger in size. The last different is that impact investor structures are sometimes government owned, enjoying the over decade accumulated knowledge on economic, environmental and social topics.

4. FACTOR MODELS

4.1 FAMA FRENCH

The Fama French Model came into life in 1992 and has been created by two American economists, Eugene F. Fama and Kenneth R. French. With this statistical asset pricing model, the aim was to describe stock returns of (i) small and big companies and (ii) companies with high or low P/B values; where P/B stands for price-to-book ratio. The idea of combining these two elements to the already existing CAPM model, that describes stock return in a market as a whole, was to analyze the correlation of value and growth stocks. In this respect, value stocks are considered a stock with a price under their intrinsic value, and so a potential profit margin is on the rise for a potential investor. Under a growth stock we understand types of stock that have future potential to exponentially can realize fast growth. Growth stocks are expected to eventually outperform the general trading market because of the potential they have. Though, a risk-adjusted analysis shows value stocks are larger in size (as well as the firm as issuer) whereas risk is considered to be lower. The Fama French, thus, seeks to confront these types of stock on the bases of size risk and value risk factors to the market risk factors (CAPM).

4.2 FACTORS

Starting with the “base” three-factor Fama French model, we can explain it as an augmented CAPM formula in which they have added two extra elements; the SMB and HML. These stand for small minus big companies/stocks (SMB), representing the return spread between small- and large-cap stocks, whereas high minus low (HML) takes into consideration the return spread between high book-to-market and low book-to-market stocks. Under a book-to-market ratio we understand the market capitalization divided by its book value of a certain stock. These two extra variables make up the three-factor Fama French model. Its three main objectives are to evaluate a company's performance in;

1. Market Risk
2. Company size; outperformance of small versus big firms -> SMB
3. Value factors; outperformance of high versus low book-to-market value -> HML

Under the SMB element we can assume that high returns generally come from small mkt. cap companies. As for HML we can take into account that a positive value means that a certain portfolio generate its return from high book-to-market ratio stocks. This because the a positive relation of HML means that in the high minus low ratio a positive number refers to stocks with a higher book-to-market ratio. This principle is, by Fama and French themselves, named as “value premium”, meaning that the valuation of value stocks are more convenient over low growth stocks; referring to the average excess returns.

Market risk (1) is being measured through the CAPM in describing the relationship between systematic risk and expected return for certain asset classes. In this formula, the risk-free rate will be taken as investor yield since the investor would expect zero risk and a certain interest attached to his investment, over a certain period of time t . Here fore we consequently add-up the given β times the “market risk premium”. The market risk premium is a confrontation of $R_m - R_{rf}$ (Exp. Return of market – Risk-free rate). The formula is thus as follows:

$$R_a = R_{rf} + [B_a \times (R_m - R_{rf})]$$

Where

R_{rf} = Risk-free rate

B_a = Beta β

R_m = Expected return of market

The final FF3F formula is as follows:

$$R_{it} = \alpha + \beta_1(Mktl_i - R_{ft}) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(MOM_t) + \epsilon_{it}$$

Where

R_{pt} = Portfolio excess return in period t

R_{Ft} = Risk-free rate (t period)

β = market Beta

$R_M - R_F$ = spread

SMB = spread in returns of small minus big market capitalization

HML = spread in returns of high minus low book-to-market ratios

Asset pricing models evolve over time, and since its first existence, the Fama French Model (FFM) has been a basis for others to elaborate on. In 1997, a couple of years after the construction of the Fama French 3-Factor (FF3F), Carhart (1996) (Paliienko, 2020) added an extra factor to the formula in the form of a WML parameter, where WML stood for Winners Minus Losers. The idea of the added factor was to understand cyclical movements of price changes, where equal weighted averages of the lowest performing firms should be subtracted from those of the highest performing firms, translated in factor “ UMD_t ”; the monthly premium on winners minus losers. This adjusted formula is better known as the Monthly Momentum Factor (MOM), suggesting that this factor directly pinpoints momentum in asset classes and stock returns. (Ehsani & Linnainmaa, 2019) found that this approach principally intends to find autocorrelations within a set of factors to form a base of individual stock momentum. Though it is mentioned that this formula has not been widespread used.

A study by (Zaremba & Czapkiewicz, 2016) analyzed in their research the Fama French in all its existing and adjusted models, and came to the conclusion that the FF5F is best capable to measure returns of portfolios and is significantly better to its previous models. According to the article, the FF5F best shows patterns in cross sectional stock return. With this is meant estimations of stock returns from a set of variables unique to each company, instead of common factors that may represent multiple companies in comparability. Stock-specific factors are important determinants analysis, where fundamental and technical data cover the necessary characteristics. These may include information on financial performances, metrics on trading volume, market capitalization, volatility, and more. The five-factor Fama French is an updated version in adding two extra variables to the model. These include the robust minus weak (RMW), comparing returns of firms with high and low profitability, and conservative minus aggressive (CMA), which is looking at the low and high intensity of investing.

In this report we will be using a FF5F model to sample *low and high* ESG activity of firms, plotting the eventual effect it may have excess returns of firms from different sectors. The analysis will therefore include a narrative in which different sectors may be analyzed on the effect that ESG may have on companies. The underlying idea of the Five-Factor Fama French is that the return of a given asset should rely heavily upon the five factors presented in the formula.

The estimate of the alpha, α , is the main indicator of interest since it will show us the elasticity of a certain stock, where;

- An alpha close or at 0 indicates no abnormal returns in respect to all risk associated with a given stock
- An alpha that hugely differs from 0 indicates that the given stock heavily responds to risk and thus is showing abnormal returns

A positive alpha of 1.0 means that a given stock outperformed the benchmark index by 1 percent. On the contrary, a negative alpha does the opposite meaning that the stock is failing to generate a return in comparison to its market (Sarwar et al., 2017).

The Fama French Five-Factor gives the report the possibility the plot a regression and implement ESG variables of which we can draw regressions out of. The formula of the five-factor Fama French model is as follows:

$$R_{it} = \alpha + \beta_1(Mktl_i - R_{f_t}) + \beta_2(SMB_t) + \beta_3(HML_t) + \beta_4(RMW_t) + \beta_5(CMA_t) + \epsilon_{it}$$

Where

R_{pt} = Portfolio excess return in period t

R_{Ft} = Risk-free rate (t period)

β = market Beta

$R_M - R_F$ = spread

SMB = spread in returns of small minus big market capitalization

HML = spread in returns of high minus low book-to-market ratios

RMW = spread in returns of most profitable and least profitable firms

CMA = spread in returns of conservative minus aggressive investing by firms

S_p, H_p, R_p, C_p = regression coefficients for each factor

Drawing;

- Null Hypothesis H_0
- Alternative Hypothesis H_1

For;

- High ESG Portfolio sectors
- Low ESG Portfolio sectors

5.0 HYPOTHESIS CONSTRUCTION

Based upon previous paragraphs written above, the report will conduct its regression based on the following hypotheses:

Hypothesis 1

H₀: High ESG scores are subject to generating a higher alpha in stock excess return for a fund

H₁: High ESG scores are **not** subject to generating a higher alpha in stock excess return for a fund

The first hypothesis needs to provide clearance on whether imposing ESG strategies will ideally lead to an increased alpha in stock excess return. The alpha, α , is an indicator of a stocks' capacity to yield positive returns in respect to that of the index benchmark; in the case of a positive alpha ratio, a certain investment can be considered successful since it has outperformed the market. Concluding, the alpha rate calculates the excess return of a certain stock by benchmarking it to the index it belongs to. In the regression of this report we want to investigate if the alpha of a certain stock is affected when ESG strategies are applied. If there is a correlation, analyses should provide answering on how significant it changes the alpha from its initial value. An alpha can be simply calculated by subtracting the expected rate of return from the actual rate of return, in order to thus conclude your portfolio return times the beta.

Hypothesis 2

H₀: The integration of ESG strategies enhances the risk-adjusted return of a fund

H₁: The integration of ESG strategies **does not** enhance the risk-adjusted return of a fund

With the second hypothesis, this report intends to measure whether stocks can hedge risk with ESG integration and present an increase in their risk-adjusted return. A higher risk-adjusted return presents a better risk profile in respect to return scenarios

for an investor. He/she can thus expect a higher return on its investment. The most common way to measure this risk is by using the Sharpe Ratio, describing how much excess return an investor will make on the extra volatility you hold with a riskier asset. Consequently, the momentum factor of this particular stock, indicating whether a certain stock is strongly or weakly responding to trends over a short period, is presumably low in a situation of higher risk-adjusted returns. The momentum factor is generally interesting to investors who seek to make profits in shorter amount of time by looking at upward (bullish) or downward (bearish) trends that may have influence on the price of a given stock. Historical data has shown that momentum traders tend to outperform since they make the highest returns on investment compared to any other type of investor (Kaiser, 2020). The price momentum can be typically calculated with the *Relative Strength Index*, abbreviated RSI, that plots momentum on a scale from 0 to 100. It is understood that an RSI respective to 70 or higher is considered overbought whereas an RSI under 30 is considered oversold, as (Hari & Dewi, 2018) . Logically one can assume that from 70 and higher it is highly recommended to sell while from 30 and lower you should be buying. This hypothesis wants to know whether ESG factors play a role in the risk-adjusted return of a stock, and thus can conclude if the momentum will be affected.

Hypothesis 3

H₀: Firms with high ESG scores outperform firms with low ESG scores in stock performances

H₁: Firms with high ESG scores **do not** outperform firms with low ESG scores in stock performance

The objective of the third hypothesis is to look whether funds with high ESG scores outperform firms that present lower ESG scores. In this hypothesis we will focus on the volatility that is involved in each sectors' stocks, based upon the historical data where the regression is based on. Performance volatility is a measurement that refers to how strong a stock changes, where higher volatility implies a stock to be riskier and greater chance of potential losses. Standard deviation is the most common way in measuring volatility, which will also be conducted in this hypothesis by taking all historical prices of companies high in ESG and low in ESG. An eventual average

will be taken from all standard deviations that roll out the eleven year data of all historical stock values. Consequently, in the results we will analyze whether high ESG companies yield or do not yield lower volatility, meaning a stock to be more steady and trustworthy. High predictability and lower valuation of uncertainty is generally preferred by investors and is one of the indications why lower volatile funds in the long run outperform higher volatile funds.

6.0 METHODOLOGY

Based on the earlier mentioned literature, suitable methodological data has been found that form the base on which we can test all stated hypotheses on. Data has been retrieved from several different databases whose will be mentioned in the next part of this chapter. After the regression will be presented and results will be discussed. Interesting will be to analyze how the variables that will be put in the regression will have effect.

6.1 REFINITIV DATABASE

In many recent literature claims are made that ESG investing has often been a source of being able to outperform the market. In this third hypothesis we want to analyze whether companies who have adopted ESG-wise initiatives, or enjoy high ESG scores, are automatically said to outperform comparable companies of the same industry with lower ESG scores. We will be again looking to the alphas that they present.

For this report we were able to retrieve data from the Refinitiv Database. Refinitiv, formerly Thomson Reuters, is one of the world's biggest provider of financial market data and technology. Its databases, available in over 190 countries, offer a wide range of data sources and information that relate to financial performances of companies. The analytics that Refinitiv use include quantitative analytics capabilities, price and valuation analytics and regulatory analytics. These analytics add value in recognizing profitable opportunities or business solutions.

The Refinitiv Database presents ESG-data for over 9,000 companies worldwide, measuring ESG performance, commitment and effectiveness based upon 450+ metrics and 70+ analytics to effectively measure the three pillars and

eventually providing a final score. ESG scores are frequently updated, mostly on a weekly basis where new company scores replace old ones based upon automatically changing records. Auditability is an important objective when forming these scores in order to keep reliability and transparency values high. Practices in this respect are high expected company disclosure, employees that manually control and verify the metrics used that affect ESG scores, especially in situations where heavy change in company ESG activity occur. Yardstick and benchmarking are frequent tools to measure peer-to-peer ESG activity within a same sector. Examples of data collection practices by Refinitiv analysts are examinations of annual reports, stock exchange filings, CSR reports and news.

Final ESG scores provided by Refinitiv are divided in four scales, so quartiles. Each quartile covers 25% of the score, naturally adding up to 100. When a company falls with its ESG score in the first quartile (0-25), it indicates poor ESG performances and low levels of ESG data disclosure. The second quartile (26-50) is explained as satisfactory and neither a low or high degree of data sharing. The third quartile (51-75) range describes companies that present good performances relative to the ESG standards, and indicate a more than average disclosure in company data. The last quartile (76-100) is the best range in which companies can fall for their ESG score, meaning that these firms present excellent results in three ESG pillars, and are said to have a high transparency in company data share.

6.2 DATA SAMPLE

In the regression that will be conducted later on in this report, the index on which we will project our analysis concerns the Standard and Poor's 500, S&P 500; .SPX, list. This index has been chosen on the basis of broad historical data that S&P 500 and its listed companies present. Also in regard to the availability of historical ESG-data, the index satisfied the amount wished for.

The ESG-data, as earlier mentioned, has been retrieved from the Refinitiv-Eikon Database. On the other side, historical financial data has been collected from Yahoo Finance. The time span of the data that has been collected goes from FY0 – FY-10, so covers a period of ten fiscal years for each company. The starting year, so FY0, is respectively FY2020. This, because not all ESG data reports of 2021 have

been collected or written, and thus there are no ESG scores for many S&P 500 listed companies yet available.

For the regression of this report we take several sectors of the S&P 500 index to be individually testing our hypothesis on. These industries include the following; - consumer cyclicals (75), - industrials (70), - healthcare (61), - consumer non-cyclicals (41), - utilities (29) and - energy (23). The numbers in brackets behind each sector indicate the amount of S&P listed companies of each sector. Based on these number the regression seeks to plot on the leaders and laggards regarding ESG scores, meaning that the top and flop of each sector will be analyzed. The specific data in historical close prices of each company has been retrieved from Yahoo Finance.

Finally, the formulas regarding several ratios, such as volatility and adjusted return, to be calculated answering the hypotheses previously stated are taken from the textbook *Corporate Finance; 4th edition* by J. Berk and P. DeMarzo. These ratios have consequently been calculated in excel and exported in the report. Data regarding historical Fama French have been obtained from the data library of Kenneth R. French faculty website. The final regression has been conducted through Stata, a statistical software where users can analyze and plot datasets to regress certain outcomes.

6.3 DESCRIPTIVE DATA

For illustrative purposes, Table 1 shows the average returns of all sector portfolios. Out of the 131 observations made, based upon the eleven year monthly time span (11x12), we can denote that for the most sectors, the average returns of high ESG sectors are respectively lower than those of low ESG sectors. The Utility sector shows a slight positive effect in regard to better scoring ESG scores with an average return of respectively 0.01 against 0.008. Regarding the composite ESG scores in high and low distinction, we cannot speak of huge differences among both mean and standard deviation outcomes. Results between high and low companies of the same sector are quite comparable and do not show significant change. The biggest deviations in as well the mean as the standard deviation column can be noted for the Energy sector, where they present strong fluctuations. In the average returns we see that firms of the section high ESG present significant lower amount than those in

respect to firms with a low ESG score (High 0.0016 versus Low 0.0261). On the other hand, looking at the standard deviation of both, we denote an increase for low ESG companies in this same sector (Low 0,1 versus 0,07 High). Generally we can say that portfolios that have a higher standard deviation, present wider spread among clusters. It can thus indicate a market of set of funds to be less reliable when the standard deviation increases. It would, for this specific sector, suggest that an increased ESG would strengthen the reliability and predictability of the sector.

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>Min</i>	<i>Max</i>
MktRF	131	.0121458	.0426229	-.1339	.1365
SMB	131	.0002183	.0254376	-.0831	.0712
HML	131	-.0044603	.0266427	-.1397	.0819
RMW	131	.0009962	.0153769	-.0388	.0426
CMA	131	-.0006008	.0148052	-.0325	.0369
NoDur	131	.0103863	.0359297	-.1149	.1002
Durbl	131	.0186351	.0847969	-.2276	.4019
Manuf	131	.0125252	.0539605	-.2006	.1685
Enrgy	131	.0025809	.0768281	-.3449	.3238
Utils	131	.0087275	.0350750	-.1301	.0786
Hlth	131	.0126115	.0407454	-.0997	.1341
NoDurHigh	131	.0074534	.0365692	-.0905	.0907
DurblHigh	131	.013916	.064997	-.2642	.2075
ManufHigh	131	.0165122	.058439	-.1958	.174
EnrgyHigh	131	.001687	.0726515	-.2817	.2434
UtilsHigh	131	.0103855	.0394049	-.1179	.1016
HlthHigh	131	.0122939	.0425692	-.0903	.1297
NoDurLow	131	.0149458	.0447467	-.1396	.1813
DurblLow	131	.016184	.0551464	-.2764	.2485
ManufLow	131	.0193061	.0499313	-.1616	.1784
EnrgyLow	131	.0261015	.1018636	-.2044	.3277
UtilsLow	131	.0083771	.0405581	-.1486	.091
HlthLow	131	.026987	.0680352	-.1561	.2447

Table 1 Descriptive data output

6.4 REGRESSION CONSTRUCTION

Since the reports intends to compare sectors in its companies with high and low ESG scores, the regression will plot the hypotheses based on the highest and lowest 15% scoring companies of each sector individually. This percentage will consequently be the cut-off point for each. The number of companies per sector measured will thus depend upon the total amount S&P companies listed in each. As explained earlier,

the sector consumer cyclicals will logically be regressed over a higher amount of funds where we see that the utilities or energy sector are of smaller size.

7. RESULTS

7.1 STATA REGRESSION OUTPUT

In this section of the thesis, the regression results will be discussed. Each sector will be individually analyzed in their top and lower 15% companies that have been regressed under an FF5F method, whose have been presented earlier. Consequently, conclusions will be drawn and eventually be add up to generate an average conclusion in regards to the hypotheses. These will be presented in the eight section “discussion and conclusion”.

	NoDurLow	NoDurHigh	ManufLow	Manufhigh	EnrgyLow	EnrgyHigh
Mkt-RF	.82538***	.72055***	.94151***	1.19662***	.81517***	1.09598***
	-1.163.952	-1.305.706	-1.702.426	-225.889	-381.317	-1.053.308
SMB	-.18886	-.23686**	.27821***	.18032*	.86046**	.51557***
	(-1.45774)	(-2.34929)	-275.346	-186.317	-220.311	-271.213
HML	.07141	-.26645***	.11498	.11417	.07569	.27557
	(.56004)	(-2.68522)	-115.624	-119.865	(.1969)	-147.292
CMA	-.05696	.73963***	-.12055	.09494	.18445	.92987***
	(-.2645)	-441.305	(-.71772)	(.59008)	(.28409)	-294.253
RMW	.21873	.37555**	.18369	.01022	.16137	.21879
	-117.798	-259.896	-126.848	(.0737)	(.28828)	(.80303)
_cons	.00503*	-.00236	.00807***	.0025	.0163*	-.01017**
	-176.359	(-1.0657)	-362.788	-117.134	-18.963	(-2.43012)
Observations	131	131	131	131	131	131
R-squared	.56146	.60235	.78578	.85651	.2309	.64182

t-values are in parentheses

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 2 Stata regression output

	HlthLow	HlthHigh	UtilsLow	UtilsHigh	DurblLow	DurblHigh
Mkt-RF	1.04732***	.8697***	.44568***	.37656***	1.01609***	1.27314***
	-1.158.291	-1.454.633	-52.817	-438.058	-1.448.845	-2.010.717
SMB	.70004***	-.17618	-.10864	-.23573	.33385**	.36754***
	-423.766	(-1.61287)	(-.7047)	(-1.50095)	-260.564	-317.722
HML	-.86309***	-.30858***	.11549	.01644	-.02176	.18033
	(-5.30861)	(-2.87037)	(.76119)	(.10635)	(-.17256)	-158.395
CMA	-.28758	.24944	.21427	.27939	-.08896	-.06709

	(-1.04723)	-137.372	(.83611)	-107.014	(-.41765)	(-.34886)
RMW	-.56623**	-.18107	.54014**	.44257*	.77265***	.68248***
	(-2.39159)	(-1.15659)	-244.463	-196.619	-420.756	-411.643
_cons	.01066***	.00072	.00309	.00566	.00285	-.00154
	-293.072	(.30073)	(.91172)	-163.852	-101.053	(-.6062)
Observations	131	131	131	131	131	131
R-squared	.69157	.65554	.24414	.16898	.71759	.83429

t-values are in parentheses

**** p<.01, ** p<.05, * p<.1*

Table 3 Stata regression

output

All sector regression outcomes are presented in the tables 2 and 3. The p-values in regressions or statistical tests are indicators whether the relationship between what you test and the null-hypothesis is significant or not. It is understood that a p-value cannot exceed 1 and is indicated by *p<.1. A p-value that holds a number of <.05 (***) tells us that there is a statistical significance in what has been observed, where the opposite >.05 indicates that from what has been observed, no significant result has been found. A figure that presents a p-value <.01 (***) can be interpreted as highly statistically significant, meaning that variables correlate strongly with the hypothesis given. These values are individually, per variable, given based on its regression output. No stars mean that the observer cannot draw conclusions from the data since variables of interest do not show significance. In our analysis we will for this reason consider values without stars to be irrelevant and not to be taken into account regarding final conclusions.

From the observations in the table we can interpret the Mkt-RF as the portfolio performance of each sector benchmarked against the market. Numbers that lay above 1 are outperforming the benchmarked excess return of the sector. This would mean that for numerous sectors, performances lay higher than that of the market. For illustrative purposes, these values represent the risk premium of the market meaning that if additional market volatility holds 1%, the fund increases with the value of the given market premium. Results of the table show that all values presented are highly significant (***). Only the sector Durables presents for both high and low ESG sides >1 market risk premiums, meaning that the entire sector seems to outplay the market. Furthermore we can conclude that out of the data IndustrialHigh, EnergyHigh and HealthLow sectors also exceed the 1 point. In regard to whether high or low ESG firms outplay each other, we note quite mixed results among clusters. On the one

hand we see sectors, respectively Industrial, Energy and Durables, where the higher ESG outperform the lower in their market premiums, what could be an indicator of high ESG being subject to higher excess returns. Though this is not everywhere the case since in for example the Health Sector lower ESG affiliated firms outplay higher ESG scoring stocks. This is in line with earlier mentioned literature (Kim & Li, 2021) that effect of better ESG scores can be hardly be measured over an entire index, where companies put together in the same analysis can be of totally different nature. One could be better conducting a more specific research where sector per sector wise, based upon characteristics and historical movement, you could investigate probable effect. Based upon the market premiums we cannot completely be stated that high ESG yields better market premiums in excess returns or not. Deeper analysis on other following factors could provide more clarity.

It could be observed that more added variables in the regression, in terms of the FF5 factors, present some degree of significance. The SMB factor measures the effect of smaller and larger market capitalization in the market. A positive value indicates a portfolio favouring smaller-cap stocks over larger-cap stocks, meaning that these will be outplayed by the market. In previous literature, such as (Humphrey et al., 2012), it is found that firms of larger market capitalization are better aware and able to invest in ESG principles. Negative SMB loadings will consequently give positive correlations in regard to what the literature tells us. Observing the outcomes we conclude that almost all significant SMB factors present positive numbers, whose are not in line with expectations among sectors where ESG plays a role. This factor is thus inversely related to the equity returns, meaning that a probable conclusion could be that these sectors are not much affiliated with ESG impact.

The regression results also show loadings regarding the HML factor, also known as the value premium. Positive HMLs reveal that companies with a high book-to-market ratio will in the long run outperform companies with a low book-to-market ratio. In case of negative value, the opposite can be said. High book-to-market ratios are seen as value stocks whereas low book-to-market stocks are aligned with growth stocks. Looking at the various ratios in the table we conclude that there is too few significance to detect among the different sectors. Only Health Care presents for both high and low ESG firms significant (and negative) values. These indicate the sector to prefer growth stocks over value stocks, and very likely will

outperform the market. Though solely based upon this one sector no hard general conclusions can be drawn regarding the whole index.

From the last two Fama French factors in this regression, respectively the CMA (conservative minus aggressive investing) and RMW (robust minus weak profitability) we can neither draw much conclusions due to a lack of much significance. We can generally conclude that, except from the market premium (CAPM), the Fama French factors have had too few effect in relation to the outcomes of the regression.

What can also be derived from the high/low portfolio numbers, is that an increase in the y-intercept, or constant, results in a significant positive shock on monthly results in this particular sector, both regarding high ESG and low ESG funds. The constant indicates that for every unit (or point) of the market, holding all other variables the same, a default prediction is presented.

This default prediction moves when the market increases by 1%-point, holding all other factors constant. This means that these values are benchmarked against the industry sector and always predicted against unit-points increases, so a 10%-point increase would indicate a factor ten multiplication of number of the given at in market performance of the constant. The constant thus represents the magnitude of a fund in its coefficient, and how it moves when the balance on the regression line increase by point. As for the regression outcomes we note that for almost every sector the constant show greater alpha in the low ESG part of the sector (5 out of 6). This could indicate that the low ESG part of the sectors move stronger when we scale the market with x points.

The R-squared, R^2 , refers to whether the variables that have been used for a statistical regression, where able to explain the output data of the measure. It describes the interrelation between predictor variables and the variation of dependent variable. Scores range from 0-1, where the higher the score means the higher the output the more it can be related to the input variables, so the better. Since not all scores are extremely close to 1, indicating a high proportion of variation between the depend variables and “ingredients” that have been used, this could be a clarification for fewer significance among certain factors. Choosing alternative, better fitting independent variables in testing again the hypothesis could probably lead to higher significance among factors.

7.2 SHARPE RATIOS AND VOLATILITY

For hypothesis two and three, Sharpe ratios and volatility analysis have been constructed for the same sectors that have been used previously in the regression. Both analyses are measures to test both hypotheses in their respective “risk-adjusted return” (Sharpe) and probable “market outperformance” (volatility). Initially, both measures will be showing results concerning the whole 10-year time span period that have also been used for the Stata regression. This dataset concerns 11x12 data observations per fund in their monthly closing prices and percentual growth. The amount of firms are not equal per sector and will depend on the total sector total, where are the cut-off points remain the same (15%).

After the 10-year analysis, the report will proceed by implementing the same measurement on a 5- and 2-year time span. The relevance of different time horizons is to analyze whether more recent data shows higher ESG impact and significance in comparison to a broader time horizon, assuming ESG to have become more popular over the more recent years. For each Sharpe ratio calculation, a 10 year maturity Treasury bill has been used as constant risk free-rate of 0,5%, a number retrieved from the Refinitiv Database INDESPX.

The terms leaders and laggards refer to firms that are positioned in either the high or low ESG “top”, falling under the 15% cut-off that has been implied to filter the sector. Calculations have been carried out through Excel and respective data been retrieved from the Yahoo Finance historical database.

-The respective tables start on the next page.-

ENERGY	Abbreviation	Leaders	Laggards
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	0,28%	39,24%
Annual st dev	St Dev	0,297073	0,540181
SHARPE RATIO		-0,007	0,717
MANUF			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	21,64%	24,97%
Annual st dev	St Dev	0,272335	0,271452
SHARPE RATIO		0,776	0,902
CONS CYC			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	17,69%	21,25%
Annual st dev	St Dev	0,313127	0,277962
SHARPE RATIO		0,549	0,746
UTILS			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	13,20%	10,53%
Annual st dev	St Dev	0,162956	0,1679392
SHARPE RATIO		0,779	0,597
HLTH CARE			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	15,95%	32,52%
Annual st dev	St Dev	0,229075	0,381052
SHARPE RATIO		0,675	0,840
CONS NON CYC			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	9,32%	19,49%
Annual st dev	St Dev	0,182315	0,239918
SHARPE RATIO		0,484	0,791
AVERAGE		0,543	0,766

Table 4 Sharpe ratio 10 yr

In this first table we see multiple Sharpe ratios of which we can state a few conclusions out of. Firstly, what we repeatedly see, is that final Sharpe ratios are, except of the sector Utilities, all bigger among Laggard companies. This simply means that low ESG companies are considered to be performing better in terms of an investment measured against risk. Although these values are higher, we cannot speak of extremely secure values since the majority is under zero. Any ratio close to or above 1 is considered good, where ones that fall under the 1 are sub-optimal. In this interpretation time horizons are important since the more data, the more difficult it

gets to attain high Sharpe ratio scores. Ratios under 1 can also be considered acceptable.

When looking more specific into the data, we see that the bigger annual returns heavily influence that eventual Sharpe ratio. This can either mean that these companies are on occasion simply yielding higher returns, and that these regard bigger enterprises that produce more and care less about pollution while generating better returns. It can on the other hand also mean that when a firm chooses to continuously invest in ESG to keep these values high, they need to accept downsizing expected returns. According to previous literature (Tamimi & Sebastianelli, 2017), the absolute number one sector with the highest numbers in pollution, is energy. Their data confirms that differences are biggest between high and low ESG companies in energy, so we recognize correlation between literature and analysis. Annual returns of leaders are on average 10% less than those of the laggards, which can indicate that indeed enhancing high ESG values is at the same time losing on potential returns since these are directly linked to decision of fewer production and so less pollution. Looking at their Sharpe ratios, we even see a negative number for the high ESG part of the sector. A logic underlying explanation is that it is simple not possible to not pollute in the energy sector, meaning that interconnected sensitivity is very strong. It is very plausible that in other sectors the same happens, but that the sensitivity depends on the characteristics of the sector; i.e. how ESG practices potentially affect production along value streams.

The standard deviation represents the measure of volatility, where the average annualized standard deviation has been taken from each sector in its leaders and laggards. Numbers are absolute but can also be interpreted in percentages. What we can learn from the table and volatility values is that for almost each sector the low ESG part present higher numbers of standard deviation, meaning that volatility is higher and most sectors have experienced fierce instability over the past ten years. As for low ESG companies we see that the sectors energy (54%) and health care (38%) are heaviest, whereas high ESG of the same sector show much less values of volatility. Based upon the outcomes we can conclude a repeatable trade-off in which higher volatility means higher risk, but also increased returns. In this respect we can note a coherence among clusters regarding both values. In terms of risk and vaster predictability, we can state that high ESG firms tend to outperform low ESG firms

since the solid majority present lower standard deviations, assuming that lower volatility is desired.

ENERGY	Abbreviation	Leaders	Laggards
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	-0,40%	52,88%
Annual st dev	St Dev	0,330078	0,553481
SHARPE RATIO		-0,027	0,946
MANUF			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	22,72%	27,21%
Annual st dev	St Dev	0,280753	0,285375
SHARPE RATIO		0,791	0,936
CONS CYC			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	19,93%	17,48%
Annual st dev	St Dev	0,33498	0,308828
SHARPE RATIO		0,580	0,550
UTILS			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	12,81%	10,08%
Annual st dev	St Dev	0,1882	0,1803275
SHARPE RATIO		0,654	0,531
HLTH CARE			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	13,47%	30,54%
Annual st dev	St Dev	0,233794	0,389745
SHARPE RATIO		0,555	0,771
CONS NON CYC			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	2,73%	9,43%
Annual st dev	St Dev	0,195031	0,247959
SHARPE RATIO		0,114	0,360
AVERAGE		0,445	0,682

Table 5 Sharpe ratio 5 yr

Based on literature found on the web and previously presented in this article, we can easily assume that interest and popularity in corporate ESG valuation and their practices have exponentially risen over the most recent past years. This has been confirmed in an article by McKinsey (Pérez, 2022), stating that from 2019 a fivefold growth in internet search indicating much greater popularity during the most recent years. A shorter time span should us thus give even greater indication of their effect on stock performances. By comparing both 10 year and 5 year data lists, we see quite comparable overlap between both. The consumer non-cyclical sector is the only one changing heavily, since it now only yields half of their previous annual returns, while standard deviation remains the same. Looking at the low and high ESG averages, we do not recognize much difference since numbers have not changed a lot. What we thus can conclude is, since we cut the first five years of the time span,

the period 2010-2015 do not seem to make the difference in analyzing the effects that ESG may or may not have on volatility. This is in line with the earlier mentioned articles stating that ESG factors have gained more popularity in the more recent last years and thus expected effect will be more visible the more recently we dig.

ENERGY	Abbreviation	Leaders	Laggards
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	2,42%	108,06%
Annual st dev	St Dev	0,418431	0,590934
SHARPE RATIO		0,046	1,820
MANUF			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	27,07%	46,51%
Annual st dev	St Dev	0,331808	0,326632
SHARPE RATIO		0,801	1,409
CONS CYC			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	37,52%	36,92%
Annual st dev	St Dev	0,425712	0,387626
SHARPE RATIO		0,870	0,939
UTILS			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	16,35%	2,08%
Annual st dev	St Dev	0,21105	0,2207064
SHARPE RATIO		0,751	0,072
HLTH CARE			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	15,59%	43,78%
Annual st dev	St Dev	0,252663	0,404481
SHARPE RATIO		0,597	1,070
CONS NON CYC			
Risk free rate	Rf	0,5%	0,5%
Annual return	Rp	3,97%	18,93%
Annual st dev	St Dev	0,206225	0,299125
SHARPE RATIO		0,168	0,616
AVERAGE		0,539	0,988

Table 6 Sharpe ratio 2 yr

The 2 year period analysis is the shortest one we conduct, and see directly the difference in several sectors. What we did not note before is that a few sectors with their laggards companies have climbed above the 1,0 value, with energy (1,8) and industrials (1,4). Any Sharpe ratio from 1 is considered very good, meaning that the risk-adjusted performance are adequate (DayTrading, 2022). Since all ratios have enjoyed a positive growth respective to previous ones, we can conclude that general stock performances to the rate of return on a risk free investment have gone up.

What we already remarked from the first table regarding Sharpe values, is that each laggard in respect to leader in ESG scores, present greater Sharpe. Again we note this in the 2 year table where, especially in the energy sector, the huge gap

between annual returns make the difference. A logical explanation could be that firms willing and actually contributing to help protecting the environment, unconsciously sacrifice potential returns. It is more ambiguous to suggest that ESG wise companies automatically feel direct cuts in expected return, since some expert argue that sustainable investing is merely focusing on the long term approach and so real results will be visible after a certain amount of time. What is safe to conclude is that on the short time, companies need to be well aware of the fact that investing and constantly bearing the values of ESG impacts the short terms streams of returns. A central question could be raising in what an investor seeks for, e.g. when one accepts lower monetary returns for funds that yield higher ESG scores. Though we see conflicting evidence since the Sharpe ratios of lower ESG funds tends to be better. Volatility though is also aligned in this sense, and is also shown to be higher for lower ESG firms.

8.0 CONCLUSION

Hypothesis 1

H₀: High ESG scores are subject to generating a higher alpha in stock excess return for a fund

H₁: High ESG scores are **not** subject to generating a higher alpha in stock excess return for a fund

The data that has been retrieved from the regression was sufficient to test the hypothesis. Out of the regression results we can state that the hypothesis in some cases have had effect; meaning that higher ESG scores have been subject to generating higher alphas as for the stock return of a fund. We saw in some sectors positive hypothesis outcomes, where correlation was found between the presented higher alphas and higher constants. Although we found this correlation, it did not count for the entire index, since some sectors did not show this tendency. Mixed results concerning the excess returns presented in the regression means that we cannot speak of high ESG scores leading to the generation of higher alphas. The hypothesis thus needs to be rejected where H₁ is here applicable.

Hypothesis 2

H₀: The integration of ESG strategies enhances the risk-adjusted return of a fund

H₁: The integration of ESG strategies **does not** enhance the risk-adjusted return of a fund

Although it is a widely used measure, the Sharpe ratio is a complex method to evaluate and sometimes confusing in its outcomes. One could argue that a high Sharpe ratio directly indicates a better risk-adjusted return profile, let us assume this ratio to be close to zero. This is on the one hand true, also it does not exclude the possibility that lower scores (of 0,5 by example) are automatically to be titled weak. Depending variables such as the time span, the stock's industry, excess returns and volatility all affect an eventual ratio. Based on the regression and study outcome of this research, there are a few things worth mentioning in regard to the hypothesis stated above. As the Sharpe ratio is a sole number, we cannot directly tell whether one firms is better risk-adjusted than the other only based upon its ratio. According to (DayTrading, 2022), a Sharpe ratio starting from 0,5 can also be seen as adequate when it regards a long term measurement, since ratios from 1 or higher are very difficult to attain over longer time spans. According to the same article, we can perceive scores of 0,2 - 0,3 in line with the benchmarked industry/sector.

Looking at the presented outcomes of chapter seven, we remarked a constant development of greater Sharpe ratio value among lower ESG scoring firms in comparison to those attaining higher ESG scores. A logic consequent explanation is that the momentum factor is therefore higher in this part of each sector, where the Sharpe presents on both variables greater st dev and annual returns values. Fluctuations between trade periods are more likely to happen whereas typical stocks will rigidly respond to upward or downwards momentum. As explained earlier, a few variables play a role in defining these scores, where one is that because there is a high probability that lower ESG concerned firms generate bigger returns over their ignorance towards these factors and values. Although this is the case, we can for the same reason not say that higher ESG scores among firms can expect better risk-adjusted returns. It does neither exclude the hypothesis, since other methods of measurement in accordance to risk-adjusted return could possibly provide greater evidence. Hypothesis 2 is for the reasons mentioned above also rejected, since we cannot find true validity based upon our Sharpe ratio calculations the hypothesis to

be true. Again we need to ignore the hypothesis by rejecting it. H_1 is the final outcome.

Hypothesis 3

H_0 : Firms with high ESG scores outperform firms with low ESG scores in stock performances

H_1 : Firms with high ESG scores **do not** outperform firms with low ESG scores in stock performance

Hypothesis 3 raised the question whether firms with higher ESG scores outperform ones that present lower ones. ‘Outperformance’ has been measured through the basis of volatility, or standard deviation, of historical values concerning S&P 500 sectors. High volatility of a fund implies bigger risk while low volatility is associated with lower risk, but generally also lower returns. Volatility thus explains how widely a certain fund has been fluctuating over a chosen period of measured time. There are though situations in which lower risk is rewarded by higher returns, called stock market anomaly. A study by (Baker, 2012) describes the contradiction of the general belief that lower or higher risk automatically increases or reduces expected return. Low volatility anomaly according to the report be found when stock A presents lower standard deviation, but higher excess returns in comparison to stock B showing opposite results.

The standard deviations in the tables, as explained in the discussion, have shown in almost all cases to be lower among the high ESG firms. From this we can conclude that we denote over the historical data that the values have been calculated on, fluctuate less. We can assume, based upon own findings and the earlier found literature (Torre, 2020), that firms that attain higher ESG scores to enjoy higher predictability and one of lower risk nature. In excess returns we have seen that there is no outperformances to be noted for the high ESG part of the sectors that have been regressed, but this could be a logic consequence of a better formed risk profile. We can conclude the hypothesis to be true with the outcome that firms with high ESG scores outperform firms with low ESG scores in continuously presenting lower risk profiles. In this conclusion we presume investors show preferences of stocks to be

less riskier of nature over stock that might yield higher returns. In this case we can speak of an outperformance.

Discussion

The outcomes of our regressions and conclusions drawn to our hypotheses show quite overlap with earlier presented studies in the literature review of this report. In studies such as (Kim & Li, 2021) and (Henisz et al., 2019) common general belief was shared that ESG factors do add value to the corporate reputation of an organization, but that there is no long-term proof that ESG would have direct impact on financial performances of a stock in i.e. increased excess- and risk-adjusted returns. Regression results earlier published in this report have shown similar result in that we cannot interpret any of both hypotheses that we hoped to test. What we, in respect to literature such as (Torre, 2020) and (Baker, 2012), positively tested is the risk-mitigating element that seems to play a role when ESG factors are recorded with high scores. The multiple standard deviations of high ESG companies to be lower than those of high ESG companies in regression table 2 and 3 have confirmed this initial belief. Investors that seek to invest in stocks being more predictable and less volatile, can based upon our results pay extra attention to those attaining high ESG scores.

Other interesting findings in the Sharpe ratio and volatility tables, was the degree of effect between variables. In other words, the multiple time spans that the tables calculated volatility and Sharpe ratios for, have been important in its distinction. This, because data have shown values to change more aggressively over the more recent time spans, where the 2yr data table presented significantly higher spreads in high/low ESG portfolio differences, compared to the 5- or 10yr data tables. This corresponds to literature such as the study by (Khan, 2019) stating that environmental, social and governance factors have enjoyed their biggest growth in popularity over the most recent couple of years. Based on these studies we were able to conclude that data most recent years tended to be much more relevant than the time span that we initially proposed in our dataset. Although we found this out in a later stage, older years were logically needed in order to discover this. The datasets that have been used in testing our hypotheses have thus been a good choice in terms of fiscal years (period), the amount of observations and added Fama French variables.

It is generally difficult to predict whether differences between high/low ESG funds are likely to grow between one and another, remain the same or will over recover in the future. A logical explanation is that not all historical data is familiar with the principles of ESG, since these scoresheets are relatively newly introduced. A plausible expectation could be that in a period of 10 years from now we will be better able to test whether companies that invest heavily in ESG practices, will potentially enjoy greater annual returns and reliability. The lower significances in the Fama French factors used during the regression, could also mean that these do simply not yet correlate with historical data incurring ESG scores. Perhaps a three factor Fama French or alternative method of describing fund stock returns are better known or able to assess the effect of ESG.

9.0 EXECUTIVE SUMMARY

Abstract

The market demand for ESG-ratings in corporate sectors have steadily grown with social developments, where firms are nowadays expected to be aware of environmental, social and governance contribution. Under asset management, we also note growing interest from investors that are becoming more willing to invest in companies that attain high ESG scores, although there is still no real evidence that there is any financial relevance attached to these strategies.

A dataset consisting six S&P 500 sectors, corresponding both top and lowest 15% ESG scoring firms, have been regressed to test three different hypotheses. For one of the three we have found convincing evidence that the hypothesis stated can be justified. It has proven higher ESG firms to outperform lower ESG firms on volatility, meaning that stocks tend to be generally spoken of safer nature in respect to risk.

In regard to the other two hypotheses presented, the conducted Fama French 5 Factor regression did not result in convincing evidence to whether high ESG firms outplay lower ESG firms in increased excess returns (1) or higher risk-adjusted returns (2).

Introduction

Over the past decades, the phenomenon *sustainability* have experienced enormous growth in size and popularity among worldwide societies. Despite the COVID-19 pandemic causing a slower rate in world population growth, the UN expects that the world will consist of 8.5± billion people by 2030 moving up to 9.7± billion by 2050 (United Nations, 2022). Logically, the more people live on this planet, the more we globally are about to consumer in primary life necessities such as food, water, electricity and clothes. This calls, according to the world we now live in, for direct global action.

Extreme awareness and social pressure on practicing environmental focused initiatives have underwent a strong growth. Among these, corporate social responsibility is the ethical sustainable pillar for corporates to pay high attention to. Socially-responsible investing aims to ‘screen’ companies on the societal and environmental impact they make, and exclude ones who do not comply to the these standards being imposed. This means that watchers of SRI performers select firms that pollute less to zero, pay attention to firm diversity, enhance employee satisfaction, etcetera. These types of activities are all examples of social and environmental issues that in the world of 2022 heavily puts pressure on organizations and other important instances that somehow have a stake in investments.

The so called ESG is a more specific set of terms that gives a broader and better perspective of respectively environmental, social and governance impacts in a company’s performance and consequently to the investment performance of a long-term portfolio. Many fund investors like to put their money in companies with high ESG standards, knowing that these are recognized as SRI market enables in where their corporate activities contribute to sustainable social development.

Purpose of the study

The purpose of this paper is to create broader understanding upon the principles of ESG, the added value may have and the importance of integrating these principles in corporate institutions. Consequently, after having understood the principles and value, the report intends to test hypotheses on possible effects that ESG may or may not have on stock performances in excess return. ESG theories are aligned with

corporate activities and the effect that eventual “scores” may have on a firm. The set of ESG standards are especially governed in investment portfolios intending to hedge risk and positively impact performances on stock indexes. Therefore an empirical analysis by investigating relationships among ESG dimensions and stocks performances of the S&P 500 index will be of leading to measure the probable effects they may have.

Literature review

Sustainable investing

Sustainable investing is not something new. The term was first used millennia ago, but experienced its first slight growth during the 80s/90s, according to (Townsend, 2020). The article states that sustainable investing has been driven by societal issues such as climate change and corporate governance, but also society itself responding to global problems such as nuclear energy, waste pollution, gender wage gaps, and many other forces.

Over the past decades, more and more investors have embraced the concept of social responsible investment. Sustainable investing under assets is on the rise and currently netting plus/minus \$35.3 trillion dollar globally, according to a report by (GSIA, 2021). In this outlook are presented the numbers for years 2016-2018-2020, where a continuous growth in sustainable investment assets can be remarked globally, and can be expected for the future. The increase of % in total sustainable investing assets has surpassed the 36 and will most likely continue to grow.

(Khan, 2019) found that over the past decades, different external forces have increased attention in environmental, social and governance issues. Growing awareness among society, the customer, producers, sellers and politics have led to several initiatives to improve company performances based on these principles. The importance of a good reputation on your ecological footprint, social activity and contribution, and governance have put pressure on companies complying to these standards.

A study written at the University of Aalborg (Haleem, F., Farooq, S., & Boer, H., 2014) tested two hypotheses on the matter of social pressure; H1. Stakeholder environmental and social pressures on company efforts to adopt CSR practices, and, H2. Context (size, location) affecting the relationship between stakeholder pressure

and company efforts on CSR. Final conclusions of this study were that both hypotheses were confirmed by their presented regressions where environmental and social pressure had significant (translated in p-value < 0.001) effect on company adoptions of CSR enhancing activity.

ESG Investing

(Iain MacNeil, 2021) sheds in their article light on how ESG can be distinct from the themes sustainability and CSR. Both ESG, standing for economic, social and governance, and CSR, corporate social responsibility are to be called subsets that both fall under the overlapping term sustainability. The article explains that the goal of ESG integration is to mitigate risks concerning the three associated factors on a financial perspective, whereas CSR is more concerned with the ethical principles in social responsibilities. ESG specifically needs to ensure that risk is mitigated and return on the investment profile is considerably secure. Good or bad final scores will be decisive in the course of whether to accept or decline a company in a fund.

A research by (Kim & Li, 2021) found that a positive ESG in respect to lower rated ones enjoy greater positive impacts on business and eventual performances. The article is stating that it is hard to determine the actual impacts that a positive ESG has on business performances. What can be ascertained is that some variables clearly respond positively to an hypothesis where ESG components play a role, in comparison to hypotheses where they do not. According to (Kim & Li, 2021) disclosure of company data is enormously important to better analyze the effects of ESG. Market dependent variables also play big roles in how a company performs, and if ESG are really needed in specific sectors yes or no. Market size, history, corporate reputation, are external factors that may heavily influence the outcome of a ESG component regression on corporate performances. (Torre, 2020) investigates whether sustainable companies that score better on their ESG rating, potentially enjoy higher excess returns on their stock price values. The article states that ESG has become a popular term in financial markets, and that investors tend to closely monitor and select companies with better ESG scores. Since stock exchange indexes themselves most of the time present ESG scores of firms, it is not difficult to find this data about the company you consider to invest in.

A last study by (Samama et al., 2020) expresses sincere doubt with its critical analysis in how these earlier mentioned climate-related initiatives, together heavily

promoted and pushed in the worlds' economy, potentially can bring risk and harm to the financial stability of our economy. It questions whether the new perceived climate-related business models cover external risks rather those meant for environment. According to the study, the accountability on climate friendly topics will grow to excessive and mistaken proportions, beyond the extend of what many organizations are perhaps capable of.

Principles of ESG

The term ESG is being derived from its three pillars that makes up the word: Environmental, Social and Governance (ESG).

Pillar one, environment, has become a very popular term in todays' world. Not only in the corporate sector, but in every inch of our society we see back the heavy importance that it has. Examples of several environmental objectives are to lower/zero emission of the mobility sector, lowering households energy consumption, and in the bigger picture governments that subsidize energy-replacing initiatives such as electric vehicles. In portfolio investing, the environmental criteria refers to how a certain company is concerned with nature. Their ecological footprint may be measured based on their usage of energy, waste policies, pollution and natural resource conservation.

The second pillar covers the principle of social awareness. With this is meant the relationship management that companies have with its employees, customers, communities and other relevant parties. This may include their way of communication, and taking proper responsibility for possible issues or problems that may happen during corporate events. This pillar is mainly driven by society and their increasing interest in positive social responsibility. The ethical values previously mentioned seek to provide stability and improve conditions under with employees work.

The third and last pillar talks about governance, and deals with how an organization is structured and governed. Under governance we understand how a company's board is structured, the interdependences among company positions, internal control, engagement etcetera. Underlying practices may include frequent HR management meetings, bottom-up approach in opinion sharing, salary division, working conditions, etcetera.

SRI versus ESG

The term SRI stands for social responsible investing and aims to ensure that companies invest in accordance with social moral objectives that are important to them. With these objectives, companies need to deal with environmental issues that arise in their business or daily activities, such as reducing pollution or active corporate citizenship.

A more holistic and bright view to how SRI measures can lead to a better and positive effect on business is much more favorable and optimistic. Though the question being stated in this report is if this is really the case. ESG is brought into life to closely judge companies on their environmental and sustainable responsibilities. ESG is solely used in investing and dealt with through stock screening in negative fund screening by any interested party. Parties with interest may include fund managers, companies or regions. The subcategories mentioned are to be individually judged by their competences and results, of which they will together form the rating.

ESG and ratings

As mentioned earlier, ESG ratings give investors strong indications in relation to potential risks that could impact the financial performances of a company. There is not one leading type of rating system. Many rating agencies that measure the scores of by client requested companies have introduced their own systems of rating. Besides agencies, also indexed itself such as S&P or FTSE Russell calculate ESG scores for their users. Generally a lower or failing ESG rate is perceived as a negative screening, meaning that potential risks are higher, volatility is stronger, and so dealing with higher unpredictable stability.

Some industries simply depend heavier on natural resources than others do, in for examples producers that rely on these raw materials versus resellers whose are more subjected to import and exploitation of sales. Ratings thus provide fierce indication whether a firms comply to its responsibilities in respect to what the industry is expecting and needs. Same volumes of, let us say, water spilling can have for one organization heavier consequences compared to another of a different industry.

Rating complexity

Possible difficulties in relation to the rating of companies are the availability of information, so the degree to which a company discloses their information. Up to a certain degree you cannot fully rely on the legitimacy of ratings. In general, agencies are continuously updating and reinventing their tools of measuring ESG pillars, though transparency in actual truth behind such factors and information can sometimes be questionable. Since each company is different than one another in structure, characteristics and governance, it is quite complex to benchmark information and empirical data with comparable alike competitors. Another complexity is that each rating agency is using its own methodology in measuring the ESG valuation of a certain company.

Different variables in rating methods mean that potential outcome of multiple rating techniques lead to other outcomes, naturally that one present more favorable results than another. Companies can thus make a selection and consequently choose their preferred, the one with the best ESG outcome, rating report and present this as definitive company ESG report. Mutual standards or minimum guidelines on how to legitimate calculate ESG scores are needed to create more reliability and accuracy.

ESG and impact investing

The definition of impact investing, also known as social investing, are investments made with the following two objectives; (i) generate positive social and environmental impact alongside the potential (ii) financial returns. Investors generally see these types of investments as an opportunity of dual profit, based upon both financial and non-financial returns that can be made. The non-financial return refers to the effect that a certain investment potentially has on society, in which it could favor or support certain activities of climate goals with the investment made. As they have many similarities, ESG and impact investing can be clearly distinguished from each other. In both its considerations, ESG investing tends to look more at the effects that social and environmental can have on investment risk and return, according to (Crifo, 2015). In contrast, impact investment tends to be more pro-active in terms of engagement and creation of social and commercial value, as (Cojoianu, 2021) points out in their article. In comparing both types of investing, the

article found that impact investing is significantly more concerned with the actual outcome of benefitting the environment or society in its objective. It is said that impact investors tend to be younger, but also larger in size. The last different is that impact investor structures are sometimes government owned, enjoying the over decade accumulated knowledge on economic, environmental and social topics.

Fama French and factors

The Fama French Model came into life in 1992 and has been created by two American economists, Eugene F. Fama and Kenneth R. French. With this statistical asset pricing model, the aim was to describe stock returns of (i) small and big companies and (ii) companies with high or low B/P values; where B/P stands for book-to-market ratio. The idea of combining these two elements to the already existing CAPM model, that describes stock return in a market as a whole, was to analyze the correlation of value and growth stocks. In this respect, value stocks are considered a stock with a price under their intrinsic value, and so a potential profit margin is on the rise for a potential investor. Under a growth stock we understand types of stock that have future potential to exponentially can realize fast growth..

The three-factor Fama French model can be explained as an augmented CAPM formula in which they have added two extra elements; the SMB and HML. These stand for small minus big companies/stocks (SMB), representing the return spread between small- and large-cap stocks, whereas high minus low (HML) takes into consideration the return spread between high book-to-market and low book-to-market stocks. Its three main objective are to evaluate a company's performance in;

1. Market Risk
2. Company size; outperformance of small versus big firms -> SMB
3. Value factors; outperformance of high versus low book-to-market value -> HML

Market risk (1) is being measured through the CAPM in describing the relationship between systematic risk and expected return for certain asset classes. In this formula, the risk-free rate will be taken as investor yield since the investor would expect zero risk and a certain interest attached to his investment, over a certain period of time t . Here fore we consequently add-up the given β times the "market risk premium".

A study by (Zaremba & Czapkiewicz, 2016) analyzed in their research the Fama French in all its existing and adjusted models, and came to the conclusion that the FF5F is best capable to measure returns of portfolios and is significantly better to its previous models. According to the article, the FF5F best shows patterns in cross sectional stock return. The five-factor Fama French is an updated version in adding two extra variables to the model. These include the robust minus weak (RMW), comparing returns of firms with high and low profitability, and conservative minus aggressive (CMA), which is looking at the low and high intensity of investing.

In this report we will be using a FF5F model to sample *low and high* ESG activity of firms, plotting the eventual effect it may have excess returns of firms from different sectors. The analysis will therefore include a narrative in which different sectors may be analyzed on the effect that ESG may have on companies. The estimate of the alpha, α , is the main indicator of interest since it will show us the elasticity of a certain stock, where;

- An alpha close or at 0 indicates no abnormal returns in respect to all risk associated with a given stock
- An alpha that hugely differs from 0 indicates that the given stock heavily responds to risk and thus is showing abnormal returns (Sarwar et al., 2017).

The Fama French Five-Factor gives the report the possibility the plot a regression and implement ESG variables of which we can draw regressions out of. The formula of the five-factor Fama French model is as follows:

$$R_{it} = \alpha + \beta_1(\text{Mkt}_i - R_{f_t}) + \beta_2(\text{SMB}_t) + \beta_3(\text{HML}_t) + \beta_4(\text{RMW}_t) + \beta_5(\text{CMA}_t) + \epsilon_{it}$$

Hypothesis construction

Hypothesis 1

H₀: High ESG scores are subject to generating a higher alpha in stock excess return for a fund

H₁: High ESG scores are **not** subject to generating a higher alpha in stock excess return for a fund

The first hypothesis needs to provide clearance on whether imposing ESG strategies will ideally lead to an increased alpha in stock excess return. The alpha, α , is an indicator of a stocks' capacity to yield positive returns in respect to that of the index benchmark; in the case of a positive alpha ratio, a certain investment can be considered successful since it has outperformed the market. In the regression of this report we want to investigate if the alpha of a certain stock is affected by ESG.

Hypothesis 2

H₀: The integration of ESG strategies enhances the risk-adjusted return of a fund

H₁: The integration of ESG strategies **does not** enhance the risk-adjusted return of a fund

With the second hypothesis, this report intends to measure whether stocks can hedge risk with ESG integration and present an increase in their risk-adjusted return. The most common way to measure this risk is by using the Sharpe Ratio, describing how much excess return an investor will make on the extra volatility you hold with a riskier asset.

Hypothesis 3

H₀: Firms with high ESG scores outperform firms with low ESG scores in stock performances

H₁: Firms with high ESG scores **do not** outperform firms with low ESG scores in stock performance

The objective of the third hypothesis is to look whether funds with high ESG scores outperform firms that present lower ESG scores. In this hypothesis we will focus on the volatility that is involved in each sectors' stocks, based upon the historical data where the regression is based on. Performance volatility is a measurement that refers to how strong a stock changes, where higher volatility implies a stock to be riskier and greater chance of potential losses.

Refinitiv database

For this report we were able to retrieve data from the Refinitiv Database. Refinitiv, formerly Thomson Reuters, is one of the world's biggest provider of financial market data and technology. Its databases, available in over 190 countries, offer a wide range of data sources and information that relate to financial performances of companies. ESG scores are frequently updated, mostly on a weekly basis where new company scores replace old ones based upon automatically changing records. Examples of data collection practices by Refinitiv analysts are examinations of annual reports, stock exchange filings, CSR reports and news.

Final ESG scores provided by Refinitiv are divided in four scales, so quartiles. Each quartile covers 25% of the score, naturally adding up to 100. The last quartile (76-100) is the best range in which companies can fall for their ESG score, meaning that these firm present excellent result in three ESG pillars, and are said have a high transparency in company data share.

Data sample

The index where our dataset will contain historical financial data from will be the the Standard and Poor's 500, S&P 500; .SPX, list. This index has been chosen on the basis of broad historical data that S&P 500 and its listed companies present. Also in regard to the availability of historical ESG-data, the index satisfied the amount wished for.

The ESG-data, as earlier mentioned, has been retrieved from the Refinitiv-Eikon Database. On the other side, historical financial data has been collected from Yahoo Finance. The time span of the data that has been collected goes from FY0 – FY-10, so covers a period of ten fiscal years for each company. The starting year, so

FY0, is respectively FY2020. For the regression of this report we take several sectors of the S&P 500 index to be individually testing our hypothesis on. These industries include the following; - consumer cyclicals (75), - industrials (70), - healthcare (61), - consumer non-cyclicals (41), - utilities (29) and - energy (23). The numbers in brackets behind each sector indicate the amount of S&P listed companies of each sector.

Finally, the formulas regarding several ratios, such as volatility and adjusted return, to be calculated answering the hypotheses previously stated are taken from the textbook *Corporate Finance; 4th edition* by J. Berk and P. DeMarzo. These ratios have consequently been calculated in excel and exported in the report. Data regarding historical Fama French have been obtained from the data library of Kenneth R. French faculty website. The final regression has been conducted through Stata, a statistical software where users can analyze and plot datasets to regress certain outcomes.

Descriptive data

Out of the 131 observations made, based upon the eleven year monthly time span (11x12), we can denote that for the most sectors, the average returns of high ESG sectors are respectively lower than those of low ESG sectors. The Utility sector shows a slight positive effect in regard to better scoring ESG scores with an average return of respectively 0.01 against 0.008. Regarding the composite ESG scores in high and low distinction, we cannot speak of huge differences among both mean and standard deviation outcomes. Results between high and low companies of the same sector are quite comparable and do not show significant change. The biggest deviations in as well the mean as the standard deviation column can be noted for the Energy sector, where they present strong fluctuations. In the average returns we see that firms of the section high ESG present significant lower amount than those in respect to firms with a low ESG score (High 0.0016 versus Low 0.0261). On the other hand, looking at the standard deviation of both, we denote an increase for low ESG companies in this same sector (Low 0,1 versus 0,07 High). Generally we can say that portfolios that have a higher standard deviation, present wider spread among clusters. It can thus indicate a market of set of funds to be less reliable when the

standard deviation increases. It would, for this specific sector, suggest that an increased ESG would strengthen the reliability and predictability of the sector.

Regression results

From the observations in the table we can interpret the Mkt-RF as the portfolio performance of each sector benchmarked against the market. Only the sector Durables presents for both high and low ESG sides >1 market risk premiums, meaning that the entire sector seems to outplay the market. Furthermore we can conclude that out of the data IndustrialHigh, EnergyHigh and HealthLow sectors also exceed the 1 point. In regard to whether high or low ESG firms outplay each other, we note quite mixed results among clusters. On the one hand we see sectors, respectively Industrial, Energy and Durables, where the higher ESG outperform the lower in their market premiums, what could be an indicator of high ESG being subject to higher excess returns. Though this is not everywhere the case since in for example the Health Sector lower ESG affiliated firms outplay higher ESG scoring stocks. This is in line with earlier mentioned literature (Kim & Li, 2021) that effect of better ESG scores can be hardly be measured over an entire index, where companies put together in the same analysis can be of totally different nature. Based upon the market premiums we cannot completely be stated that high ESG yields better market premiums in excess returns or not.

It could also be observed that more added variables in the regression, in terms of the FF5 factors, present some degree of significance. The SMB factor measures the effect of smaller and larger market capitalization in the market. In previous literature, such as (Humphrey et al., 2012), it is found that firms of larger market capitalization are better aware and able to invest in ESG principles. Negative SMB loadings will consequently give positive correlations in regard to what the literature tells us. Observing the outcomes we conclude that almost all significant SMB factors present positive numbers, whose are not in line with expectations among sectors where ESG plays a role. This factor is thus inversely related to the equity returns,.

The regression results also show loadings regarding the HML factor, also known as the value premium. Since only Health Care presents for both high and low ESG firms significant (and negative) values, we cannot solely based upon one sector draw hard conclusions.

From the last two Fama French factors in this regression, respectively the CMA (conservative minus aggressive investing) and RMW (robust minus weak profitability) we can neither draw much conclusions due to a lack of much significance. We can generally conclude that, except from the market premium (CAPM), the Fama French factors have had too few effect in relation to the outcomes of the regression.

What can also be derived from the high/low portfolio numbers, is that an increase in the y-intercept, or constant, ($_cons$) results in a significant positive shock on monthly results in this particular sector, both regarding high ESG and low ESG funds. The constant indicates that for every unit (or point) of the market, holding all other variables the same, a default prediction is presented.

This default prediction moves when the put-call ratio increases by 1%-point, holding all other factors constant. As for the regression outcomes we note that for almost every sector the constant show greater alpha in the low ESG part of the sector (5 out of 6). This could indicate that the low ESG part of the sectors move stronger when we scale the market with x points.

The R-squared, R^2 , refers to whether the variables that have been used for a statistical regression, where able to explain the output data of the measure. It describes the interrelation between predictor variables and the variation of dependent variable. Since not all scores are extremely close to 1, indicating a high proportion of variation between the depend variables and “ingredients” that have been used, this could be a clarification for fewer significance among certain factors. Choosing alternative, better fitting independent variables in testing again the hypothesis could probably lead to higher significance among factors.

Sharpe Ratios and volatility

10 year time span

In the first 10 year table we see multiple Sharpe ratios of which we can state a few conclusions out of. Firstly, what we repeatedly see, is that final Sharpe ratios are, except of the sector Utilities, all bigger among Laggard companies. This simply means that low ESG companies are considered to be performing better in terms of an investment measured against risk. Although these values are higher, we cannot speak

of extremely secure values since the majority is under zero. Although we attain longer time spans, ratios under 1 can also be considered acceptable.

When looking more specific into the data, we see that the bigger annual returns heavily influence that eventual Sharpe ratio. This can either mean that these companies are on occasion simply yielding higher returns, and that these regard bigger enterprises that produce more and care less about pollution while generating better returns. It can on the other hand also mean that when a firm chooses to continuously invest in ESG to keep these values high, they need to accept downsizing expected returns. It is very plausible that in other sectors the same happens, but that the sensitivity depends on the characteristics of the sector; i.e. how ESG practices potentially affect production along value streams. The standard deviation represents the measure of volatility, where the average annualized standard deviation has been taken from each sector in its leaders and laggards. What we can learn from the table and volatility values is that for almost each sector the low ESG part present higher numbers of standard deviation, meaning that volatility is higher and most sectors have experienced fierce instability over the past ten years. Based upon the outcomes we can conclude a repeatable trade-off in which higher volatility means higher risk, but also increased returns. In this respect we can note a coherence among clusters regarding both values.

5 year time span

By comparing both 10 year and 5 year data lists, we see quite comparable overlap between both. The consumer non-cyclical sector is the only one changing heavily, since it now only yields half of their previous annual returns, while standard deviation remains the same. Looking at the low and high ESG averages, we do not recognize much difference since numbers have not changed a lot. What we thus can conclude is, since we cut the first five years of the time span, the period 2010-2015 do not seem to make the difference in analyzing the effects that ESG may or may not have on volatility. This is in line with the earlier mentioned articles stating that ESG factors have gained more popularity in the more recent last years and thus expected effect will be more visible the more recently we dig.

2 year time span

What we did not note before is that a few sectors with their laggards companies have climbed above the 1,0 value, with energy (1,8) and industrials (1,4). Any Sharpe ratio from 1 is considered very good, meaning that the risk-adjusted performance are adequate (DayTrading, 2022). Since all ratios have enjoyed a positive growth respective to previous ones, we can conclude that general stock performances to the rate of return on a risk free investment have gone up.

Again we note in the 2 year table where, especially in the energy sector, the huge gap between annual returns make the difference. A logical explanation could be that firms willing and actually contributing to help protecting the environment, unconsciously sacrifice potential returns. It is more ambiguous to suggest that ESG wise companies automatically feel direct cuts in expected return, since some expert argue that sustainable investing is merely focusing on the long term approach and so real results will be visible after a certain amount of time. What is safe to conclude is that on the short time, companies need to be well aware of the fact that investing and constantly bearing the values of ESG impacts the short terms streams of returns.

8.0 Conclusion

Hypothesis 1

Out of the regression results we can state that the hypothesis in some cases have had effect; meaning that higher ESG scores have been subject to generating higher alphas as for the stock return of a fund. We saw in some sectors positive hypothesis outcomes, where correlation was found between the presented higher alphas and higher constants. Although we found this correlation, it did not count for the entire index, since some sectors did not show this tendency. Mixed results concerning the excess returns presented in the regression means that we cannot speak of high ESG scores leading to the generation of higher alphas. The hypothesis thus needs to be rejected where H_1 is here applicable.

Hypothesis 2

Looking at the presented outcomes of tables 4,5 and 6, we remarked a constant development of greater Sharpe ratio value among lower ESG scoring firms in comparison to those attaining higher ESG scores. A logic consequent explanation is that the momentum factor is therefore higher in this part of each sector, where the Sharpe presents on both variables greater st. dev and annual returns values.

Fluctuations between trade periods are more likely to happen whereas typical stocks will rigidly respond to upward or downwards momentum. As explained earlier, a few variables play a role in defining these scores, where one is that because there is a high probability that lower ESG concerned firms generate bigger returns over their ignorance towards these factors and values. Although this is the case, we can for the same reason not say that higher ESG scores among firms can expect better risk-adjusted returns. It does neither exclude the hypothesis, since other methods of measurement in accordance to risk-adjusted return could possibly provide greater evidence. Hypothesis 2 is for the reasons mentioned above also rejected, since we cannot find true validity based upon our Sharpe ratio calculations the hypothesis to be true. Again we need to ignore the hypothesis by rejecting it. H_1 is the final outcome.

Hypothesis 3

Hypothesis 3 raised the question whether firms with higher ESG scores outperform ones that present lower ones. 'Outperformance' has been measured through the basis of volatility, or standard deviation, of historical values concerning S&P 500 sectors. The standard deviations in the tables, as explained in the discussion, have shown in almost all cases to be lower among the high ESG firms. From this we can conclude that we denote over the historical data that the values have been calculated on, fluctuate less. We can assume, based upon own findings and the earlier found literature (Torre, 2020), that firms that attain higher ESG scores to enjoy higher predictability and one of lower risk nature. We can conclude the hypothesis to be true with the outcome that firms with high ESG scores outperform firms with low ESG scores in risk profile.

Discussion

Regression results earlier published in this report have shown similar result in that we cannot interpret any of both hypotheses that we hoped to test. What we, in respect to literature such as (Torre, 2020) and (Baker, 2012), positively tested is the risk-mitigating element that seems to play a role when ESG factors are recorded with high scores. The multiple standard deviations of high ESG companies to be lower than those of high ESG companies in regression table 2 and 3 have confirmed this initial belief.

Other interesting findings in the Sharpe ratio and volatility tables, was the degree of effect between variables. In other words, the multiple time spans that the tables calculated volatility and Sharpe ratios for, have been important in its distinction. This corresponds to literature such as the study by (Khan, 2019) stating that environmental, social and governance factors have enjoyed their biggest growth in popularity over the most recent couple of years. Based on these studies we were able to conclude that data most recent years tended to be much more relevant than the time span that we initially proposed in our dataset.

It is generally difficult to predict whether differences between high/low ESG funds are likely to grow between one and another, remain the same or will over recover in the future. A logical explanation is that not all historical data is familiar with the principles of ESG, since these scoresheets are relatively newly introduced. A plausible expectation could be that in a period of 10 years from now we will be better able to test whether companies that invest heavily in ESG practices, will potentially enjoy greater annual returns and reliability.

10.0 REFERENCES

- Khan, M. (2019). *Corporate Governance, ESG, and Stock Returns around the World*. Los Angeles (CA): Routledge Taylor and Francis Group.
- Henisz et al., W. (2019). *Five ways that ESG creates value*. Stamford: McKinsey.
- Kim, S., & Li, Z. (2021). *Understanding the Impact of ESG Practices in Corporate Finance*. Basel: Klaus Reiner.
- Camilleri, M. A. (2018). *The Corporate Governance Reporting in the European Union*. Malta: Uni of Malta.
- Torre, M. L. (2020). *Does the ESG Index Affect Stock Return? Evidence from the Eurostoxx50*. Rome: MPDI.
- Samama et al., F. (2020). *The green swan Central banking and financial stability in the age of climate change*. Paris: Banks For International Settlements.
- Moen, E. (2020). *MSCI ESG Ratings*. n/a: MSCI.
- Paliienko, O. (2020). *An empirical investigation of the Fama-French five-factor model*. Sumy: LLC “Consulting Publishing Company “Business Perspectives”.
- Ehsani, S., & Linnainmaa, J. (2019). *Factor Momentum and the Momentum Factor*. USA: School of Business, Northern Illinois University.
- Zaremba, A., & Czapkiewicz, A. (2016). *Digesting Anomalies in Emerging European Markets: A Comparison of Factor Pricing Models*. Poznan: Poznan University of Economics and Business.
- Sarwar et al., G. (2017). *Using Five Factor Fama-French Alpha for US Sector Rotation*. London: University of Greenwich, London, UK.
- Crifo, P. (2015). *THE ECONOMICS OF CORPORATE SOCIAL RESPONSIBILITY: A FIRM-LEVEL PERSPECTIVE SURVEY*. Paris: JOURNAL OF ECONOMIC SURVEYS.
- Cojoianu, T. F. (2021). *Impact vs. ESG Investing in Private Markets*. Dublin: SSRN Papers.
- GSIA. (2021). *GLOBAL SUSTAINABLE INVESTMENT REVIEW 2020*. Europe: GSIA.
- Townsend, B. (2020). *From SRI to ESG: The Origins of Socially Responsible and Sustainable Investing*. US: The impact of impact & esg.
- Strohle, R. G. (2018). *Exploring Social Origins in the Construction of ESG Measures*. Oxford: Saïd Business School, University of Oxford.

- Iain MacNeil, I.-m. E. (2021). *From a Financial to an Entity Model of ESG*. Glasgow: Springer.
- Haleem, F., Farooq, S., & Boer, H. (2014). *Environmental and social pressure as drivers of corporate social responsibility in a globalizing world*. Aalborg: Proceedings of the 21st International EurOMA Conference on Operations Management in an Innovation Economy.
- Boffo, R., & Patalano, a. R. (2020). *ESG Investing: Practices, Progress and Challenges*. Paris: OECD Paris.
- United Nations. (2022). *World Population Prospects 2022*. New York: Department of Economic and Social Affairs.
- Ivan Montiel et al. (2021). *Implementing the United Nations' Sustainable Development Goals in international business*. New York: Journal of International Business Studies.
- Mačaitytė, I. (2018). *Volkswagen Emission Scandal and Corporate Social Responsibility - A Case Study*. Sumy: Sumy State University.
- Kaiser, L. (2020). *ESG Integration: Value, Growth and Momentum*. Vaduz: University of Liechtenstein.
- Hari, Y., & Dewi, L. P. (2018). *Forecasting System Approach for Stock Trading with Relative Strength Index and Moving Average Indicator*. Indonesia: -.
- DayTrading. (2022, n.d. n.d.). *Sharpe Ratio*. Opgehaald van Daytrading: <https://www.daytrading.com/sharpe-ratio>
- Baker, N. L. (2012). *Low Risk Stocks Outperform within All Observable Markets of the World*. US: Haugen Custom Financial Systems.
- Pérez, L. (2022). *Does ESG really matter—and why?* Boston: David Schwartz.
- Humphrey et al. (2012). *Does it cost to be sustainable?* Canberra: Journal of Corporate Finance.
- Tamimi, N., & Sebastianelli, R. (2017). *Transparency among S&P 500 companies: an analysis of ESG disclosure scores*. Pennsylvania: Emerald Publishing Limited.