THE ROLE OF ENVIRONMENTAL, SOCIAL AND GOVERNANCE RATING PROVIDERS FOR ALPHA GENERATION IN EQUITY MARKETS:

A COMPARATIVE STUDY

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To my wife, who offered me continuous support.

ABSTRACT

This research aims to examine the function of Environmental, Social and Governance (ESG) rating providers in asset management and investigate if ESG integration leads to enhanced portfolio performance. The research will assess various ESG scoring methods provided by independent agencies to determine if any of them offer superior financial results compared to the overall market. This will be done by constructing ESG-focused portfolios using different scoring methods from the industry and comparing their risk and return versus a standard market benchmark. A key issue for asset managers is the varying conclusions from independent rating agency data as there is yet to be an agreed industry standard for the rating methods employed.

The introduction of the dissertation provides a brief overview of the ESG topic, the meaning of an ESG score and identifies the research aim, questions, and objectives. The literature review focuses on how the ESG topic evolved in relation to the standards and regulations over the years and explains the different ESG rating methods adopted by four well-known research agencies. These include Morgan Stanley Capital International Inc. (MSCI), Morningstar Inc. Sustainalytics (MS Sustainalytics), S&P Global Ratings (S&P Global) and Refinitiv. It also delves into different research papers written on the subject by various academics, rating agencies and investment managers and the difference between their conclusions in relation to risk and return driven by ESG criteria. Finally, the research compares a portfolio consisting of United States (U.S.) equities having a high ESG score from the different rating providers against each other, and against the market benchmark. In this case the U.S. equity market as represented by the Standards & Poors 500 Index (S&P 500) is used. This research concludes that integrating high ESG scores in equity portfolio management generates higher returns and at times, also lower risk over the long and medium term.

STATEMENT OF AUTHENTICITY

I, the undersigned Christian Buhagiar (Student Code: I1069668) , do hereby declare that the dissertation "***The Role of Environmental, Social and Governance Rating Providers for Alpha Generation in Equity Markets: A Comparative Study"***, is the result of my own original work and research. Any declarations, recommendations and conclusions contained herein are my own, unless otherwise stated.

30/01/2023

Date

Christian Buhagiar

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I sincerely would like to take this opportunity to thank all those who assisted me during the process of writing this dissertation. I would like to express my appreciation and gratitude to my dissertation supervisors and tutors for their continues support and guidance during this journey.

On a more personal note, I'd like to express my gratitude to my parents for their unwavering support throughout my whole academic journey. Additionally, this dissertation is dedicated to my wife, Mrs. Alexandra Buhagiar, for her immense patience, love and support throughout the years of my Master's degree.

TABLE OF CONTENTS

LIST OF ACRONYMS

ACWI – All Country World Index

COP – Conference of the Parties

CSR – Corporate Social Responsibility

EC – European Commission

EU – European Union

ESG - Environmental, Social and Governance

ETF – Exchange Traded Fund

FTSE – Financial Times Stock Exchange

GHG – Green House Gas Protocol

GRI – Global Reporting Initiative

IFC – International Finance Cooperation

IIRC – International Integrated Reporting Council

ISSB – International Standards Board

MiFiD – Markets in Financial Instruments Directive

MS – MorningStar Inc

MSCI - Morgan Stanley Capital International Inc

NFRD – Non-Financial Reporting Directive

NGOs – Non-Governmental Agencies

OECD – Organisation for Economic Co-operation and Development

PRI - Principles for Responsible Investments

S&P Global – Standard & Poor's Global

SAB – Sustainability Accounting Board

SABS – Sustainability Accounting Standards Board

SDGs – Sustainable Development Goals

SFRD – Sustainable Finance Disclosure Regulation

UN – United Nations

UNSSE – United Nations Stock Exchange Initiative

VAR – Value at Risk

WHO – World Health Organization

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1- INTRODUCTION

1.1 BACKGROUND

"If we can't all swim together, we will sink. There is no Plan B, because there is no Planet B"[1] – This was one the most memorable quotes which characterized Ban Ki-moon's nine-year stint as Secretary General of the United Nations (U.N.) strongly urging world leaders to change their course over climate change. The U.N. is in fact one of the major intergovernmental organizations which have been promoting sustainable development over the last thirty years. For financial markets, it was in 2004 however that a breakthrough by the U.N. was done following a report entitled *'Who Cares Wins – connecting financial markets to a changing world',* in which the term 'ESG' was first created. This report created standards and proposals on how better to increase awareness and incorporate environmental, social and governance issues into investments and research.

Sustainability awareness has been placed high on the global agenda for the past decade with the signing of the Paris Agreement[2] in 2015, which is a legally binding international treaty that covers climate change mitigation and finance. A transition to a sustainable society and economy is necessary to protect human health. The COVID-19 pandemic has also been a stark reminder that human health and the integrity of the environment and the planet's ecosystems are interlinked. The pandemic thought us that societies can act swiftly when required (Mahmood and Sanchez, 2020). New rules like closures of airports, restaurants, schools, and other important aspects of our daily lives can be enacted overnight if there is a legitimate reason to do so. Several countries took great measures to safeguard human health, even at an immense economic cost, along with the risk of economic recession and severe unemployment. The reduction in traffic, shipping and aviation led to sudden improvements in air quality and noise levels with concentration of nitrogen dioxide declining by up to 60% compared to 2019 (EEA, 2020c). The pandemic also had an immediate effect of encouraging people to use alternative methods of transportation. The European Union (EU) established several plans including the 'Green Deal' and the 'NextGenerationEU' to build a union which is greener, more digital, and resilient for forthcoming challenges (EC, 2021).

[1] Source: https://news.un.org/en/news?f%5B0%5D=date%3A2014
[2] Source: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

An important question remains whether a similar degree of awareness will be achieved to help a strong transition to sustainability? (Scharmer, 2020). Unfortunately, early signs are not very encouraging with airborne pollutants increasing to pre-pandemic levels (EEA, 2020d) while demand for energy continues to increase as countries returned to normality. The horrific war in Ukraine is also posing another risk for achieving carbon neutral sustainable goals. In the EU, many countries are highly dependable on gas flowing from Russia and as supply is inconsistent, some are resorting back to unconventional means including coal and wood burning. The war is also posing severe threats of nuclear accidents whilst land and marine ecosystems are suffering severe damage from military shelling.

The financial markets play an important role by re-orienting private capital to more sustainable investments. Different types of sustainable finance have expanded strongly over time as investors and asset managers are incorporating numerous ESG investment approaches. ESG investing criteria has now become a crucial aspect in asset allocation to generate sustainable, long-term returns. This is because ultimately investors seek to generate financial return, whilst at the same time align this to their values and support sustainable objectives (OECD, 2022).

As more and more investment managers and institutional investors are incorporating ESG investing criteria, ESG rating and scoring mechanisms have become crucial. One of the most important challenge faced by investment houses is that independent ESG rating providers data appear to conclude various outcomes and, unlike to credit rating agencies for bonds, there is still no established industry accord on ESG rating methods being used.

Furthermore, as the aim of investors is to maximize returns, it is not always clear that by incorporating ESG criteria in the investment management process will provide better returns as different literature seems to provide distinct results. Although there is an extensive list of literature which tackles the subject of ESG integration in portfolio management, few research goes into the comparison of different research agencies and analyze the risk/return statistics in detail comparing what such integration provides against non-integration.

1.1.1 What is ESG?

ESG refers to environmental, social, and governance factors considered by companies in their operations and by asset managers/investors in their investment decisions (International Finance Cooperation IFC). ESG factors cover various topics and issues and have become a useful representation for evaluating how businesses recognize non-financial risks and opportunities, and whether they are improving and creating proper strategies to manage or mitigate ESG risks.

Environmental Factors

The resources used and products/services produced by companies may directly or indirectly impact the environment. These include carbon and climate issues, greenhouse gasses, land usage, waste and water usage and treatment, and inventions that reduce environmental impact.

Social Factors

The products and services used may be beneficial or hurt the society. These include equal opportunity, diversity, health and safety, impacts on local communities, harassment, human rights and child/forced labour.

Governance Factors

When businesses make decisions and allocate their financial, human and natural resources, they need to consider how the creation of long-term value will benefit all stakeholders. These factors include board diversity, executive pay, risk governance, ethics and compliance, shareholders right, disclosure and transparency and values/culture.

ESG has gained popularity in asset management in recent years, with fund managers globally, especially in Europe, incorporating non-financial factors into their investment processes to identify risks and opportunities. By 2020, it is estimated that around $35.3 trillion in assets across developed markets were invested according to ESG principles (Global Sustainability Investment Alliance).

1.1.2 ESG Standards

ESG guidelines and criteria have been developed over time to aid companies in managing and disclosing ESG information and support investors in their investment choices. Following on the publication of *'Who Cares Wins'* report in 2004, the U.N. launched its "Principles for Responsible Investment" (UN PRI) framework in 2006. The UN PRI's primary goal is to "achieve sustainable global financial system by encouraging adaptation of the six principles"[3]. Pledge to these principles increased exponentially over the years and now boast close to 4,000 signatories worldwide.

Several other standards have been developed over the years to assist businesses in managing and divulge ESG practices and support investors to understand ESG performance. In 1997, the Global Reporting Initiative (GRI) Sustainability Reporting Standards was one of the pioneering initiatives that helped companies in their non-financial disclosures. Today, more than 90% of the largest companies globally use the GRI standards for reporting on their ESG performance. In 1999, the Organisation for Economic Co-operation and Development (OECD) issued nonbinding principles on corporate governance whilst in the year 2000, the "U.N. Global Compact", a voluntary program to push CEO's on their commitments to drive sustainable goals, was also launched. To harmonize global stock exchanges and increase collaboration between investors, issuers, and regulators on ESG matters, the U.N. Sustainable Stock Exchange Initiative (UNSSE) was created in 2009.

With regards to accounting standards, the Sustainability Accounting Standards Board (SASB) was created in 2011 to encourage high-quality disclosure of material non-financial information. This was followed up more recently in 2021 by a working group of the IFRS[4] Foundation with the aim of accelerating the convergence in global sustainability reporting standards. In 2015, the U.N. Sustainable Development Goals (SDGs) were approved. These are 17 global objectives aimed at promoting sustainability and equality. The SDGs cover a wide range of ESG issues, including climate change, waste reduction, health, gender equality, strong institutions, and others. Many companies today are using the SDGs as a framework to assess the impact

[3] Source: https://www.unpri.org/about-us/about-the-pri
[4] International Financial Reporting Standards

of their operations on society and the environment, while investors use them to align their ESG investment mandates with their values. The SDGs provide a comprehensive and integrated approach to sustainability, and the pursuit of these goals is seen as critical for the future of our planet and society.

1.1.3 What is an ESG score?

Asset managers can incorporate ESG in their investments by analyzing scores from independent research firms. Rating agencies may have different processes, but their output serves the same purpose: to identify firms with strong ESG integration. A company's ESG rating measures its perceived performance on various ESG factors, indicating the sustainability of its operations and serving as a shield against future risks. A high ESG score shows strong ESG integration, while a low score may indicate material risks from inadequate ESG practices.

ESG ratings differ from credit ratings and do not solely focus on climate or environmental restoration. They aim to assess a company's financial resilience to ESG risks, examining the key ESG concerns that could impact the company's risk and opportunity profile. ESG ratings primarily support ESG integration by investors, aiding in building robust portfolios and enhancing risk-adjusted returns. As asset managers increasingly adopt ESG principles, the ratings have also spurred companies to consider ESG factors.

1.2 RESEARCH AIM

This research aims to examine the impact of ESG factors in asset management, investigating whether ESG integration leads to improved portfolio returns (additional alpha). It will compare the various ESG scoring methods offered by independent agencies, determining which, if any, deliver better financial performance compared to the wider market. To achieve this, ESG-themed portfolios will be created using different rating methods in the industry and evaluated against a conventional market index in terms of risk and reward. In this research, we will be looking at the U.S. equity market.

Although there is a lot of literature which tackles ESG from a rating provider’s perspective, I think that due to the fact different agencies provide different mechanism

for ratings, there seems to be a gap with regards to how they compare with each other. Furthermore, since that there is still no exact consensus in the industry on how the equity market should be rated from an ESG perspective, unlike to what happens with credit rating scores for the bond market, it would also make sense to understand which of these different rating methods perform the better against each other and against the market.

1.3 RESEARCH QUESTIONS

The main research question is:

- *Which ESG rating mechanism provides the best risk/return trade-off against the broader market? Does ESG integration really provides alpha generation?*

The following sub-questions will also be answered:

- *What are the major challenges currently faced by asset managers in integrating ESG criteria in their investment management processes?*
- *What are the major differences between various ESG rating providers currently available on the market?*

1.4 RESEARCH OBJECTIVES

The research objectives of the study are:

a) To understand what ESG scoring signifies in asset management; what's it's use and what is not

b) To understand and compare the different ESG rating methodologies by different agencies including MorningStar Sustainalystics, Refinitiv, S&P Global and MSCI.

c) To understand and define what makes a scoring mechanism different from another and why there is still no broad consensus on which methods to use.

d) To understand which rating agency provided over-performance from a risk/return basis against the broader market, and between themselves by looking at the U.S. large cap equity universe.

1.5 SCOPE & LIMITATIONS

In this research I will be using secondary data sources including online articles/studies by asset managers and institutional investors, research papers written on the subject by investment professionals, rating agency providers and academics, and financial books/journals. To compare the different ESG ratings, I will be using primary data sourced from various rating agency providers and well-established data firms including Refinitiv and Bloomberg.

When looking at secondary data, one of the main challenges is to remain objective whilst making use of such information. This is especially the case when analyzing research papers and articles from rating agency providers themselves who are explaining their processes. With regards to primary raw data, this was sourced from world leading independent data providers however there were some instances where data was missing, or inconsistent. As an example, certain companies of the S&P 500 were not rated by all the rating agencies used in this study and thus these were omitted from the overall comparison.

CHAPTER 2 - LITERATURE REVIEW

2.1 OVERVIEW

What is sustainable investment?

Sustainable investment is an investment approach that considers ESG factors in portfolio selection and management. (Global Sustainable Investment Review, 2020).

Whilst the term sustainable investment may be used interchangeably with ESG investing, responsible investment, socially responsible investment, among other terms, there are distinctions and regional variations in its meaning and use.

In most regions, like Europe and Australasia, it is increasingly the case that the same investment product or strategy will combine several sustainable investment strategies, such as negative/exclusionary screening, ESG integration and corporate engagement.

Investment and asset managers across the globe, broadly recognize seven core approaches to sustainable investment which are listed below (Global Sustainable Investment Review, 2020):

Table 1: Approaches to Sustainable Investment

ESG Integration	Including ESG factors in the analysis
Corporate Engagement & Shareholder Action	Activity taken to impact company practices such as filing of shareholder resolution, engaging with management and proxy voting.
Norms-based Screening	Screen against international standards or practices set up by NGOs (e.g. United Nations, OECD and others).
Exclusionary/Negative Screening	Elimination of an investment based on involvement in a controversial sector or activity. These can include weapons, tobacco, human rights violation, testing on animals and others.
Positive/For Good Screening	Investment in sectors, companies, or projects selected for positive ESG performance, relative to industry peers. Also called "best in class."
Sustainability Themed/Thematic Investing	To invest in ideas or solutions which contribute to a better sustainable environment and society (e.g. low emission portfolio).
Impacting Investing & Community Investing	Impact Investing: Invest to generate a quantifiable positive ESG impact. Community Investing: Invest directly to low income/educated communities.

During 2020, investments in the sustainability area achieved USD 35.4 trillion across key markets with a 15% growth compared to 2018 and 55% increase compared to 2016.

Table 2: Sustainable Investment Regional AUM ($bn)[5]

REGION	2016	2018	2020
Europe*	12,040	14,075	12,017
United States	8,723	11,995	17,081
Canada	1,086	1,699	2,423
Australasia*	516	734	906
Japan	474	2,180	2,874
Total (USD billions)	**22,839**	**30,683**	**35,301**

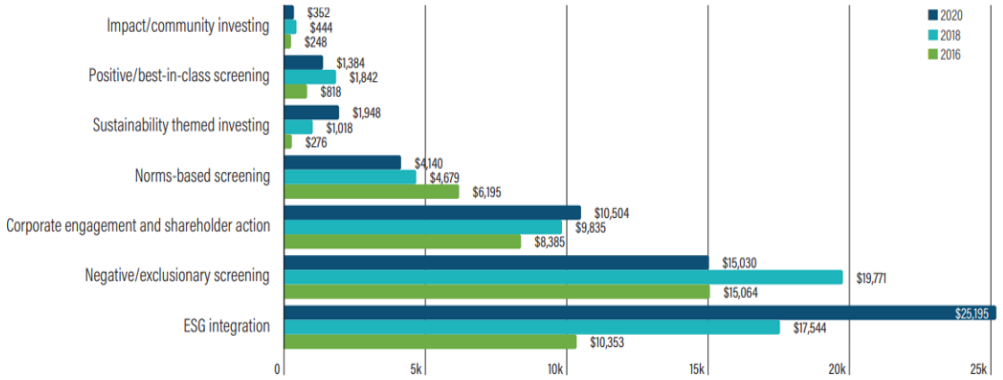
Assets under management (AUM) in sustainable investments across all regions sum up to 35.9% of the total AUM (Table 3).

Table 3: Total Sustainable AUM ($bn)[5]

REGIONS	2016	2018	2020
Total AUM of regions	81,948	91,828	98,416
Total sustainable investments only AUM	22,872	30,683	35,301
% Sustainable investments	27.9%	33.4%	35.9%
Increase of % sustainable investments (compared to prior period)		**5.5%**	**2.5%**

From all the different type of sustainable investment strategies mentioned, ESG integration approach has seen the highest growth of over 143% between 2016 and 2022. Table 4 shows that ESG integration is the largest sustainable investment strategy globally with a combined USD 25.2 trillion in AUM.

Table 4[5]*: Global growth of sustainable investments strategies 2016 - 2020*



	2020	2018	2016	GROWTH 2016-2020	COMPOUND ANNUAL GROWTH RATE
Impact/community investing	$352	$444	$248	**42%**	**9%**
Positive/best-in-class screening	$1,384	$1,842	$818	**69%**	**14%**
Sustainability-themed investing	$1,948	$1,018	$276	**605%**	**63%**
Norms-based screening	$4,140	$4,679	$6,195	**-33%**	**-10%**
Corporate engagement and shareholder action	$10,504	$9,835	$8,385	**25%**	**6%**
Negative/exclusionary screening	$15,030	$19,771	$15,064	**0%**	**0%**
ESG integration	$25,195	$17,544	$10,353	**143%**	**25%**

NOTE: Asset values are expressed in billions of US dollars.

For the purpose of this research, ESG integration within the investment approach will be considered as the main focus for sustainable investment.

[5] Source for Tables 2, 3 and 4 is the Global Sustainable Review 2020

Investors have been interested in sustainability for several decades now, but the real wake-up call came in January 2004 when UN Secretary-General Kofi Annan wrote a letter to the CEOs of significant financial institutions. In it, he asked them to participate in an initiative to integrate ESG into capital markets. This move has since been taken further by the Paris agreement and ensuing COP (Conference of the Parties) yearly conferences focusing on climate change. Consequently, ESG information is becoming increasingly valuable for corporations, investors, and regulators, for reasons ranging from reputational concerns to financial performance.

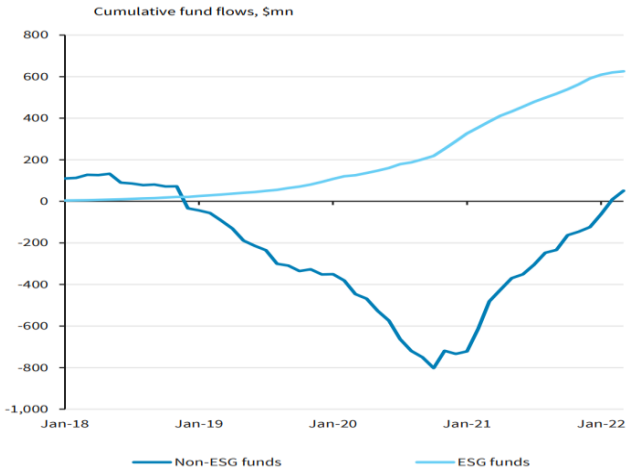
Demand for ESG information has peaked over the last couple of years. The term ESG, although invented in 2004, was not really used within the investment community or in boardrooms. On the other hand, interest was mainly on generic corporate social responsibility. It is only very recently that ESG, as a concept on its own, started to evolve and created interest. As per Figure 2a, demand for information has started to increase over the past couple of years.

Figure 2a: Interest in ESG over time (Google trends[6])

As a matter of fact, we have also started seeing interest and investment in ESG driven funds. Since 2018 (Figure 2b), these have seen much larger inflows compared to non-ESG funds (Walls and Gordon, 2022).

[6] Google trends searches on ESG. Numbers represent search interest relative to highest point on chart. Value of 100 is peak popularity whilst value of 0 is lowest popularity.

Figure 2b[7]: Cumulative Fund flows ($ mn) in ESG and Non-ESG Funds



2.2 ESG STANDARDS

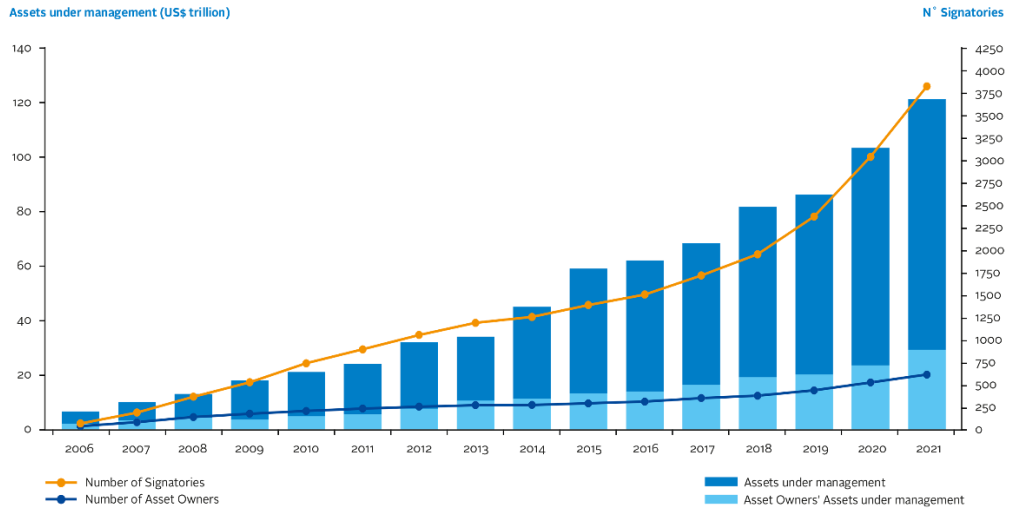
Over the past thirty years, several standards have been created by different governmental and non-governmental worldwide institutions. These standards act as principles and recommendations to businesses to manage their ESG factors and assist them in disclosing such information. These standards are also imperative to support investors in their investment decisions when looking at various business.

One of the main active global bodies on the topic is the United Nations with various reports and initiatives launched over the years. In 2006, the U.N. launched its "Principles for Responsible Investment" (UN PRI) framework to understand investment implications of ESG factors and support its signatories to incorporate these factors in their decision (UN PRI, 2022). Ultimately, the PRI acts in the interest of its signatories, financial markets and economies these operate in and the society at large.

Across sixty different countries, more than 4,000 companies which include banks, asset managers, insurance companies, private equity firms and institutional investors have become signatories. These companies have committed to six specific principles including the incorporation of ESG issues into investment analysis and decision making processes, promote implementation and acceptances of PRI, and seeking appropriate disclosures on ESG issues in entities they invest into. Commitment has continued to increase over the years with AUM for signatories reaching over $120 trillion in 2021.

[7] ESG Research – Introduction, Wells and Gordon, 2022, Barclays

Figure 2c: PRI Signatory Growth[8]



The increasing number of asset managers signing onto these sustainable investment principles shows a growing recognition of ESG's importance. However, it doesn't mean they all have internal expertise in ESG or are trained to address environmental, social, and governance issues. It indicates that more traditional asset managers are taking interest in responsible investment and moving away from short-termism in the industry.

A further crucial move was made in 2015, when 193 countries of the U.N. General Assembly approved the UN SDGs. SDGs have become a commonly used framework for sustainable investment and ESG integration as they provide a comprehensive and standardized approach to sustainability. By setting out clear goals and targets, they help companies and investors prioritize their ESG efforts and assess their impact. The widespread adoption of the SDGs has also facilitated the development of metrics and tools to measure progress towards the goals, further promoting the integration of ESG factors in investment decision-making.

[8] Source: https://www.unpri.org/about-us/about-the-pri

Figure 2d: U.N. Sustainable Development Goals (SDGs)[9]

2.3 INTERPRETING THE TREND – ESG INTEGRATION

2.3.1 Macro Factors

Global economies and corporations are facing various challenges and uncertainties in their process to align towards a more Sustainable environment. Many of these issues are summarised below (Societe Generale, Road to ESG integration, 2020):

- ***Geopolitical uncertainties*:** mounting social unrest, rise of nationalism and populism, trade wars, large scale involuntary migration, pandemic disruptions, military tensions, and wars.
- ***Demographics and ageing population***: income inequality, pressures on healthcare systems and shortage of supplies (food/water scarcity).
- ***Climate change:*** extreme weather events, global warming, high energy prices.
- ***Technological changes*:** digitalisation, automation, artificial intelligence, and cyber-attacks.
- ***Increasing regulatory and stakeholder pressure:*** more regulations, heighted reporting standards, more media pressures and greater transparency expected.
- ***Consumers' changing habits:*** new consumption models and more appetite for sustainable products, more awareness about general well-being, higher concerns about waste and pollutants, and more environmentally conscious consumers.

[9] Source: U.N. Global Compact. https://www.unglobalcompact.org/library/2291

Indeed, in a survey by the World Economic Forum (WEF) , many of these challenges have been identified as the most severe global risks being faced over the next ten years (WEF Global Risk Perception Survey, 2021-2022). These concerns have also been recognized as the leading reasons as to why more than 84% of respondents are either concerned or worried about the outlook for the world. As the global risk landscape is evolving, it is not surprising that investing with an ESG theme is becoming more popular. ESG metrics can help investors identify companies that are well positioned for the future and that may provide better risk-adjusted returns over the long term. This information can also help companies themselves improve their ESG performance and better manage material ESG risks, thereby enhancing their reputation and attracting more investment.

2.3.2 Stakeholder pressures

One single company has many stakeholders including clients, stockholders, workers, contractors, local communities, governments, public bodies, and Non-Governmental Agencies (NGOs) amongst others. With mounting pressure from various stakeholders, every company now must act in an ethical and sustainable fashion and answer for its ESG compliant business practices. Stakeholders act as safeguards voicing ethical, societal, and environmental concerns. A couple of examples below (Societe Generale, Road to ESG integration, 2020):

- ***Customers:*** consumer preferences and behaviors are changing rapidly. They are now seeking products and services which are more sustainable, customized, innovative, healthy, digital, and genuine.
- ***Shareholders/Investors:*** these are increasingly engaging with companies to make an impact on how companies are managing their finances keeping in mind ESG practices, with the most extreme cases being shareholder activism.
- ***Employees:*** apart from diversity and inclusion, employees are now seeking better work-life balance, including remote or hybrid working arrangements with such trend being sped up during the covid pandemic.
- ***Suppliers:*** nowadays companies are being held accountable for their whole business eco-system. Firms are expected to guide and monitor their supply chain business practices.
- ***Local communities:*** multi-national corporations operate in various countries and thus must respect cultures, traditions, environmental and customs of locals

everywhere they do business.

- ***Government and public bodies**:* such stakeholders are very important since often, companies act once regulators force changes.
- ***NGOs***: they interact with companies and pioneer society's concerns in defending human and animal welfare and the environment.

2.4 HIGH PROFILE CASES OF FINANCIALLY MATERIAL ESG INDICENTS

Several high-profile events have caused tremendous impacts on businesses, from ESG-related risks to controversies. This has increased further pressure on companies to integrate ESG and become the norm. Below are a couple of corporate events that led to the rise of ESG:

Enron (2001) – accounting fraud

Enron, a major energy business filed for bankruptcy in 2001 following a massive scandal. The company was manipulating its accounting to hide major debts and creating bogus profits. Between 1996 and 2000, when Enron was really losing money, the company reported increase in sales ($13.3 billion to $100.8 billion). Shareholders lost billions of investments whilst employees lost all their pension benefits. Following this scandal, the Sarbanes-Oxley Act was enacted in the U.S. thereby increasing consequences for companies who fraud, alter or fabricate their financial statements. (BBC, 2002)[10]

Figure 2e: Enron Share Price Jan 2000 - 2002[11]

[10] Source: http://news.bbc.co.uk/2/hi/business/1780075.stm
[11] Source: https://www.institutionalinvestor.com/article/b1hzpm1ytxssh2/5-myths-about-company-stock

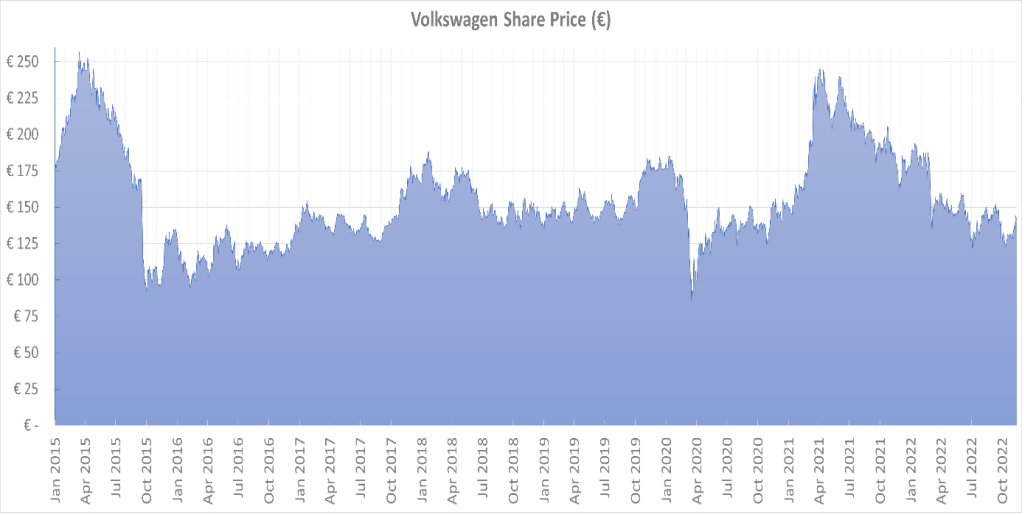
BBC (2017) – gender inequality

During the time, only 34% of BBC employees that earned over £150,000 were women. When this information was made public, various senior employees resigned and other male leading presenters taking a pay cut. Following the controversy, the corporation did a salary check analysis to ensure equal pay for all its employees, irrespective of the gender (BBC, 2017).

Volkswagen (2015) – emission scandal

Any cars that had been sold in the U.S. were implanted with a special device that would identify when their emissions are being checked to improve their ecological scores. In reality however, such cars were polluting forty times higher the limit allowed in the country. Volkswagen confessed the cheating which involved 11 million cars sold around the world which led to heavy fines and threw media attention on the climate effects of all diesel cars. Total cost including penalties and fines accounted to €27.4 billion.

Figure 2f: Volkswagen share price[12]



As a result, share price dropped heavily from €257 in March 2015 to €92.6 in October 2015, that is a drop of 64% over a period of slightly more than six months. Up till October 2022, the high's registered prior the emission scandal in 2015, have not yet been reached again. Therefore, there has been a push to decrease the production of diesel cars across the globe. The auto industry is now also having a key role in the shift towards zero-carbon transportation.

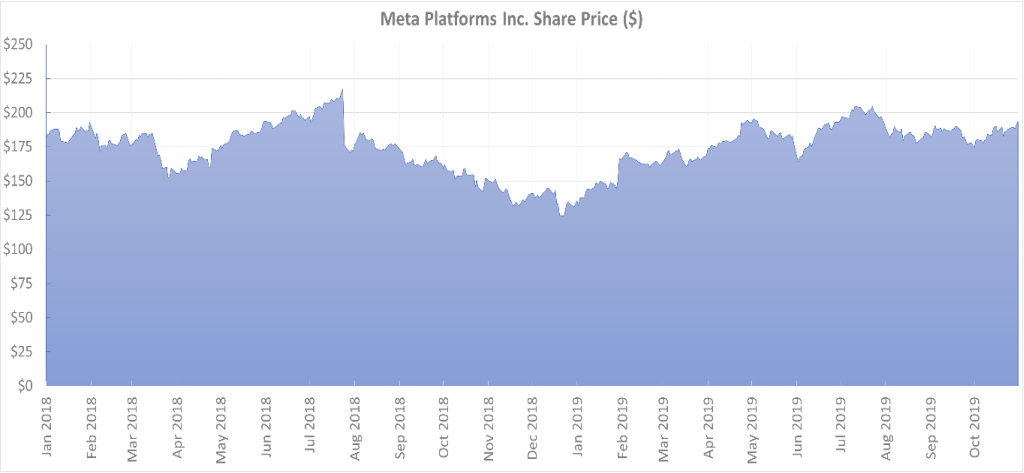
[12] Source: Bloomberg

Meta Platforms Inc (2018) – Cambridge Analytica scandal

Meta Platforms Inc.'s (Meta) personal data, previously known as Facebook, was obtained, without authority, by Cambridge Analytica. The data was utilised to track locations, create profiles, and deployed in political campaigns with a total of 87 million users affected.

As a result of this scandal, share price dropped from its previous high of $217.50 on the 25th of July 2018 and reached bottom on the 24th of December 2018 at $124.06, that is, a decrease of 43% over six months.

Figure 2g: Meta Platforms share price[13]



Meta CEO Mark Zuckerberg was heavily fined and the U.S. government also imposed further regulations on the company with the aim of protecting the user data. Following the ordeal, Meta pledged to increase its workforce on cyber security and implemented the new EU General Data Protection Regulation (GDPR) all over the world following these events.

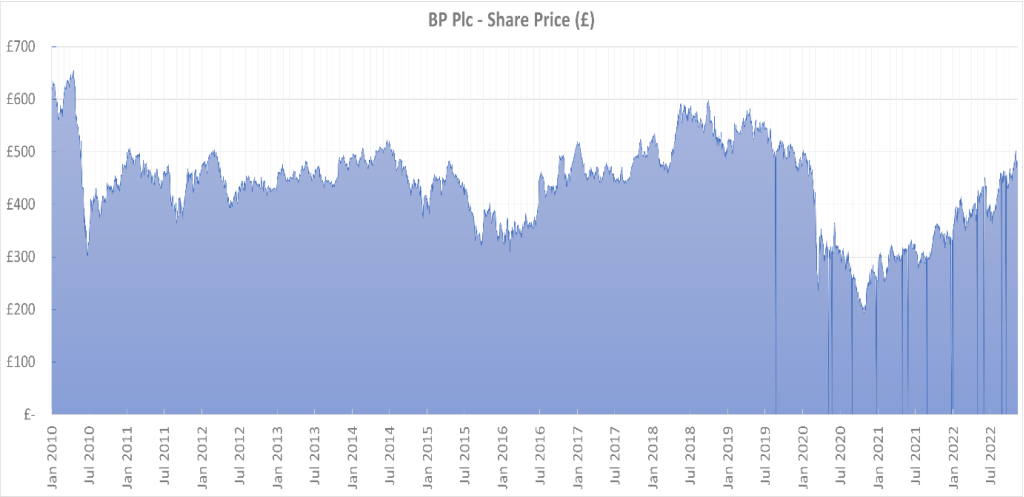
BP Oil Spill (2010)

A gas release and subsequent explosion occurring on the Deepwater Horizon oil rig in the Gulf of Mexico is known as the largest ecological catastrophe in the U.S. and the greatest marine oil spill globally. The spill released over 130 million gallons of crude oil in the sea over a period of 87 days, polluting 1,300 miles of shoreline along five US states. Eleven rig workers died on site together with thousands of marine mammals, sea turtles, birds, and fish.

[13] Source: Bloomberg

As a result, share price dropped heavily from £655.4 in April 2010 to £302.9 in June 2010, that is a drop of 56% over a period of just two months. Up till October 2022, the high's registered prior the oil spill disaster have not yet been reached again.

Figure 2h: BP Plc share price[14]



In 2016, BP estimated that the final cost for the oil spill totaled to $61.6 billion (National Oceanic and Atmospheric Administration, 2017). The funding was used by state and federal agencies to undertake an intense scientific study of the impacts of the spill and develop comprehensive restoration plan for the Gulf of Mexico. This unprecedented event made the public realise the uniqueness of the region. It was the beginning of a commitment to collaboration that became the foundation of the programs and projects that followed.

Due to the inefficient and insufficient awareness of various ESG risks, these companies all ended up losing huge amounts of funds at the detriment of their shareholders, the environment, and their communities. By integrating ESG considerations into their processes, asset managers can identify and mitigate risks that might not be evident in financial analysis. The analysis of ESG data can also provide an understanding of a company's operational and reputational risks and indicate potential opportunities for long-term value creation.

[14] Source: Bloomberg

One approach for investment managers to integrate ESG in their mandates is by evaluating ESG scores provided by third party private research agencies. The methods used by these agencies tend to be distinct however the end goal would be the same. Specifically, to understand which investible assets incorporate ESG the most.

2.5 THE ESG REGULATORY RACE

As a way for governmental authorities to instigate rapid change, interest and ultimately push businesses towards more ESG integration, rules and regulations have been evolving around the globe. Regulation for ESG is an innovative notion and currently regulators around the globe are investigating and focusing on these three points:

1) *Company disclosures: safeguarding the fact that shareholders have enough information on ESG practices of the businesses they will be investing in.*
2) *Investment Product Disclosures: will make it easier to understand which investment solutions will apportion, and how much, to ESG interests.*
3) *Taxonomies: to create market consensus identifying what ESG is.*

The EU is at the lead on rules and regulations. The Non-Financial Reporting Directive (NFRD) (Directive 2014/95/EU) was adopted in 2014 and applied to large publicly traded companies targeting more than 11,500 corporations around the EU. The NFRD was criticized as it was non-binding and did not cater for quality of information which is now being demanded by users.

Following the Paris Agreement and the adaptation of the UN SDGs in 2015, the EC started its work on Taxonomy which is an EU-wide categorisation system for corporations to identify which of their commercial and financial activities, or activities they have interest in, can be considered as sustainable.

The Corporate Sustainability Reporting Directive (CSRD), issued in 2021 superseded the NFRD and seeks to make large companies[15] (both listed and non) more accountable and transparent when reporting non-financial ESG data. This directive is

[15] These need to meet two out of the following: having more than 250 employees, net turnover of higher than €40million and balance sheet higher than €20million.

expected to make it mandatory for over 49,000 companies in the EU to report non-financial ESG information. The changes for large companies are expected to be implemented in a staggered manner over the years, with Small and Medium sized businesses expected to start reporting from January 2026 (EC, 2023).

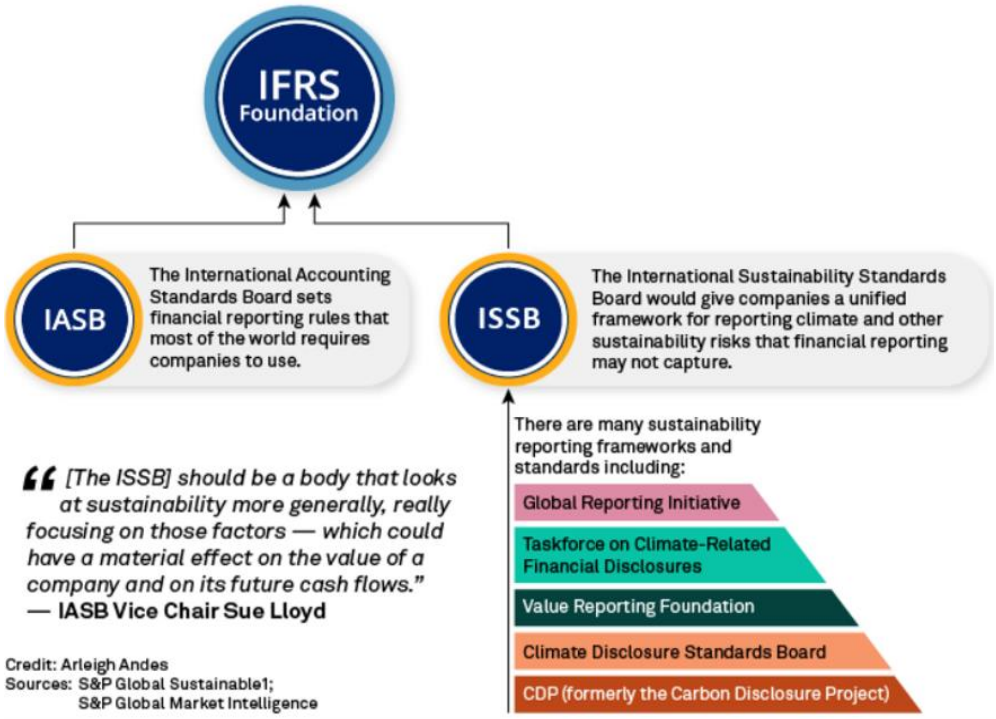
The ESG information from companies will then be used by financial market participants including asset managers, banks, insurance companies, financial advisors and others so they can take informative decisions when considering their ESG investments. To protect the end clients, the Sustainable Finance Disclosure Regulation (SFDR) comes into place whereby it sets out disclosure requirements for products and services offered by market participants. This regulation came into force in March 2022 to provide a harmonized EU rules on disclosure to the extent to which risks in relation to sustainability are combined in portfolio management decisions or investment advice, the consideration of adverse sustainability impacts, and sustainability related information for financial products.

As a way of example of how Taxonomy works, asset managers use information reported by companies under CSRD to report ESG criteria for their managed funds under SFDR. Financial advisors will turn use this information when discussing investments with end users to understand their ESG preferences as per the Markets in Financial Instruments Directive (MiFiD) suitability test.

Currently, one of the major hurdles is that full disclosure for company reporting has not fully kicked in yet however fund and portfolio managers are still expected to show ESG related material on their investment products. Additionally, investment advisors are required to understand the end users ESG preferences and amalgamate this information on the best suited product based on limited or insufficient information. Another issue is that single EU nations are pushing for their regulations thus making them less consistent on EU wide level and therefore more complicated. Moreover, non-EU countries are also implementing their own set of rules and regulations that can be different from those of the EU hence a common reporting framework is more challenging to be attained.

Conversely, the IFRS has created the International Sustainability Standards Board (ISSB) for global reporting ESG standards. The purpose is to assist companies in relation to ESG data disclosures that need to be added in the financial statements.

Figure 2i: How ISSB fits in with reporting and ESG disclosure frameworks



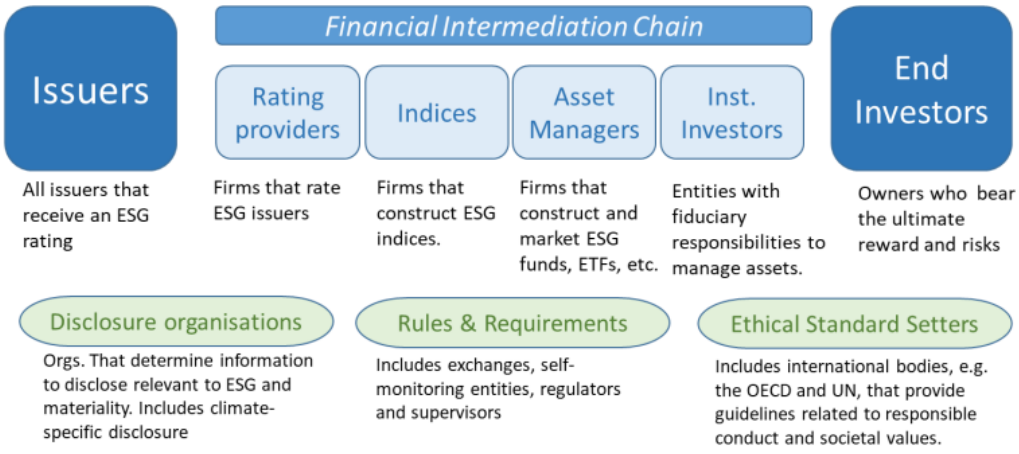
With the creation of the ISSB in 2021, a further drive for global sustainability standards for corporate reporting continued to gain traction. This has however also created certain forces of divergence with what the EU has been proposing thereby creating interoperability concerns.

Similar to annual financial statements, shareholders or prospective investors are meant to be the primary users of reports produced under ISSB standards. On the other hand, the EU aims also at other groups including fund/portfolio managers. The idea for the ISSB is to have consistency and comparability in standards around the globe. Various regions which have different policy goals, including the EU, can combine their own standards to this approach. The ISSB is seen to be very much driving the development of the new sustainability standards (Howitt, Reuters, 2022).

2.6 ESG FINANCIAL ECOSYSTEM

As the ESG concept continues to grow and gets accepted across the industry, it is imperative to understand who all the stakeholders and contributors are in this intermediation chain. Below is a diagram from Boffo & Pataleno, 2020[16] which explains the ESG financial ecosystem.

Figure 2j: ESG Financial intermediation chain



The financial intermediation chain (Figure 2j) includes issuers (e.g., bond issuers, equity issuers, fund managers and other investors) who disclose ESG information and receive a rating accordingly. The ecosystem also includes an interlinked group of financial services providers, NGOs, regulators, and global organisations that influence different parties in ESG investing. These are explained below:

Financial Issuers: These provide capital issuance to the markets in the form of equity or debt. These can also be investors or asset managers who provide investment products to retail or institutional investors. Issuers need to provide ESG data and analytics for the other parties involved.

ESG ratings providers: these entities provide ESG ratings based on the disclosure from issuers. ESG rating providers include MSCI, MS Sustainalytics, Bloomberg, Refinitiv and S&P Global.

ESG index providers: Most of the rating agencies are also index providers. These ESG indices are constructed based on the data collected from the rating providers. Indices are growing in importance to track the relative performance of different ESG themed portfolios. Indices or benchmarks are also used by certain fund providers to create ESG tilted portfolios or funds and ETFs.

[16] Boffo, R., and R. Patalano (2020), "ESG Investing: Practices, Progress and Challenges", OECD Paris

ESG users: the users of ESG ratings comprise of all the investors, including asset managers and institutional investors. Although many of these can also perform in-house ESG analysis, many rely on third-party ESG ratings to assess an investment.

Asset managers/investment funds: these construct investment funds and products that have an ESG themed mandate using ESG ratings and information.

Institutional investors: these can include various institutions who use ESG scores in their asset management strategies as per their ESG mandates.

Public sector institutions: these can include public debt issuers, central banks and other governmental agencies that will use ESG ratings in their investment decisions. This is part of the overall push of governments to move towards the sustainable theme.

End investors: these would be the ultimate owner who bears the risk and reward for having an ESG themed portfolio.

The ecosystem also includes framework developers such as standard setters and regulatory bodies that offer guidance on disclosure and good practices to all parties. These incorporate the Global Reporting Initiative (GRI), the International Integrated Reporting Council (IIRC) and the Sustainability Accounting Standards Board (SAB) and inter-governmental organisations such as the UN and the OECD. Rules and regulations, such as the EU taxonomy mentioned previously help to provide a common standard for reporting and push issuers and investors disclose standardised and high quality ESG information.

2.7 PURPOSE OF ESG RATINGS

ESG ratings are meant to measure a company's resistance to financially material environmental, societal and governance risks. These look at important ESG issues that can generate significant risks and opportunities for the company or industry.

By way of example, to establish whether a semiconductor firm will run out of water it needs to produce microchips, analysts may look at whether the firm is in an area where water might be scarce. A further risk can be if for instance a regulation is in place limiting water consumption or if the company conflicts with local communities in relation to water usage and whether the business is taking these matters seriously and tackling them. For an insurance company on the other hand, a risk can be that of losing talent and what is being done to retain that talent. In summary, ESG ratings mainly focus on risks and opportunities that affect the company's profits.

ESG scores are constructed primarily for the investment community to support the integration of ESG issues in portfolio construction. As fund managers continue to integrate ESG into their procedures, the scores have aided in the acceptance of ESG considerations by various organsations as well. *'Impact investing'* is also a type of investment that focuses primarily of creating a measurable sustainable impact like investing in an active fund which aims at achieving several UN SDGs. In this case, an ESG rating does not necessarily place the creation of a sustainable impact ahead of economic return. *'Value-based investing'* is also another sustainable type of investing which creates portfolios based on ethical values. Therefore, the investment manager will for example avoid investing in tobacco, land mines, animal testing companies, pornography, alcohol, gambling, and others. Important to keep in mind that even a high ESG score will not necessarily filter out such investments.

It is crucial to also recognize that industries can face different ESG risks. A fossil fuel company will have more risks related to carbon emissions than a fast-food chain. The fast-food chain can still manage to increase its ESG score but at the same time also increase its emissions. This is done as the fast-food chain can develop other ESG factors – *such as sustainable packaging, safety at the place of work, sustainable food sourcing etc.* – which are more applicable to the food business than emissions. This would therefore mean that more weight is given to such factors and thereby

increasing the overall ESG score. Moreover, even though the fast-food company have raised its carbon emissions, this can still be one of the smallest compared to the industry, since ESG ratings are always relevant to their respective industry competitors.

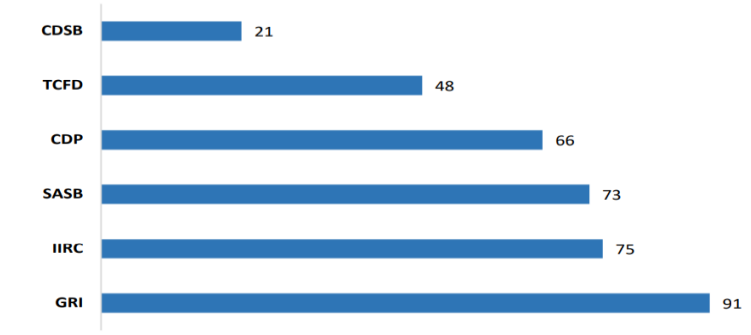
2.8 COMPARING DIFFERENT ESG RATING METHODS

2.8.1 Framework

The starting point for research agencies to generate an ESG rating is generally comparable. Data is gathered from several sources including company financial statements and ESG disclosures, NGOs (UN, SASB, OECD), government and the media. Even though the information is sourced in a similar way, the relevant ESG output score can differ significantly from one rating house to another[17].

This might happen due to lack of standaristation in reporting guidelines with different exchanges having their own set of standards. While progress is clear, exchanges are using different reporting frameworks that have distinct approaches in relation to financial materiality and ethical standards (Figure 2k[18]). On this front, many exchanges understand that ESG convergence is still far away from reality. Global divergence on ESG standards and practices is currently a huge concern for the industry (Boffo & Patalano, 2020).

Figure 2k: The percentage of ESG standards being used by different exchanges



Note: In percentage out of 100
Source: Sustainable Stock Exchange Initiative (2020), "ESG Disclosure Guidance Database". GRI is Global Reporting Initiative; IIRC is International Integrated Reporting Council; SASB is Sustainability Accounting Standards Board; , CDP is a non-profit disclosure provider for sustainability, TCFD is the Taskforce on Climate-related Financial Disclosures; CDSB is Climate Disclosure Standards Board.

[17] Fatemi, A., M. Glaum and S. Kaiser (2018), "ESG performance and firm value: The moderating role of disclosure", Global Finance Journal, Vol. 38, pp. 45-64, http://dx.doi.org/10.1016/j.gfj.2017.03.001.
[18] Boffo, R., and R. Patalano (2020), "ESG Investing: Practices, Progress and Challenges", OECD Paris

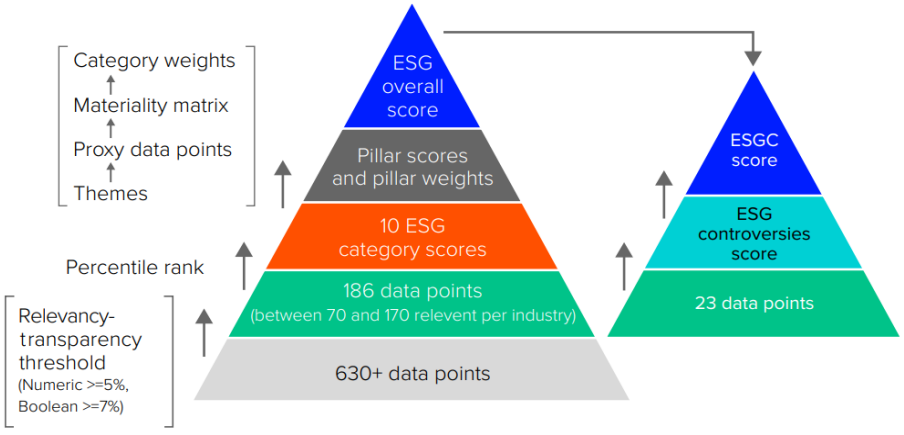
2.8.2 Factors, Key Issues and Sub-Categories

Agencies determine a rating by evaluating crucial factors and considering various themes or categories that impact the company's three aspects (E, S, and G).

As issues, categories and themes are not entirely the same for each provider, different providers would rank different characteristics of the sustainability of the company they asses thereby increasing the chance of a different output. Environmental criteria may include natural resource use, carbon emissions and energy efficiency. Social factors can include work related issues like health, diversity and training and can also include societal issues such as human rights and data protection. Governance factors may include board diversity, independence, corporate ethics, and shareholder rights.

Refinitiv uses over 630 company level ESG measures, of which 186 of the most comparable and material in the industry are used. These are grouped into 10 categories (25 sub-categories) that align to the three pillars of ESG.

Figure 2l: The process from Refinitiv[19]



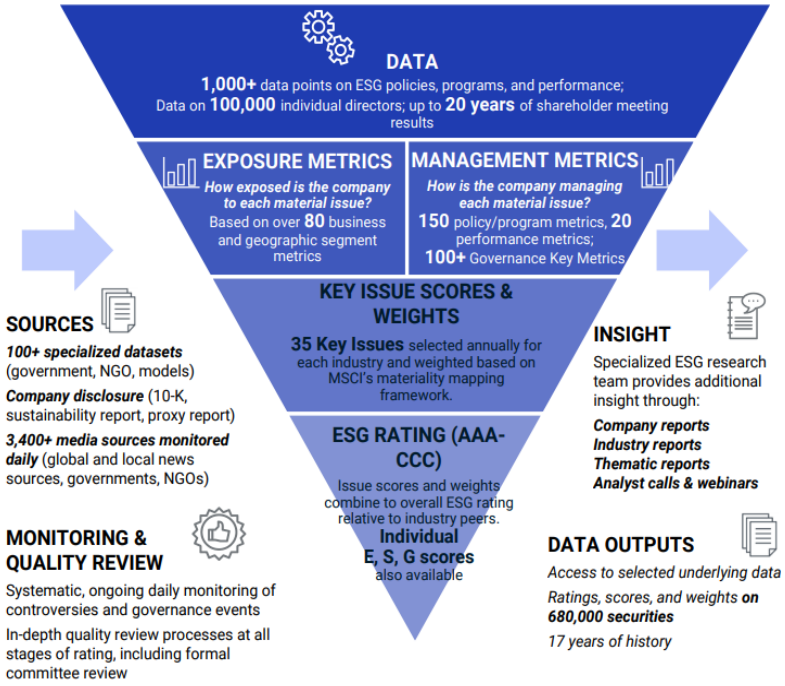
[19] Environmental, Social and Governance scores from Refinitiv, March 2022

Figure 2m: Categories and issues identified by Refinitiv[20]

Pillars	Categories	Themes
Environmental	Emission	Emissions
		Waste
		Biodiversity
		Environmental management system
	Innovation	Product Innovation
		Green revenues, research & development and CapEX
	Resource Use	Water
		Energy
		Sustainable packaging
		Environmental supply chain
Social	Community	Equally important to all industry groups
	Human rights	Human rights
	Product responsibility	Responsible marketing
		Product quality
		Data privacy
	Workforce	Diversity and inclusion
		Career development and training
		Working conditions
		Health and safety
Governance	CSR strategy	CSR strategy
		ESG reporting and transparency
	Management	Structure (independence, diversity, committees)
		Compensation
	Shareholders	Shareholder rights
		Takeover defenses

MSCI on the other hand, captures over 1,000 data points across 35 ESG key issues focused on those that create significant opportunities and risk for the business.

Figure 2n: The process from MSCI[21]*:*



[20] Environmental, Social and Governance scores from Refinitiv. March 2022
[21] MSCI ESG Ratings Methodology – MSCI ESG Research LLC. June 2022

Figure 2o: Themes and issues identified by MSCI[22]:

Pillars	Themes	Key Issues
Environmental	Climate Change	Carbon Emissions
		Product Carbon Footprint
		Financing Environmental Impact
		Climate Change Vulnerability
	Natural Capital	Water Stress
		Raw Material Sourcing
		Biodiversity & Land use
	Pollution & Waster	Toxic Emissions & Waster
		Electronic Waste
		Packaging Material & Waste
	Environmental Opportunities	Opportunities in Clean Tech
		Opportunities in Green Buildings
		Opportunities in Renewables
		Energy
Social	Human Capital	Labour Management
		Health & Safety
		Human Capital Development
		Supply Chain Labour Standards
	Product Liability	Product Safety & Quality
		Privacy & Data Security
		Chemical Safety
		Responsible Investment
		Consumer Financial Protection
		Health & Demographic Risk
	Stakeholder Opposition	Controversial Sourcing
		Community Relations
	Social Opportunities	Access to Communications
		Access to Finance
		Access to Healthcare
		Opportunities in Nutrition & Health
Governance	Corporate Governance	Ownership & Control
		Pay
		Board
		Accounting
	Corporate Behaviour	Business Ethics
		Tax Transparency

S&P Global ESG ratings are obtained from the Corporate Sustainability Assessment. This is a questionnaire-based process that assesses a company's ability to understand and address sustainability opportunities and challenges. The qualitative assessment focuses on sustainability issues that have a financial impact and are relevant to the industry. Companies receive scores based on their responses, which are then weighted and aggregated into criteria, dimensions, and a total ESG score specific to their industry.

[22] MSCI ESG Ratings Methodology – MSCI ESG Research LLC. June 2022

Figure 2p: The process from S&P Global[23]

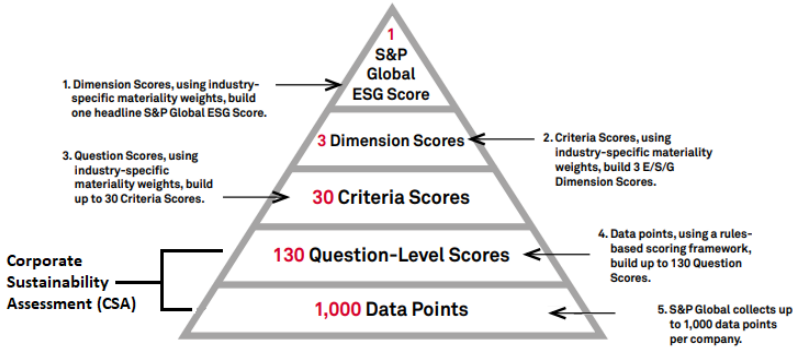


Figure 2q: Themes identified by S&P Global[24]

Pillars	Key Issues
Environmental	Climate Strategy
	Environmental Policy & Management Systems
	Environmental Reporting
	Operational Eco-Efficiency
	Product Sewardship
	Biodiversity
	Climate Strategy
	Food Loss & Waste
	Genetically Modified Organisms
	Packaging
	Sustainable Agricultural Practices
	Water Related Risks
	Transmission & Distribution
	Water Operations
Social	Addressing Cost Burden
	Corporate Citizenship & Philanthropy
	Financial Inclusion
	Health Outcome Contribution
	Human Capital Development
	Human Rights
	Labor Practic Indicators
	Occupational Health & Safety
	Social Reporting
	Strategy to Improve Acces to Drugs & Products
	Talent Attraction & Retention
	Stakeholder Engagement
	Privacy Protection
	Living Wage
Governance	Anti-Crime Policy & Measures
	Codes of Business Conduct
	Corporate Governance
	Customer Relationship Management
	Information Security/Cybersecurity & System Availability
	Financial Stability & Systemic Risk
	Innovation Management
	Marketing Practices
	Materiality
	Policy Influence
	Privacy Protection
	Product Quality & Recall Management
	Risk & Crisis Management
	Strategy for Emerging Markets
	Supply Chain Management

Contrary to most other players, **MS Sustainalytics** provides an ESG Risk Rating, rather than ESG score. This rating determines how much a business has exposure to unmanaged ESG risk which can have tangible financial impact. Disregarding or mismanaging ESG issues could sustain significant economic costs to companies and jeopardize their ability to earn long-term, sustainable profits. Therefore, this rating is used to measure the degree to which ESG risk could potentially impact the company's bottom line.

[23] Source: https://www.spglobal.com/esg/
[24] Source: https://www.spglobal.com/esg/

This risk score made of so called ‘exposure’, which evaluates the corporation exposure and weakness to ESG risks and ‘management’, which is what the company is currently doing to manage that particular risk. The ESG Risk Rating assessment blends the exposure score and the management score together into a single score that tells you how at risk a company’s enterprise value is from ESG issues (MS Sustainalytics, 2022).

Figure 2r: MS Sustainalytics rating methodology[25]

The final ESG Risk Ratings scores are known as unmanaged risk which is ESG risk that has not been managed by the corporation. This involves management gap, which is the risk that can be managed by the management but is currently not and unmanageable risk which is a risk that cannot be addresses in any way (MS Sustainalytics, 2022).

One key difference in ratings is how the final score is presented. Refinitiv categorizes scores into 12 buckets, ranging from D- (laggard) to A+ (leader), while MSCI categorizes scores into 7 buckets, from CCC (laggard) to AAA (leader).

[25] Source: https://www.sustainalytics.com/

Figure 2s: Refinitiv final rating scale

Score range	Grade	Description
0.0 <= score <= 0.083333	D -	'D' score indicates poor relative ESG performance and insufficient degree of transparency in reporting material ESG data publicly.
0.083333 < score <= 0.166666	D	
0.166666 < score <= 0.250000	D +	
0.250000 < score <= 0.333333	C -	'C' score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.
0.333333 < score <= 0.416666	C	
0.416666 < score <= 0.500000	C +	
0.500000 < score <= 0.583333	B -	'B' score indicates good relative ESG performance and above-average degree of transparency in reporting material ESG data publicly.
0.583333 < score <= 0.666666	B	
0.666666 < score <= 0.750000	B +	
0.750000 < score <= 0.833333	A -	'A' score indicates excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.
0.833333 < score <= 0.916666	A	
0.916666 < score <= 1	A +	

Figure 2t: MSCI final rating scale

Letter Rating	Leader/Laggard	Final Industry-Adjusted Company Score
AAA	Leader	8.571* - 10.0
AA	Leader	7.143 – 8.571
A	Average	5.714 – 7.143
BBB	Average	4.286 – 5.714
BB	Average	2.857 – 4.286
B	Laggard	1.429 – 2.857
CCC	Laggard	0.0 – 1.429

MS Sustainalytics rating are provided on a scale from Negligible to Severe, with lower (higher) scores indicating lower (higher) ESG risk. A negligible (severe) risk score is considered to have trivial (serious) risk of material financial impact driven by ESG factors. Finally, **S&P Global** scores are measured on a scale of 0 to 100, where 100 represents the maximum score.

Figure 2u: MS Sustainalytics final rating scale[26]*:*

[26] Source: https://www.sustainalytics.com/

2.8.3 Financial Materiality

ESG factors have varying levels of impact on a company's financial performance. MSCI ratings are based on industry categories defined by the SASB[27]., while MS Sustainalytics uses materiality metrics from the GRI[28], reflecting ESG issues of concern to stakeholders. The financial relevance of ESG factors can vary between sectors. For example, carbon emissions, waste, and water stress are significant to the Energy sector but not so much to the Financials sector, while the opposite is true for human capital, data security, and financial protection. The below table shows the MSCI sector materiality maps for the Financials (Figure 2v) and Energy sectors (Figure 2w).

Figure 2v: MSCI Sector Materiality Maps (Financials)

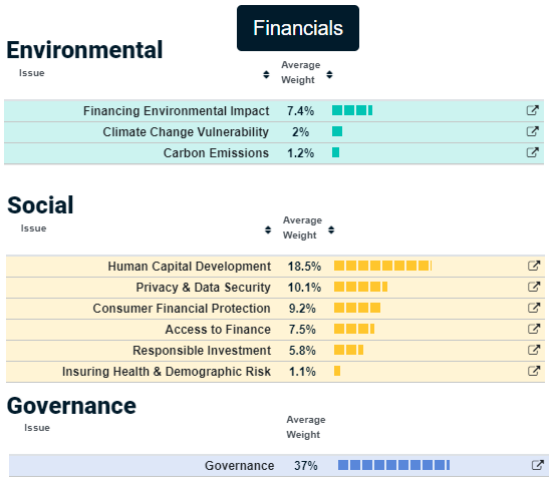
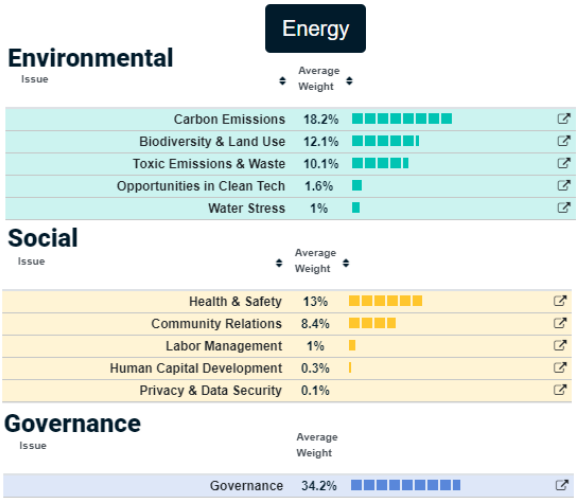


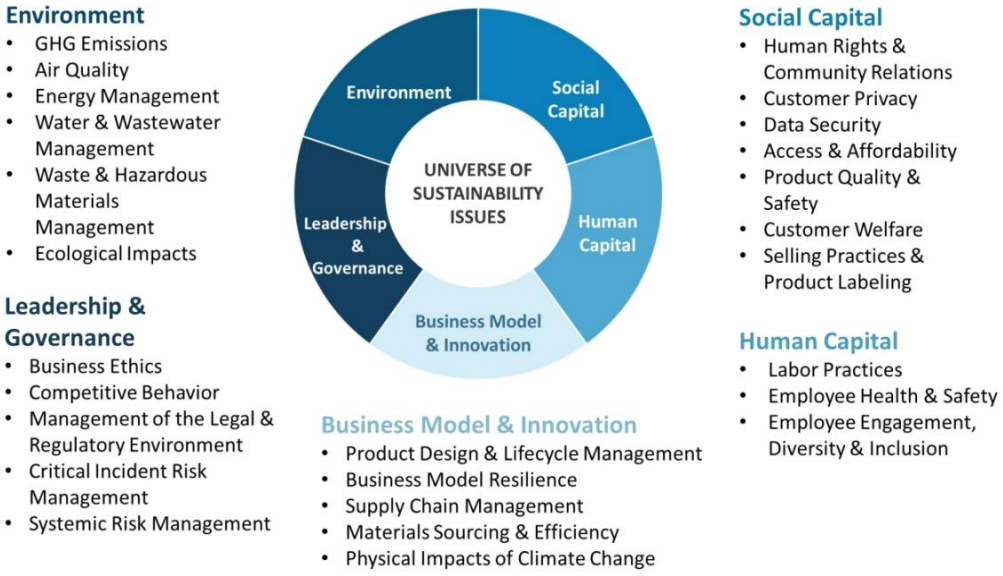
Figure 2w: MSCI Sector Materiality Maps (Energy)



[27] Sustainability Accounting Standards Board (SASB), provides guidance to guide materiality of metrics across industries, which in turn are used by ESG assessors
[28] Global Reporting Initiative (GRI), is an international standards organization, provides specific standards of reporting key sustainability metrics by industry, based on engagement with host of stakeholders and standard setters on sustainability issues.

SASB's ESG framework prioritizes financial materiality by assessing each industry's importance of each factor and subfactor based on the external environment and business model. SASB aligns with existing reporting standards and incorporates existing metrics when formulating accounting metrics. This materiality approach has significant impact on determining ESG ratings for different industries, including key metrics and their weighting. Despite this, dialogues with rating providers indicate a diverse range of views on the materiality of metrics.

Figure 2x: SASB materiality map[29]



2.8.4 Controversies

ESG providers also evaluate controversies that could harm a company's reputation. The rating assesses a company's ability to handle these risks. Some rating firms incorporate this risk into the overall ESG rating, while others offer it as a separate assessment. Refinitiv for instance, generates an ESG rating with controversies included as a separate rating from the standard rating. The main aim here is to discount ESG performance score based on global negative media stories and is done by incorporating the impact of significant and material controversies into the overall score. In order to decrease market cap bias for scandal coverage, large cap companies' stories are discounted compared to small cap due to a much higher media coverage.

[29] Boffo, R., and R. Patalano (2020), "ESG Investing: Practices, Progress and Challenges", OECD Paris

2.8.5 Judgement calls and factor weightings

Differences in ESG ratings can also stem from other methods used by the rating firms. Some rely on judgement calls to create indicators or interpret data, while others are more transparent and data-driven, using quantitative methods. For instance, Refinitiv and MS Sustainalytics are transparent about the specific weights of indicators affecting scores, while MSCI acknowledges using judgement to determine some category scores based on risk and impact on performance.

2.9 SCORING DIFFERENCES AND OUT-PERFORMANCE

2.9.1 Correlation

According to research (Berg, Kolbel & Rigbon, 2019), correlation among six different ESG research agencies for equities was on average 0.61. This is significantly low in comparison to the major credit rating agencies (Moody's, Fitch and Standard's & Poor's) with a correlation of 0.99 for the bond markets. The variation in ESG scores creates confusion and reduces the likelihood that higher ESG ratings directly correspond to better financial performance, diminishing their usefulness as an investment tool.

State Street Global Advisors (2019) [30] research highlights the common lack of consistency in ESG reporting and grading as a major challenge for stakeholders and investors. The study found that correlation between leading data providers can be as low as 0.47, with an average correlation of 0.59 among five providers (Figure 2y).

Figure 2y: Correlation matrix between different ESG rating providers

	Sustainalytics	MSCI	RobecoSAM	Bloomberg ESG
Sustainalytics	1	0.53	0.76	0.66
MSCI		1	0.48	0.47
RobecoSAM			1	0.68
Bloomberg ESG				1

An OECD study (Boffo & Patalano, 2020) [31] analyzed three ESG rating sources to determine variations in their ratings. Significant differences were found, with R^2 values of 0.21 and 0.18 for the S&P500 and STOXX 600 respectively (Figure 2z)

[30] The ESG Data Challenge, State Street Global Advisors. 2019
[31] Boffo, R., and R. Patalano (2020), "ESG Investing: Practices, Progress and Challenges", OECD Paris

Figure 2z[32]: Correlation for different providers (S&P 500, STOXX 600)

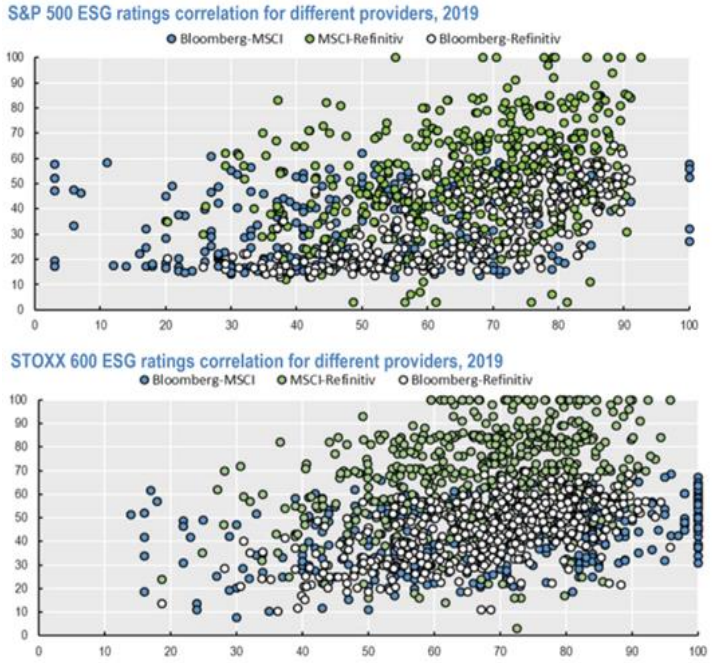


Figure 2aa is from another research (Berg, Koelbel, Pavlova & Rigobon, 2022) which compares correlations between several ESG rating agencies. Even in this case, it is pretty much clear that divergence in the outcome is quite strong. As a result, this hampers the motivation of companies to improve their ESG performance as there are mixed signals from rating agencies about what to focus on and what is valued in the industry.

[32] Providers' names in the legend correspond to the Y axis when at the left and to the X axis when at the right (e.g.: Bloomberg-MSCI: Bloomberg = Y axis, MSCI = X axis).

Figure 2aa[33]: Correlation matrix between different ESG data providers

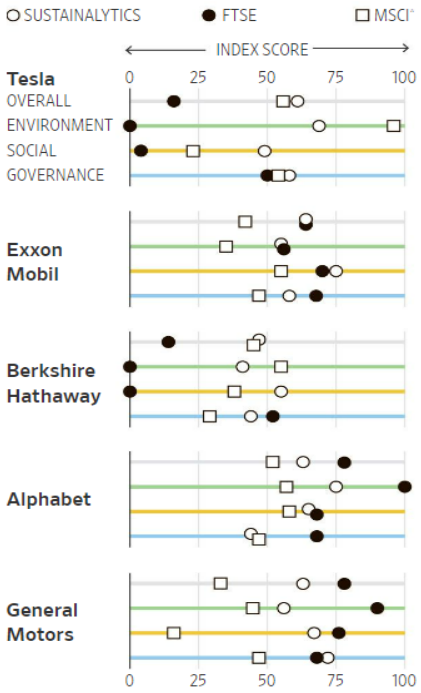
	ISS	Moody's	MSCI	Refinitiv	RepRisk	Sustainalytics	S&P Global	TVL
Eurozone								
ISS	1							
Moody's	0.65	1						
MSCI	0.47	0.50	1					
Refinitiv	0.56	0.63	0.42	1				
RepRisk	-0.24	-0.35	-0.07	-0.43	1			
S&P Global	0.50	0.59	0.39	0.63	-0.43	1		
Sustainalytics	0.26	0.31	0.39	0.23	0.18	0.22	1	
TVL	0.24	0.17	0.21	0.06	0.10	0.05	0.06	1
U.K.								
ISS	1							
Moody's	0.68	1						
MSCI	0.35	0.23	1					
Refinitiv	0.62	0.56	0.21	1				
RepRisk	-0.29	-0.31	0.05	-0.38	1			
S&P Global	0.55	0.64	0.18	0.68	-0.37	1		
Sustainalytics	0.23	0.18	0.39	0.10	0.17	0.16	1	
TVL	-0.02	-0.09	0.15	-0.04	0.30	-0.17	0.09	1
Japan								
ISS	1							
Moody's	0.61	1						
MSCI	0.38	0.41	1					
Refinitiv	0.56	0.69	0.34	1				
RepRisk	-0.21	-0.29	0.02	-0.36	1			
S&P Global	0.56	0.63	0.36	0.63	-0.34	1		
Sustainalytics	0.25	0.25	0.24	0.26	0.07	0.33	1	
TVL	0.07	0.11	0.10	0.10	0.11	0.06	0.05	1
U.S.								
ISS	1							
Moody's	0.70	1						
MSCI	0.40	0.38	1					
Refinitiv	0.63	0.68	0.36	1				
RepRisk	-0.33	-0.40	-0.10	-0.45	1			
S&P Global	0.59	0.63	0.31	0.64	-0.41	1		
Sustainalytics	0.14	0.08	0.23	0.18	0.12	0.10	1	
TVL	0.12	0.09	0.25	0.07	0.14	0.05	0.01	1

[33] Berg, Koelbel, Pavlova and Rigobon (2022), "ESG Confusion and Stock Returns: Tackling the Problem of Noise".

2.9.2 Score differences

As per figure 2ab (WallStreet Journal, 2018), three different rating agencies are scoring differently, sometimes quite drastically, the same company.

Figure 2ab: ESG scoring comparison[34]



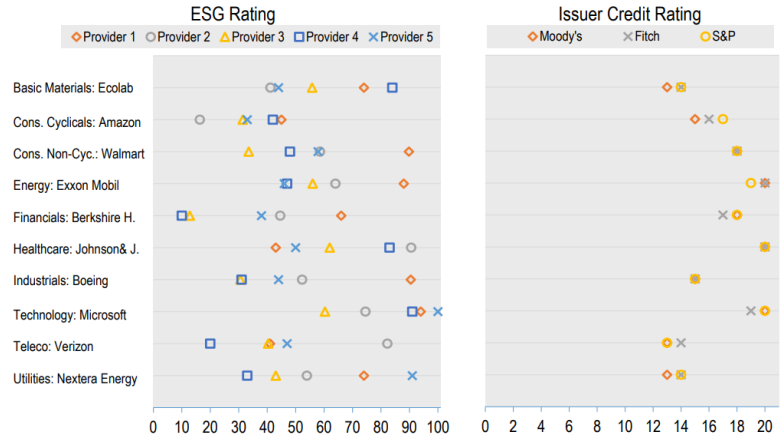
In this analysis, Tesla is being given an almost flawless environmental score by MSCI as it has chosen major topics for the car industry; namely carbon produced and clean technology. On the contrary, FTSE gave Tesla a “zero” ecological score because the analysis ignores emissions from its cars, rating only emissions from its factories. Difference in disclosure treatment also effects the different ratings. Furthermore, FTSE adopts a "worst-case" approach for scoring, meaning if no information is provided, a low score is given. Tesla provides little disclosure and in fact suffers greatly from FTSE’s approach on social issues. MSCI on the other hand assumes that if there is lack of disclosure, the company is currently operating in line with industry norms. This is reflective with a higher score compared to FTSE.

Exxon is rated highly by Sustainalytics, who places 40% weight on social issues and gives credit to the company for good employee and community policies. MSCI on the other hand rates Exxon lower as it gives a much lower weight (17%) to social issues and higher weight (51%) to the environment.

[34] Source: https://www.wsj.com/articles/is-tesla-or-exxon-more-sustainable-it-depends-whom-you-ask-1537199931

Berskshite Hatahaway also suffers on disclosure and is hence punished greatly by FTSE. MSCI rates Alphabet quite low especially in governance thanks to controlling shareholders and related party transactions, but score is also lifted thanks to strong approach on corruption and instability. FTSE here also takes an opposite approach, rating the company higher overall for governance but stating that the score was held back in part due to a weak anticorruption system and training. OECD (2020) research found that while ESG ratings from various providers vary widely, credit ratings of the same companies showed much less divergence (Figure 2ac).

Figure 2ac: ESG ratings and issuer credit ratings (2019)



Note: Sample of public companies selected by largest market capitalisation as to represent different industries in the United States. The issuer credit ratings are transformed using a projection to the scale from 0 to 20, where 0 represents the lowest rating (C/D) and 20 the highest rating (Aaa/AAA). Source: Refinitiv, Bloomberg, MSCI, Yahoo finance, Moody's, Fitch, S&P; OECD calculations

2.9.3 Performance Analysis

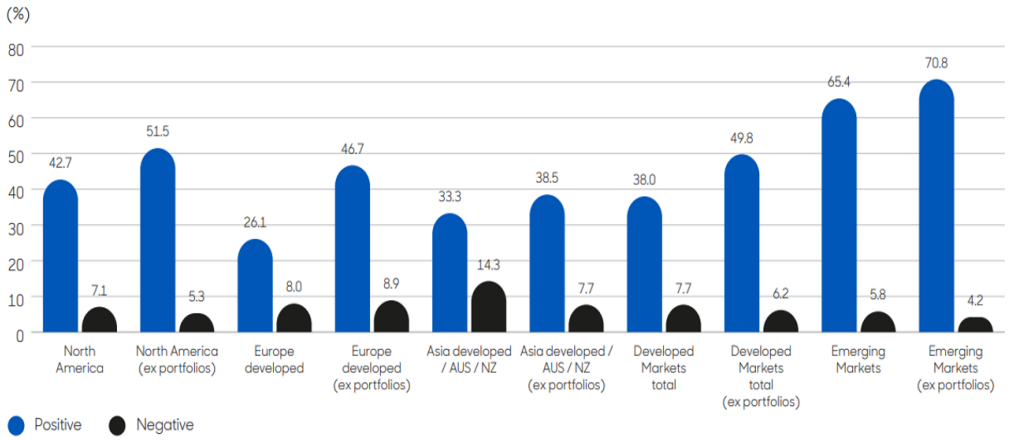
Research findings on the relationship between high ESG performance and positive financial performance are mixed. Some studies have found that high ESG rated companies tend to outperform their peers, while others have found no clear relationship. It's important to note that the results can vary based on the geographic region, the time period studied, and the ESG scoring methodology used.

A study by Cesarone, Martino and Carleo (2022)[35] identified that for US equity markets, a high ESG ranked portfolio generated out-performance whereas for EU markets, ESG criteria does not seem to help in performance. Another recent study by Pisani and Russo (2022)[36] comparing Sustainable Funds against the benchmark (MSCI Europe) clearly demonstrated that the funds with the higher ESG score where

[35] Cesarone, F.; Martino, M.L.; Carleo, A. *Does ESG Impact Really Enhance Portfolio Profitability*? Sustainability 2022
[36] Pisani, F.; Russo, G. Sustainable Finance and COVID-19: *The Reaction of ESG Funds to the 2020 Crisis*. 2021

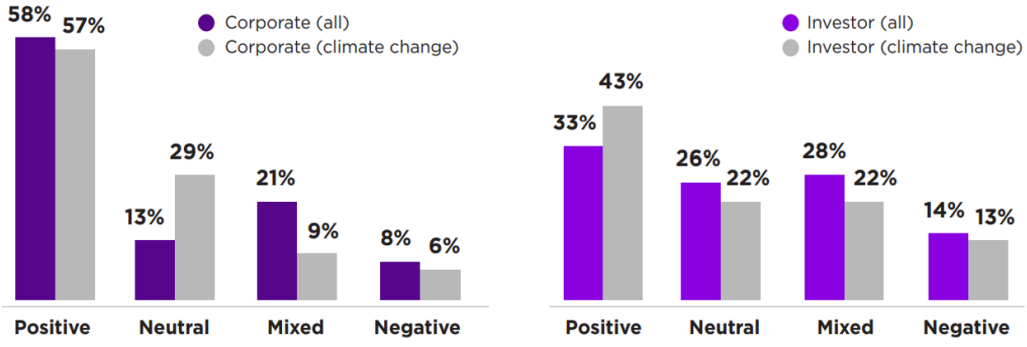
able to out-perform during the COVID 19 market turmoil in 2020. An Aberdeen Standard Life Asset Management[37] study concluded that higher quality companies, defined those with better ESG scores, provide better corporate financial performance. This can be seen in form of better profitability, return on equity, return on assets, dividends and other. As per Figure 2ad, this is more evident in Emerging economies. Better corporate financial performance is then expected to transcend into better share price performance over the longer term.

Figure 2ad: Relationship between ESG and corporate financial performance



A meta-analysis[38] (Figure 2ae) by NYU Stern Center for Sustainable Business supports the idea that ESG integration can have a positive impact on corporate financial performance and better risk-adjusted returns and downside protection for share prices. In fact, ESG integration provided better corporate performance (58% positive impact) and better shareholder return (59% superior or parallel returns).

Figure 2ae: Corporate and Investor Performance Study



Another study by the MSCI[39] revealed that during the period 2015-2019, corporations with strong ESG ratings largely exhibited a lower cost of capital compared to those corporations with weaker ratings. This was clear in both advanced and developing

[37] Source: https://www.abrdn.com/docs?editionId=e9849fef-1cc0-4bec-8b54-ccfadaffeea7
[38] NYU Stern Center for Sustainable Business and Rockefeller Asset Management collaborated to examine the relationship between ESG and financial/investment performance in more than 1,000 research papers from 2015-2020.
[39] Source: MSCI. https://www.msci.com/www/blog-posts/esg-and-the-cost-of-capital/01726513589

markets. Likewise, it was also established that higher ESG ratings imply lower cost of debt/equity for companies compared to lower rated one's.

Figure 2af: Cost of Capital, Equity and Debt relative to ESG scores

On the other hand, in the paper by La Torre and Mango (2020)[40], results showed that the Eurostoxx50 companies' performance does not seem to be affected by their efforts in terms of ESG commitments. Furthermore, in a recent study by the University of Chicago, using Sustainalytics ratings, researchers found that funds with the highest ESG scores underperformed lower ESG rated funds. Another controversial paper[41] which compared self-labelled ESG managed funds in the U.S. found out that these funds hold shares in companies with inferior track records for labor and environmental laws, relative to other non ESG funds managed by the same financial institution. Furthermore, the ESG driven funds also underperformed non ESG funds managed by the same manager, whilst charging higher fees (Raghunadan, Rajgopal, 2020).

As mentioned in the introduction, firms which sign the UN PRI are expected to improve their sustainable criteria. A study by the European Corporate Institute[42] seem to disqualify this. It found that ESG scores of companies which signed the UN PRI did not really see any improvement in ESG scores following the signings. Furthermore, there investment performance was worse-off, whilst having a higher risk, compared to non-UN PRI signatory firms.

[40] La Torre, Mango, Cafaro, Leo (2020) Does the ESG Index Affect Stock Return? Evidence from the Eurostoxx50. Sapienza University of Rome.
[41] Do ESG funds make stakeholder-friendly investments? Aneesh Raghunandan, London School of Economics and Shiva Rajgopal, Columbia Business School. May 2022.
[42] Brandon, Glossner, Krueger, Steffan. ESGI - Do Responsible Investors Invest Responsibly? 2020.

2.10 CRITIQUE AND ASSESSMENT OF LITERATURE

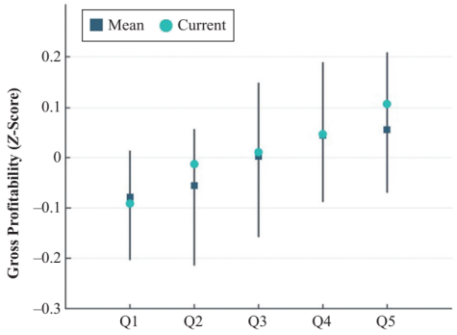
The most problematic issued that was faced when doing research on the topic was that different journals, academics, and industry experts often disagreed on the outcome of ESG benefits with respect to higher performance and lower risk.

Research conducted by Bank of America[43] and J.P. Morgan[44] shows that there is a robust correlation between superior ESG ratings and returns. Another study by Giese, Lee, Melas, Nagy and Nishikawa (2019) clearly demonstrated that risk, return and risk-adjusted return for MSCI ACWI ESG Leaders Index were "*significantly improved*" compared to the standard index. In fact, all risk measures for the ESG driven index (MSCI ACWI ESG Leaders Index) including value at risk (VaR), expected shortfall and other measures such as kurtosis for the period in question were better over the parent index (MSCI ACWI World). From a performance perspective, the study clearly demonstrated that at a global level, ESG integration led to lower risk and slight positive performance. The same study showed however that there is a regional difference between the final outcomes provided. While Emerging Markets have a low average ESG score with only a handful of shares having high scores, most of the ESG leaders observed outperformance. In the Developed world however, whilst there were more companies which had strong ESG scores, these registered poorer performance results. This is also significant for the U.S. (MSCI USA ESG Leaders Index) which as expected registered lower risk than its benchmark (MSCI USA), but a lower return too. These regional differences show that excluding companies with low ESG rating was not really a guarantee for out-performance (Giese, Lee, Melas, Nagy and Nishikawa. 2019).

Another paper by Gregory, Tharyan and Whittaker (2014) explains that companies with high ESG profiles have a strong competitive advantage thanks to more efficient use of resources, better human capital development, or better innovation management whilst they are also better at developing long-term business plans and long-term incentive plans for senior management. These companies thus use this advantage to generate better returns which ultimately leads to greater profitability (see figure 2g) and also paid higher dividends (see figure 2h).

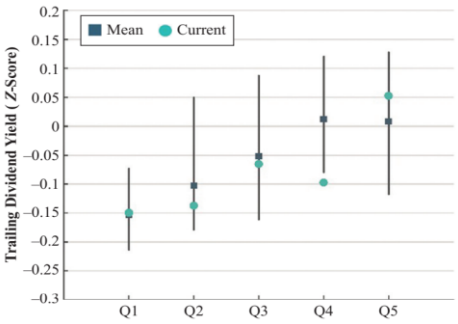
[43] Bank of America, Merrill Lynch, "ESG from A to Z: a global primer" 2019
[44] J.P. Morgan, ESG Investing 2016

Figure 2g[45]: Gross Profitability of ESG quintiles



Notes: Gross profitability (Z-score) of size-adjusted ESG quintiles is computed as most recently reported sales less cost of goods sold, divided by most recently reported company total assets. Data from January 2007 to May 2017. Average value over the period is represented by square dots; current exposure by round dots. The vertical bars represent the 5% to 95% range of observed values.

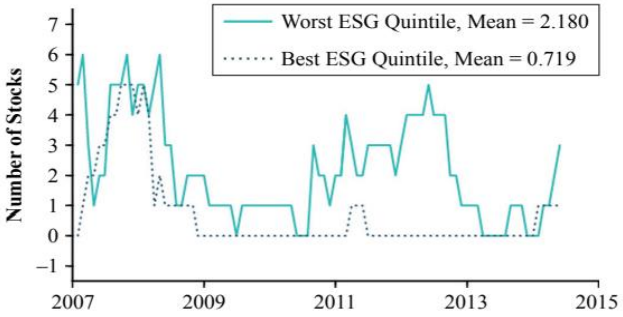
Figure 2h[46]: Trailing dividend yield of ESG Quintiles



Notes: Trailing dividend yield (Z-score) of size-adjusted ESG quintiles is computed by dividing the trailing 12-month dividend per share by the price at the last month end. Data from January 2007 to May 2017. Average value over the period is represented by square dots; current exposure by round dots. The vertical bars represent the 5% to 95% range of observed values.

Strong ESG profile is a common trait for better risk control. Research done by Godfrey, Merrill, and Hansen (2009); Jo and Na (2012); and Oikonomou, Brooks, and Pavelin (2012) explains that companies with strong ESG characteristics typically have above-average risk control and compliance standards across the company and within their supply chain management. Because of better risk control standards, high ESG-rated companies suffer less frequently from severe incidents (Figure 2i) such as fraud, embezzlement, corruption, or litigation cases that can seriously impact the value of the company and therefore the company's stock price (Hong and Kacperczyk 2009). A lower risk of frequent incidents leads to less stock-specific declines in the share price, making ESG integrated firms more attractive to investors.

Figure 2i: Incident Frequency for Best & Worst rated ESG stocks



Conversely there are studies that show a negative relationship between ESG scores and risk and returns. One of the main reasons is because rating agencies can provide different outcomes. Research by Berg et al (2019) suggests that ratings vary due to unique frameworks, different weighting mechanism, different methods which in turn

[45] Giese, G., Lee, L-E., Melas, D., Nagy, Z., Nishikawa, L., (2019). The journal of Portfolio Management- Foundations of ESG Investing: How ESG affects valuation, risk, and performance

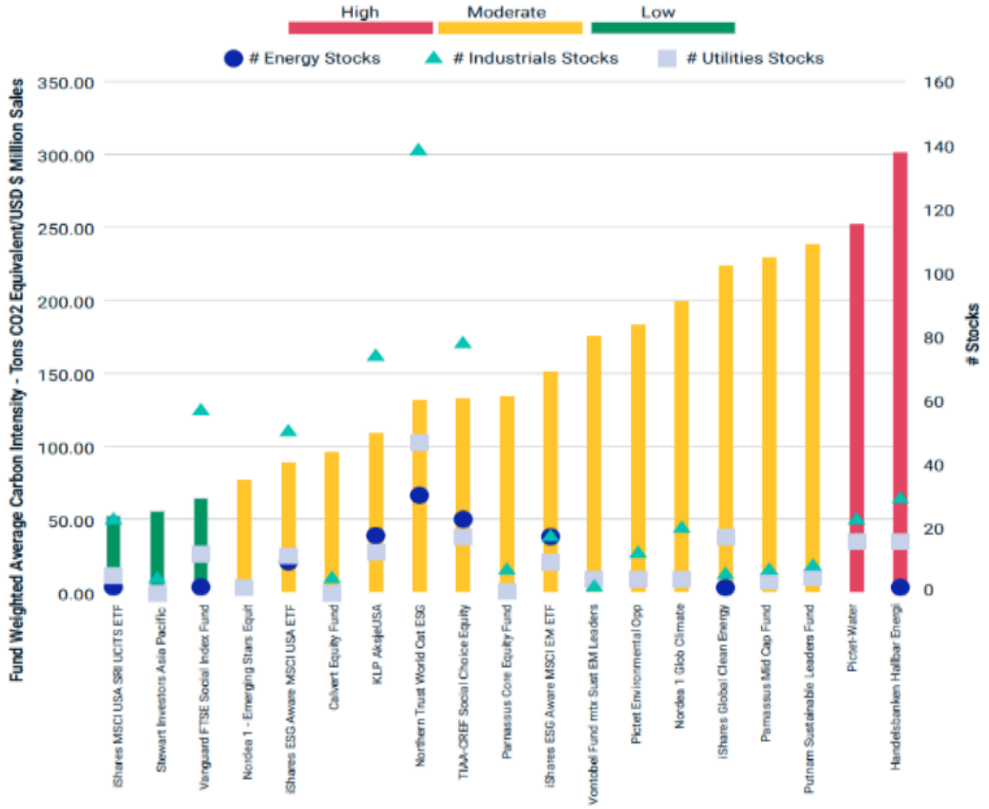
[46] Giese, G., Lee, L-E., Melas, D., Nagy, Z., Nishikawa, L., (2019). The journal of Portfolio Management- Foundations of ESG Investing: How ESG affects valuation, risk, and performance

provides different outcome. Another interesting study by Gibson et al. (2019) tries to understand how ESG rating differences affect stock returns. What they found was that the higher the difference between ratings given on the same stock, the higher the valuation of that stock thus lower overall earnings. Reports analyzed show that there is inconsistency and issues may be due different rating houses used, different geographical analysis and different timelines.

In another research by Bae, El-Ghoul, Gong and Guedhami (2020), using 1,750 U.S. firms, found no evidence that Corporate Social Responsibility (CSR) affected stock returns during the pandemic stock market crash (18th February – 20th March 2020). This finding holds in the post-crash period and across industries. The study suggest that pre-crisis CSR is not effective at protecting shareholder wealth from the adverse effects of a crisis, suggesting a potential disconnect between firms' CSR orientation (ratings) and actual actions.

Another issue is that ESG as a concept, is often associated mainly with the Environmental aspect especially due to the rise in the global agenda in the fight against climate change. Something crucial to keep in mind is that High ESG scores do not entirely mean low carbon emissions or better environmental qualities. Furthermore, by avoiding Energy stocks, which would include Oil & Gas majors, would not entirely decrease emissions. A study by MSCI found out that out of the 20 largest Funds with the highest ESG score, two have very high carbon emissions within their portfolio of stocks. Also, these funds do not hold energy stocks and thus carbon intensity can arise even from unconventional sources and in fact show higher emissions than funds that do hold energy stocks.

Figure 2j: Carbon footprint for the Largest ESG Funds[47]



[47] Source: MSCI

CHAPTER 3 – RESEARCH METHODOLOGY

3.1 INTRODUCTION

The Research philosophy addresses the research process and methodology. It provides framework for data collection and interpretation, guiding the selection of methods and techniques. It can be positivist, interpretivist, pragmatist, constructivist, critical, or realist in nature, and the choice of philosophy depends on the research question and the nature of the phenomenon being studied. The research philosophy influences the design of the study, the choice of methods, and the interpretation of results. It is important for researchers to be explicit about their research philosophy as it can influence the validity and reliability of their findings (Saunders, Lewis and Thornhill, 2019). The research philosophy helps guide the entire research process and affects the validity and reliability of results. Different research philosophies have different assumptions about knowledge, reality, and the role of the researcher, leading to different approaches to research design and data analysis (Crotty, 1998).

The chosen philosophy for this research is pragmatism as it involves a lot of value-driven research initiated by my own doubts and beliefs on ESG analysis. Furthermore, the research is based on quantitative data which provides practical solutions and outcomes (Saunders, Lewis and Thornill, 2019).

ESG is a major and prevalent subject on the global agenda which is affecting from top policy makers and officials to corporations and regulators, asset managers and the global population at large. This means that there were several challenges that had to be faced when conducting the necessary research due to the depth of the subject. As the topic in question has been evolving over time, preliminary research has been done not just on ESG and what it entails, but also on how it has been growing in importance and changing. Several governmental and NGO sources have been used to gain insight into the latest regulatory and industry best practices on the matter. During the research, several materials from fund management houses which specialise in sustainable investment together with intergovernmental agencies like OECD and the U.N. have been used. These will serve as the basis on how ESG criteria are currently considered in the investment management environment.

This research aims to evaluate the consistency and correlation of ESG scores provided by different independent agencies, and also examine the impact of ESG integration in portfolio management on financial performance relative to the broader market. By analysing the current ESG scoring mechanisms and comparing them, the research aims to provide insights into the usefulness of ESG scores as a tool for investment decisions.

For this analysis, four different portfolios have been constructed using ESG scores from MSCI, MS Sustainalytics, Refinitiv and S&P Global which are considered as leading independent institutions for ESG scoring mechanism. The data for portfolio construction and the relevant risk-return comparisons have been sourced from Bloomberg terminal.

3.2 RESEARCH DESIGN & DATA COLLECTION

The research methodology chosen was primarily quantitative in the form of ESG scores as provided by the independent research agencies and have been sourced directly from Bloomberg. In this research, the S&P 500 index will be utilised as the benchmark with which the ESG rated portfolios will be compared. S&P 500 underlying constituent data was sourced from Bloomberg and will be used as the starting point for the analysis and portfolio construction. The ESG rating agencies used for this study are Refinitiv, MorningStar Sustainalytics, S&P Global and MSCI.

A general aim among ESG rating agencies is to reduce risk. The theory is that a good ESG score ultimately enhances performance by decreasing risks associated with different environmental, social or governance factors. On this front, MSCI states that "*the ratings support ESG risk mitigation and long-term value creation*." Sustainalytics calculates "*the degree to which a company's economic value is at risk*" because of ESG factors. If these providers are correct in their thesis and accurate in their measurement, we should be able to observe a correlation between ESG ratings and subsequent performance and risk which would be directly and indirectly effected by factors such as financial performance or reduced likelihood of regulatory violations, litigation, or bankruptcy.

ESG ratings are reported in different ways by various ESG rating agencies to reflect a company's absolute or relative ESG risk or performance. Some use a 7-point scale from AAA to CCC (like MSCI) whilst others, like Refinitiv or S&P Global, use a scale from 1 to 100. This has been extensively explained in the Literature Review.

3.3 PORTFOLIO CONSTRUCTION

The starting point for the construction of the four portfolios was the S&P 500 index as at 30 June 2022. The first step was to decide how many stocks each portfolio will hold. It was decided to filter the S&P 500 index using Refinitiv and include the stocks which had a Refinitiv ESG score of B+ or above and thus ended up with a total of 256 stocks. The reason for choosing B+ and higher, rather than A or higher is because the portfolio would have then contained 142 stocks, with the substantial majority (40%) in the Information Technology (IT) sector thereby increasing concentration risk. IT firms by nature have high ESG scores as they easily score high for generating low levels of carbon emissions, physical waste and for creating people-oriented cultures and transparency. To keep the portfolios sector neutral as much as possible, it was decided to increase the sample of stocks, whilst also keep a strong ESG profile. As per Table 5[48], by using stocks rated B+ or more from Refinitiv, relative sector differentials against the benchmark are kept at a minimum.

Table 5 – Sector exposure differentials between ESG B+ (or higher stocks) and ESG A (or higher) stocks using Refinitiv

Sectors	ESG B+	S&P 500	Relative
Communication Services	8.8%	8.9%	0.0%
Consumer Discretionary	10.0%	10.6%	-0.6%
Consumer Staples	8.6%	6.9%	1.7%
Energy	3.8%	4.4%	-0.5%
Financials	6.1%	10.9%	-4.8%
Healthcare	15.3%	15.2%	0.2%
Industrials	7.7%	7.8%	-0.2%
Information Technology	31.0%	26.8%	4.2%
Materials	2.7%	2.6%	0.0%
Real Estate	3.3%	2.8%	0.5%
Utilities	2.7%	3.1%	-0.4%

Sector %	ESG A	S&P 500	Relative
Communication Services	1.5%	8.9%	-7.4%
Consumer Discretionary	10.8%	10.6%	0.2%
Consumer Staples	7.4%	6.9%	0.5%
Energy	3.6%	4.4%	-0.8%
Financials	6.6%	10.9%	-4.3%
Healthcare	17.4%	15.2%	2.2%
Industrials	5.1%	7.8%	-2.7%
Information Technology	40.0%	26.8%	13.2%
Materials	3.3%	2.6%	0.7%
Real Estate	2.0%	2.8%	-0.8%
Utilities	2.3%	3.1%	-0.8%

Since each rating agency has its own framework, and report the ESG scores in different manners, it was decided to have 256 stocks for each of the portfolios to somewhat have the same level of stock diversification. In this way, the differences in results between separate rating agencies will be more focused on their different approach to the scoring mechanisms rather than to the market efficiency.

[48] Data as at 30th June 2022. Source: Bloomberg, Refinitiv

For the MSCI ESG Portfolio, it was decided to use the first 256 stocks (out of 500 in the S&P 500 index) which ended up having an MSCI ESG rating between AAA and A. For the S&P Global ESG Portfolio, it was decided to use the first 256 stocks which ended up having an S&P Global ESG rating between 100 and 67. For the MS Sustainalytics ESG Portfolio, it was also decide to use the first 256 stocks which ended up having an MS Sustainalytics ESG rating between 7 and 21 (Negligible to Medium ESG Risk). As expected, different rating agencies rated certain stocks in a different manner, and in turn different shares were picked for each portfolio. Each portfolio, although having the exact same number of shares, ended up with different weightings and sector allocation which resulted in differences in performance and risk. This will be investigated over the next chapter.

Several metrices will be used to understand if these ESG portfolios will ultimately generate alpha against the market. These include total return, standard deviation, sharpe ratio, treynor ratio, information ratio, upside/downside capture and VaR. These statistics are very commonly used in the world of portfolio management and have also been used in previous studies when comparing performance including research by Gregory, A., R. Tharyan, and J. Whittaker (2014), Bae, KH., El Ghoul, S., Guedhami, O., (2021), Berg, F., Kölbel, J., and Rigobon, R., (2019), Boffo, R., and R. Patalano (2020) amongst others.

3.4 LIMITATIONS & RISKS

A key limitation of this dissertation had to do with data. The main data source for this study including the ESG scores for each stock within the four portfolios constructed was Bloomberg terminal. The platform in turn sources the information from the four different agencies which are utilised in this analysis mainly MSCI, MS Sustainalytics, Refinitiv and S&P Global. Bloomberg, although is a world-renowned source of high-quality data, sources the information directly from each rating agency which might increase the chances of errors. Another problem here was the fact that certain data points were not updated by the different agencies at the same time and hence might give rise to some discrepancies in the rating provided for each company.

As previously discussed, an assumption was used to utilise 256 stocks for all portfolios which was based on a B+ (or higher) ESG score from Refinitiv on the benchmark. It is

probable that we would have had a different set of underlying stocks and therefore different outcomes if for each portfolio, we would base the number of holdings on their own 'good' ESG rating. As an example, for MS Sustainalytics, one can include only stocks with Low or Negligble ESG risk only. This would have meant that instead of 256 stocks, we would have held 224 stocks. For MSCI, for instance, one would decide to hold stocks rated A or higher, which would mean having 293 stocks, rather than 256. For S&P Global, one could have held only stocks with a rating of 70 and over which would end up with 169 stocks, instead of 256. The problem with such approach, and thus an overall limitation, was that each rating agency has its own scoring methodology and classifications thereby comparison is difficult.

Another limitation of this comparative study was that, due to time constraints, only the most salient investment performance variables were considered. The analysis is based on a back-testing exercise using stocks constructed on recent[49] high quality ESG data scores. Therefore, it is assumed that the companies that have been chosen for the study would have been rated highly during all the time periods. In the real world, portfolio management is a constant exercise and market events can happen rapidly which can re-rate companies instantly.

Another limitation of this study was that we only have a period of 4.5 years of returns, which although it was considered since a lot of market events happened during the period, it might not have been long enough to factor in a typical long-term investment time horizon. One of the issues faced here was the fact that the ESG standards, frameworks, regulation, and effective rating system has only been around over the last couple of years and hence sourcing high quality long-term data would have not always been possible.

[49] 30/06/2022

CHAPTER 4 – COMPARATIVE ANALYSIS

4.1. INTRODUCTION

This chapter analyses in detail the four portfolios constructed based on high ESG scoring from the different rating agencies. The aim here is to understand how the portfolios are correlated, which are the riskiest and how did they perform against each other and the market index over time. Risk and return indicators taken into consideration were total return, relative return, standard deviation, downside risk, value at risk (VaR), tracking error, Sharpe ratio, Jensen alpha, Information ratio, Treynor measure and Upside/Downside market capture ratio.

Portfolios were constructed using data from Bloomberg terminal and the ESG rating agencies used were Refinitiv, S&P Global, MorningStar Sustainalytics and MSCI. The period in question for the analysis stretches between 1st January 2018 and 30th June 2022.

The period chosen was very eventful and thus gave rise to different market conditions which made a better test for portfolio resilience. 2018 proved more challenging than expected due to the escalation in the US-China trade conflict and first-rate hikes since the financial crises which impacted company profits. In 2019, markets recovered strongly and ended up positively as trade tensions eased, whilst economic growth and corporate earnings were better than expected. 2020 brought the worst global pandemic in over a century – countries announced severe lockdowns, travelling came to a halt, supply chains disrupted as global economies faced major repercussions. On this backdrop, equity markets heavily declined, and volatility shot up in the first part of the year. Markets eventually recovered strongly as economies re-opened and policy makers announcing unprecedented monetary and fiscal stimulus. 2021 was a year of uncertainty and anticipation in hopes for a return to normalcy following the pandemic with markets eventually continuing to climb even higher. In 2022, the first half of the year was characterized by Russia's invasion in Ukraine and a slowing economy, as central banks started to tighten aggressively. This led to weakness in market sentiment and rise in volatility, with the equity market falling the most in the past 40 years, during the first half of 2022. For the purpose of this analysis, the market benchmark index used is the S&P 500, which is represented by the AMUNDI S&P 500 UCITS ETF (500 FP). The currency used for all portfolios, including the market index is USD.

4.2 PORTFOLIO COMPARISON ANALYSIS

4.2.1 Allocation

As discussed in the previous chapter, the four created portfolios have 256 shares which include the following:

- *The Refinitiv Portfolio include equities that have a Refinitiv ESG score of B+ or higher*
- *The MS Sustainalytics Portfolio includes the first 256 equities which have a MS Sustainalytics ESG Risk Score between 7 and 21 (Negligible to Medium ESG Risk)*
- *The S&P Global Portfolio include the first 256 equities that have an S&P Global ESG rating between 100 and 67.*
- *The MSCI Portfolio includes the first 256 stocks which have an MSCI rating between AAA and A.*

Table 6 shows the relative sectorial differences of the portfolios with the benchmark. Although in the majority of the sectors, the differences are minimal, the Refinitiv Portfolio shows a clear bias towards Information Technology companies against mostly the more traditional Financials sector. The MS Sustainalytics and the MSCI portfolios also have a stronger exposure towards the IT sector which is however compensated for larger underweights in a spread of sectors. The S&P Global portfolio is on the other hand surprisingly slightly underexposed to the IT sector, with the largest overweight in healthcare.

Table 6: Relative sectorial exposure for the four portfolios constructed

Sectors	MSCI	S&P 500	Relative
Communication Services	6.2%	8.8%	-2.6%
Consumer Discretionary	7.9%	10.9%	-3.0%
Consumer Staples	8.2%	6.4%	1.8%
Energy	4.4%	4.6%	-0.2%
Financials	8.8%	11.1%	-2.3%
Healthcare	10.9%	14.2%	-3.3%
Industrials	7.9%	7.7%	0.2%
Information Technology	35.9%	27.6%	8.3%
Materials	2.8%	2.8%	0.0%
Real Estate	3.1%	3.0%	0.1%
Utilities	3.9%	2.9%	1.0%

Sectors	Refinitv	S&P 500	Relative
Communication Services	8.8%	8.9%	0.0%
Consumer Discretionary	10.0%	10.6%	-0.6%
Consumer Staples	8.6%	6.9%	1.7%
Energy	3.8%	4.4%	-0.5%
Financials	6.1%	10.9%	-4.8%
Healthcare	15.3%	15.2%	0.2%
Industrials	7.7%	7.8%	-0.2%
Information Technology	31.0%	26.8%	4.2%
Materials	2.7%	2.6%	0.0%
Real Estate	3.3%	2.8%	0.5%
Utilities	2.7%	3.1%	-0.4%

Sectors	S&P Global	S&P 500	Relative
Communication Services	9.2%	8.8%	0.4%
Consumer Discretionary	10.7%	10.9%	-0.2%
Consumer Staples	8.3%	6.4%	1.9%
Energy	3.2%	4.6%	-1.4%
Financials	7.7%	11.1%	-3.4%
Healthcare	18.4%	14.2%	4.2%
Industrials	7.5%	7.7%	-0.2%
Information Technology	26.8%	27.6%	-0.8%
Materials	3.0%	2.8%	0.2%
Real Estate	3.1%	3.0%	0.1%
Utilities	2.2%	2.9%	-0.7%

Sectors	MS Sustainalytics	S&P 500	Relative
Communication Services	6.2%	8.9%	-2.7%
Consumer Discretionary	9.4%	10.6%	-1.3%
Consumer Staples	4.5%	6.9%	-2.4%
Energy	3.2%	4.4%	-1.2%
Financials	13.1%	10.9%	2.2%
Healthcare	12.6%	15.2%	-2.6%
Industrials	6.8%	7.8%	-1.0%
Information Technology	35.7%	26.9%	8.9%
Materials	2.8%	2.6%	0.2%
Real Estate	3.8%	2.8%	1.0%
Utilities	2.1%	3.1%	-1.0%

Having a high exposure to the IT sector is very common in ESG driven portfolios since IT companies generally score very highly. One reason for this is that technology stocks are less likely to have a high number of environmental violations compared to for instance energy companies. Also ESG themed portfolios hold 27% more technology stocks on average than non-ESG themed funds (Raghunadan, Rajgopal, 2022[50]).

IT companies are known to keep sustainability at heart. As an example, Alphabet[51] issued a sustainable bond with proceeds used to help Black business leaders, companies impacted by the pandemic, green buildings and other causes. Apple is highly committed to produce products using only clean energy by 2030 whilst Amazon is hugely investing in renewable energy to reach net zero carbon emissions by 2040. In a survey conducted by KPMG[52], 57% of IT CEOs acknowledged that to achieve sustainable long-term success, the companies must look beyond financial growth and aligning ESG principles will provide better risk management. Furthermore, as most IT consumers are millennials, such segment does not only seek good prices with high quality, but also, they would expect high ESG standards. In fact, IT CEOs understand this with 74% of respondents believe that their policies need to reflect the values of their customers. IT companies also display a capacity to adapt faster to environmental and social changes than companies in other sectors. This happened during the pandemic with disruptions to their supply chains and operations as most businesses continued to operate smoothly.

With reference to Appendix tables A1-A4, it can be noticed that a couple of stocks in the IT sector that are amongst the top twenty companies of the S&P 500 benchmark, are also held in the respective portfolios with shares of Microsoft and NVIDIA predominant. Other equities which are an integral part of the benchmark and highly rated by all the agencies include Consumer Discretionary company Home Depot and Financials company Mastercard. UnitedHealth Group Inc, Proctor & Gamble Co. and Visa Inc. are also held in three out of four ESG rated portfolios.

[50] Raghunandan, A., Rajgopal, S. (2022) *Do ESG funds make stakeholder-friendly investments?* SSRN
[51] Source: https://blog.google/alphabet/alphabet-issues-sustainability-bonds-support-environmental-and-social-initiatives/
[52] Source: 2020 Technology Industry Innovation Survey

Appendix tables A5 – A8 show the top twenty holdings sorted by the highest ESG rating (lowest risk for MS Sustainalytics) within each portfolio constructed. As can be clearly noticed, the shares which have the highest ESG rating do not necessarily mean that they have the highest weight in the index or in the portfolio. This is because the portfolios have been constructed in a way to keep market risk as minimum as possible, whilst emphasising the highest ESG rated stocks.

Furthermore, it was noticed that some companies are rated differently by the rating agencies. Table 7 is a snapshot of the S&P 500 index sorted by the highest ESG ratings from Refinitiv. Additionally, ratings from the three other firms have also been listed for comparison purposes. As it can be clearly seen, although the substantial part of the stocks shown here (27) that have a high Refinitiv score, have a high or fairly high ESG score from other firms, there are a couple that show huge discrepancies. 3M Company (MMM) for example has an A+ rating from Refinitiv, AAA score from MSCI and an 89 score from S&P. It has however a high-risk score of 33.6 from MS Sustainalytics. A similar scenario is observed for Amazon (AMZN) whereby although it has a relatively high score of 87 (A) from Refinitiv, it is rated slightly more modest by S&P Global (71) and MSCI (BBB) whilst it is considered high risk from MS Sustainalytics. A considerable discrepancy can also be seen for Edison International which is rated A and BBB from Refinitiv and MSCI respectively but scored very low (40) by S&P Global.

Table 7: ESG Scoring differences[53]

Stock Name	Sector	% Wgt S&P 500 Index	Ticker	ID_ISIN	Refinitiv ESG Score	RefinitivESG Score Grade	S&P Global Scores	MS Sustain Risk Score	MS Sustain Risk	MSCI
MICROSOFT CORP	Information Technology	6.0	MSFT UW Equity	US5949181045	93	A+	97	13.6	Low	AAA
3M CO	Industrials	0.2	MMM UN Equity	US88579Y1010	92	A+	89	33.6	High	AAA
PEPSICO INC	Consumer Staples	0.7	PEP UW Equity	US7134481081	90	A	67	15.9	Low	AA
WALGREENS BOOTS ALLIANCE INC	Consumer Staples	0.1	WBA UW Equity	US9314271084	89	A	85	18.4	Low	A
HEALTHPEAK PROPERTIES INC	Real Estate	0.0	PEAK UN Equity	US42250P1030	89	A	93	9.8	Negligible	AA
ANTHEM INC	Healthcare	0.3	ANTM UN Equity	US0367521038	89	A	96	11.6	Low	A
HUMANA INC	Healthcare	0.2	HUM UN Equity	US4448591028	89	A	93	22.9	Medium	A
INTEL CORP	Information Technology	0.5	INTC UW Equity	US4581401001	89	A	90	16.7	Low	AA
PHILIP MORRIS INTERNATIONAL	Consumer Staples	0.5	PM UN Equity	US7181721090	89	A	83	23.8	Medium	BBB
WASTE MANAGEMENT INC	Industrials	0.2	WM UN Equity	US94106L1098	88	A	100	16.7	Low	A
AGILENT TECHNOLOGIES INC	Healthcare	0.1	A UN Equity	US00846U1016	88	A	95	15.3	Low	AA
CISCO SYSTEMS INC	Information Technology	0.6	CSCO UW Equity	US17275R1023	87	A	100	12.1	Low	AA
S&P GLOBAL INC	Financials	0.4	SPGI UN Equity	US78409V1044	87	A	100	14.4	Low	AA
KINDER MORGAN INC	Energy	0.1	KMI UN Equity	US49456B1017	87	A	85	18.5	Low	A
NEWMONT CORP	Materials	0.2	NEM UN Equity	US6516391066	87	A	100	23.5	Medium	AA
AMAZON.COM INC	Consumer Discretionary	3.0	AMZN UW Equity	US0231351067	87	A	71	30.2	High	BBB
TARGET CORP	Consumer Discretionary	0.2	TGT UN Equity	US87612E1064	87	A	83	14.8	Low	AA
LINDE PLC	Materials	0.5	LIN UN Equity	IE00BZ12WP82	86	A	99	8.2	Negligible	A
LOWE'S COS INC	Consumer Discretionary	0.4	LOW UN Equity	US5486611073	86	A	86	11.5	Low	AA
CBRE GROUP INC - A	Real Estate	0.1	CBRE UN Equity	US12504L1098	86	A	96	7.0	Negligible	AAA
JOHNSON & JOHNSON	Healthcare	1.4	JNJ UN Equity	US4781601046	86	A	78	25.1	Medium	BBB
REALTY INCOME CORP	Real Estate	0.1	O UN Equity	US7561091049	86	A	70	14.3	Low	BBB
CADENCE DESIGN SYS INC	Information Technology	0.1	CDNS UW Equity	US1273871087	86	A	81	13.1	Low	AA
TEXAS INSTRUMENTS INC	Information Technology	0.4	TXN UW Equity	US8825081040	85	A	80	20.3	Medium	AAA
HEWLETT PACKARD ENTERPRISE	Information Technology	0.1	HPE UN Equity	US42824C1099	85	A	98	11.9	Low	AAA
BAKER HUGHES CO	Energy	0.1	BKR UW Equity	US05722G1004	85	A	81	21.3	Medium	AA
EDISON INTERNATIONAL	Utilities	0.1	EIX UN Equity	US2810201077	85	A	40	27.4	Medium	BBB

[53] Source: Bloomberg, Refinitiv, S&P Global, MS Sustainalytics, MSCI. Data as at 30.06.22

4.2.2 Portfolio ESG Scoring Summary

Table 8 shows a summary of the ESG data for each portfolio. As expected, each portfolio scored very well using its own rating methodology with the Refinitiv ESG Portfolio scoring 78.9 (A-), which indicates an excellent ESG performance and high degree of transparency in reporting ESG material. The MS Sustainalytics ESG Portfolio also scored well with a low weighted risk score of 15.5 indicating a low ESG risk. The S&P Global ESG Portfolio had an excellent score at 85.9 whilst MSCI ESG Portfolio also scored well at 7.5 (AA). Each portfolio also registered strong own scores relative to the benchmark.

Interestingly however, each portfolio scored relatively worse using other rating agencies methods. The Refinitiv ESG Portfolio scored 20.8 using MS Sustianlytics method thus listed with Medium ESG risk, whilst registered a score of 6.6 (A) and 75.6 using MSCI and S&P Global methodologies respectively. The MS Sustainalytics ESG Portfolio registered a Refinitiv score of 71.9 (B+), 71.3 (S&P Global) and 6.9 (A) for MSCI. The S&P Global Portfolio registered an even worse Refinitiv score of 67.3 (B+), a medium risk (20.6) score for MS Sustainaltytics and 6.5 (A) for MSCI. Finally, the MSCI Portfolio scored the second best Refinitiv score at 74.8 (B+), the second-best MS Sustainalytics score at 19.7 (low) and the second-best S&P Global score at 78.5.

Table 8: ESG scores analytics[54]

	S&P 500 (benchmark)	Refinitv ESG Portfolio	MS Sustainalytics ESG Portfolio	S&P Global ESG Portfolio	MSCI ESG Portfolio
No of Holdings	500	256	256	256	256
Top 20 Holdings Weight	36.7%	47.1%	51.2%	44.4%	41.6%
Average Weight	0.20%	0.39%	0.39%	0.39%	0.39%
Median Weight	0.08%	0.16%	0.15%	0.17%	0.18%
IT Sector Exposure	27.6%	31.0%	35.7%	26.8%	35.9%
Refinitiv ESG Data					
Average ESG Score	64.6	76.4	65.1	67.9	68.8
Median ESG Score	67.3	76.1	67.9	69.1	70.3
Weighted ESG Score	*71.2*	***78.9***	*71.9*	*67.3*	*74.8*
MS Sustainalytics ESG Data					
Average ESG Risk Score	21.5	20.9	15.9	20.4	20.3
Median ESG Risk Score	21.0	20.9	16.0	19.9	19.6
Weighted ESG Risk Score	*21.3*	*20.8*	***15.5***	*20.6*	*19.7*
S&P Global ESG Data					
Average ESG Score	66.5	75.9	69.9	84.5	75.6
Median ESG Score	68.0	79.0	72.0	84.0	78.0
Weighted ESG Score	*70.5*	*75.6*	*71.3*	***85.9***	*78.5*
MSCI ESG Data					
AAA	10.1%	14.1%	18.7%	15.61%	19.4%
AA	19.2%	21.5%	24.3%	21.50%	36.7%
A	32.5%	31.7%	36.1%	25.55%	43.9%
BBB	27.1%	26.5%	14.0%	31.10%	0.0%
BB	7.7%	4.3%	6.4%	4.24%	0.0%
B	2.6%	1.7%	0.1%	1.79%	0.0%
CCC	0.0%	0.2%	0.5%	0.21%	0.0%
Weighted Averag ESG Rating	*6.2 (A)*	*6.6 (A)*	*6.9 (A)*	*6.5 (A)*	***7.5 (AA)***

4.2.3 Correlation

The study also calculated the correlation between the ratings being given by each rating agency for all the individual companies within the S&P 500. Since each rating agency provides different output numbers, these have been grouped together using a 10-point scoring mechanism[55]. For Refinitiv and S&P Global, which rate stocks from 0 (the lowest) to 100 (the highest), a 10-point scoring system was used to score each stock. For MS Sustainalytics, which scores ESG risk from 0 (negligible risk), which is a positive score, to 100 (severe risk), which is a negative score, the same system was used but in reverse order. MSCI ratings data was only available in letter format and thus it was decided to group each of the seven letter ratings into an average scoring system from 0 to 10 using the MSCI average scoring table (refer to Figure 2t MSCI final rating scale).

[54] For explanation of the scores, please refer to Literature review section 2.8.
[55] More information is provided on the Appendix pg. 99

Table 9 confirms previous studies[56] that correlation between ESG rating agencies is not very strong. The highest correlation is between Refinitiv and S&P Global at 0.48, which makes sense when looking at the risk and return data in section 4.2.5. The lowest correlation is consistently found with MS Sustainalytics which can also be attributed to the fact that the rating focus is ESG vulnerability or susceptibility to ESG risk compared to the other raters which focus more on both opportunities and challenges.

Table 9: Correlation between portfolios

	MSCI	Refinitiv	S&P Global	MS Sustainalytics
MSCI	**1.00**			
Refinitiv	0.26	**1.00**		
S&P Global	0.31	0.48	**1.00**	
MS Sustainalytics	0.19	0.18	0.22	**1.00**

4.2.4 Portfolio Performance[57]

Period: 01/01/2018 – 30/06/2022 (Full period)

With regards to investment performance, during the period between 1st January 2018 and 30th June 2022 all the four ESG constructed portfolios managed to strongly beat the benchmark[58]. The Refinitiv ESG Portfolio generated a total return of 107.21% whereas the market benchmark (S&P 500) generated a total return of 51.84%. This means an out-performance of 55.37%. The MS Sustainalytics ESG Portfolio generated a total return of 114.38% meaning an out-performance of 62.54%. The MSCI ESG Portfolio generated a total return of 128.02% meaning an out-performance of 76.81%. The S&P Global ESG Portfolio generated a total return of 102.20% meaning an out-performance of 50.36% against the benchmark.

Period: 31/12/2019 – 31/12/2020 (Covid Pandemic Period)

Figures A5 – A8 on the Appendix show the performance during 2020 when the world was hit by the coronavirus pandemic which brought travelling to a halt, supply chains heavily disrupted, global lockdowns and with major repercussions on world economies. When the first major lockdowns were announced and the World Health Organisation (WHO) declared COVID as a pandemic in February 2020, equity markets faced an aggressive sell-off. The heavy decline was then followed by a strong

[56] Refer to page 56, section 2.9.1 Correlation
[57] All returns quoted are in USD terms and in total returns
[58] For full charts, refer to Appendix figures A1 – A12

market rally as economies started to re-open as lockdowns were eased and eventually removed and countries started to return to some sort of normality. Central Banks in the U.S. and the E.U. remained highly accommodative and governments enacted unprecedented stimulus.

During the initial period of the year, all the four ESG portfolios declined heavily as the market indicating a strong correlation. The Refinitiv ESG Portfolio was also the only one, although for a short period, underperforming for the year. This did not last long as when markets started to recover, the portfolios started to deliver higher returns and ended up the year out-performing greatly. In fact, the Refinitiv ESG Portfolio made 29.22% for the period whilst the benchmark made 17.56% thereby a relative return of +11.66%. The MS Sustainalytics ESG Portfolio generated a total return of 32.21% outperforming the benchmark by +14.65%. The MSCI ESG Portfolio generated the highest total return during the period of 38.42% outperforming the benchmark by +20.86%. The S&P Global ESG Portfolio generated the lowest total return during the period of 27.72% outperforming the benchmark by +10.16%.

Period: 31/12/2021 – 30/06/2022 (Stagflation, Ukraine War, Rate Hikes)

2022 started with a post-COVID global economic recovery which was gathering momentum and supply bottlenecks were beginning to ease. Inflation was rising but initially central banks were reluctant to raise rates and inflation was seen as transitory. Markets however started to decline heavily in January as Russian-Ukraine tensions escalated and war broke out. As Russia invaded Ukraine, a new supply chain crisis ensued with crude oil touching $129 in March. Inflation continued to increase at an alarming rate and both stocks and bonds suffered massive losses whilst global economic activity declined. To combat inflation, central banks around the globe started increasing rates at a fast pace, markets continued to plunge, and volatility pursued. During such difficult period, all portfolios recorded negative returns but still managed to out-perform the market. The Refinitiv ESG Portfolio returned -16.03% for the period whilst the benchmark made -20.72% thereby a relative return of +4.68%. The MS Sustainalytics ESG Portfolio returned -18.61% thereby outperforming the benchmark by +2.10%. The MSCI ESG Portfolio returned -16.98% thereby outperforming the benchmark by +3.74%. The S&P Global ESG Portfolio returned -15.93% thereby outperforming the benchmark by +4.78%.

4.2.5 Performance Summary

Table 10: Total Return summary during different periods[59]

TOTAL RETURN ($)	*Staglation, Ukraine War, Rate Hikes Period (6 months)*	*COVID Pandemic Period (1 Year)*	*Full Period (4.5 years)*	*Annualised Returns (4.5 Years)*
Portfolio Name	31/12/2021 - 30/06/2022	31/12/2019-31/12/2020	01/01/2018 - 30/06/2022	
S&P 500 (benchmark)	-20.7%	17.6%	76.8%	13.1%
Refinitiv Portfolio	-16.0%	29.2%	107.2%	17.1%
MS Sustainalytics Portfolio	-18.6%	32.2%	114.4%	18.0%
MSCI Portfolio	-17.0%	38.4%	128.0%	19.6%
S&P Global Portfolio	-15.9%	27.7%	102.2%	16.5%

During the full period of the analysis, all the four portfolios managed to beat the benchmark with the MSCI ESG Portfolio generating the highest returns and the S&P Global ESG Portfolio reporting the least. Similar results were reported in the COVID pandemic period with the MSCI ESG Portfolio generating the highest return and the S&P Global ESG Portfolio generic the lowest. In the negative period of the analysis (31/12/2021 – 30/06/2022), the portfolios also managed to beat the benchmark but, in this case, S&P Global managed to register the lowest decline with MS Sustainalytics ESG Portfolio registering the highest decline.

[59] Source: Bloomberg, MSCI, MS Sustainalytics, Refinitiv. As at 30/06/22.

4.2.6 Risk and Return Statistics

Table 11 illustrates the risk and return statistics from all the four portfolios.

Table 11: Risk and return statistics during different periods[60]

Risk/Return Statistics	Short Term - Year to Date (30/06/2022)				Long Term - Full Period (4.5 years)			
	Refinitiv	MS Sustainalytics	MSCI	S&P Global	Refinitiv	MS Sustainalytics	MSCI	S&P Global
Standard Deviation (Annualised)	23.81	24.64	36.06	23.80	22.53	23.03	24.51	22.41
Downside Risk (Annualised)	17.35	17.67	26.83	17.40	16.67	16.99	18.21	16.54
VaR 95% (ex-post)	-2.81	-2.88	-3.42	-2.84	-2.07	-2.11	-2.19	-2.10
Tracking Error (Annualised)	2.42	2.96	3.61	2.69	2.17	2.88	3.12	2.49
Sharpe Ratio	-1.19	-1.32	-1.31	-1.18	0.90	0.91	1.20	0.86
Jensen Alpha	4.68	2.10	3.70	4.80	7.85	8.27	12.87	7.00
Information Ratio	4.08	1.13	4.87	3.76	3.22	2.63	3.70	2.48
Treynor Measure	-0.30	-0.33	-0.45	-0.30	0.20	0.20	0.28	0.19
Downside/Upside Capture Ratio	77.4	89.8	81.9	76.9	139.6	148.9	166.7	133.1

Standard Deviation

Over the short-term period, S&P Global, Refinitiv and MS Sustainalytics ESG Portfolios have a similar risk pattern whilst MSCI ESG Portfolio is shown to be the most volatile and risky. As we have seen, MSCI registered the highest decline in returns over this volatile period which ties in with the highest standard deviation figure and lower predictability of returns. Over the long term, similar results are analysed however this time round, MSCI had a standard deviation similar to the other four portfolios as volatility is smoothened out. S&P Global ESG Portfolio registered the lowest risk over all time periods which is in line to lowest decline for the first six months of 2022 and the lowest overall return over the full period.

Downside Risk

As expected, a portfolio with a higher standard deviation (risk) will also have the highest downside risk. In this case, MSCI has the highest potential loss in value during market turmoil. The other three portfolios have a similar downside risk figures with S&P Global again with the lowest numbers over the longer term.

Var 95%

All the portfolios have a 95% confidence that over the longer term, the losses will not be larger than 2.07%-2.19% in any one day. This shows that although different ESG metrics have been used, over time the risk is somewhat balanced out. Over the short

[60] Short term refers to the period between 31/12/2021 – 30/06/2022 whilst long term refers to the period between 01/01/2018 – 30/06/2022. Data source: Bloomberg

term however, we can notice that as per previous data points, MSCI has the highest probability of loss with a 95% confidence that losses will be not larger than 3.42% in any given day.

Tracking Error

As expected, even here the MSCI ESG Portfolio has had the highest tracking error compared to the other three portfolios both over the short and long term. This goes hand in hand with the highest risk and highest return figures registered over the period. The lowest tracking error was registered for the Refinitiv ESG Portfolio, both over the short- and long-term periods. This comes somewhat surprising since data shows that it was the S&P Global ESG Portfolio the least risky with the lowest standard deviation and lowest downside risk. What this might mean is that stock selection for Refinitiv resulted in better risk adjusted returns thereby Refinitiv's ESG scoring mechanism provided better risk-return trade-off.

Sharpe Ratio

Over the short-term period, all the four portfolios registered a negative sharpe ratio which indicates that a risk-free asset generated better returns. Interestingly, the worst faring portfolio here was the MS Sustainalytics ESG Portfolio which registered a slightly lower result than MSCI. During the full period, the best Sharpe ratio registered was for the MSCI portfolio at 1.20 which tells us that the portfolio had the better risk-adjusted returns. In other words, the higher returns obtained over the longer term were obtained without too much additional risk. The worst faring portfolio was the S&P Global ESG Portfolio with the lowest ratio. Therefore, although this portfolio had the lowest risk associated with it (as noted earlier), portfolio selection, and thereby returns, was not optimal for the level of risk attained.

Jensen Alpha

During the short-term period, the worst faring portfolio was the MS ESG Sustainalytics Portfolio, with the lowest out-performance whilst the better faring portfolio was the S&P Global, with the highest over-performance against the benchmark. For the full period in the study, MSCI portfolio came out with the highest ratio with S&P Global registering the lowest figure. In other words, the MSCI portfolio was the better portfolio to consistently out-perform the benchmark after adjusting for risk with S&P Global portfolio being the worst.

Information Ratio

During both the short- and long-term period, the MSCI ESG Portfolio managed to register the better ratio which compares excess return versus the benchmark to total risk. This ratio shows that the high ESG rated stocks found in this portfolio performed the best relative to the level of risk taken. A high information ratio shows a higher outperformance against the benchmark generated per unit of risk. The other three portfolios all generated a strong positive ratio over all periods with the worst being MS Sustainalytics for the short term and S&P Global for the longer term.

Treynor Measure

This measure is very useful for highly diversified portfolios as Treynor ratio only penalises funds for risk that cannot be diversified away. During the longer term, the MSCI Portfolio had the highest ratio which indicates a higher return generated per unit of risk with the S&P Global Portfolio registering the lowest ratio. Over the short period, all the portfolios had a negative ratio which indicates that the portfolios performed worse than a riskless asset.

Upside/Downside Capture Ratio

During the short-term period when markets fell, all the portfolios outperformed as their downside capture ratio was lower than 100. The portfolio with the best downside capture ratio during this period was the S&P Global ESG Portfolio (76.9) which indicates that although the portfolio lost value, the decline captured was less than that of the benchmark.

During the long-term period, when markets rallied, all the portfolios outperformed as their upside capture ratio was higher than 100. The portfolio with the best upside capture ratio was the MSCI Portfolio (166.7) which indicates that the portfolio captured more upside than the benchmark.

Figure 4a is a scatter diagram which plots total returns against standard deviation (risk) annualised over the full period. As mentioned in the previous sections, we can notice that all the four ESG based portfolios from different rating providers generated higher returns, with higher risk compared to the benchmark. The Refinitiv and S&P Global ESG Portfolios generated very similar returns with similar risk levels whilst the MSCI ESG Portfolio registered the highest returns with the highest levels of risk.

Figure 4a: Risk/Return chart – Full period

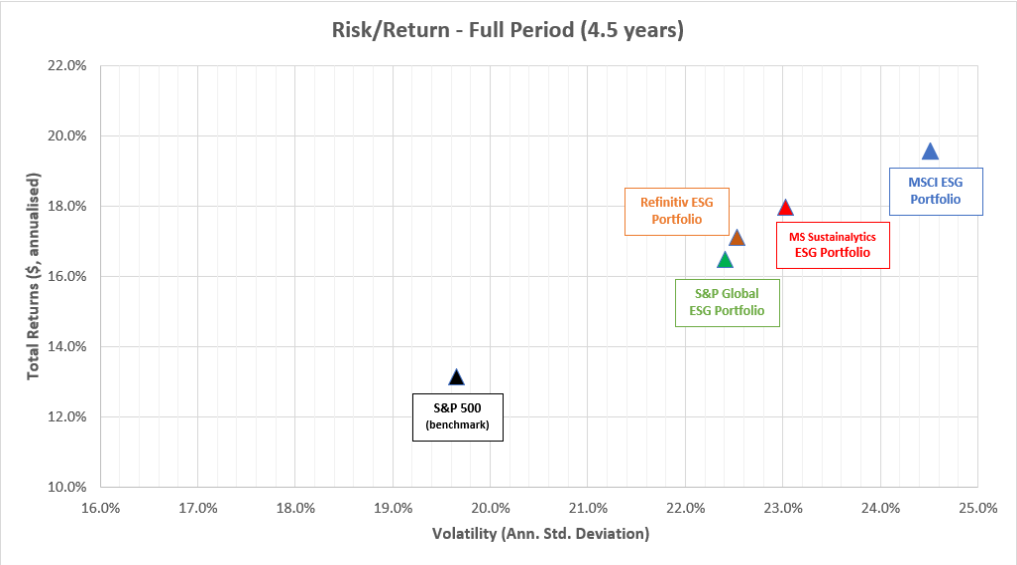
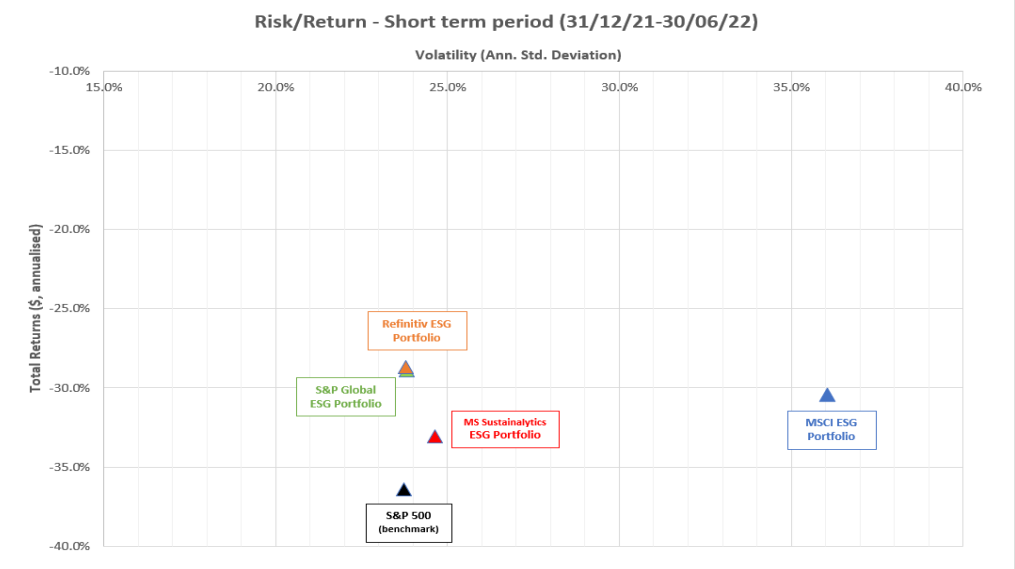


Figure 4b shows annualised risk and return over the short-term period which experienced very high volatility and market turmoil. In this case, all the four portfolios declined in value but still managed to out-perform the market. The best risk-return trade-off was made by the Refinitiv and S&P ESG Global Portfolios as they had a similar risk level to the benchmark and the lowest decline in value.

Figure 4b: Risk/Return chart – Short-Term period



4.3 CONCLUDING REMARKS

The general assumption about ESG integration is that good quality companies will ultimately provide better share price performance as risks associated with ESG are diminished. In this study it turned out to be true since all the four portfolios managed to out-perform the benchmark with better risk-adjusted[61] returns.

In fact, the research question has been answered in a positive manner in the sense that the study shows that constructing a portfolio with high ESG scores, from different rating providers, provided alpha during both up and down markets. This is consistent with previous research made on the subject by scholars Martino & Carleo (2022) and Pisani & Russo (2022) whereby high ESG ranked portfolios generated out-performance. This was also verified in a previous meta-analysis by the NYU Stern Center which concluded that ESG integration in firms provided better corporate and financial performance.

Alpha generation did however come at a cost due to the higher volatility experienced during certain times for some of the portfolios constructed. Some of this risk comes naturally from the concentration risk in these portfolios due to the fact that they have lower number of holdings (256) against the 500 of the benchmark. Furthermore, the Refinitiv, MS Sustainaltyics and MSCI ESG Portfolios all have significant overweights in the Information Technology sector. This provided better returns during times when interest rates were low since IT companies generally gain during such times due to the growth style nature of the sector. On the other hand, although the portfolios did suffer when during 2022, interest rates started to increase drastically, they still managed to outperform the benchmark.

During the full period of the analysis, that is from 01/01/2018 up to 30/06/2022, the MSCI ESG Portfolio generated the best returns (+128.0%) whilst the S&P Global ESG Portfolio generated the worst results (+102.2%). Same results were observed during the COVID pandemic period (31/12/2019 – 31/12/2020), with the MSCI ESG Portfolio generating the best returns (+38.4%) and the S&P Global ESG Portfolio generating the worst results (+27.7%). Finally, during the period of six months

[61] Risk-adjusted return is a calculation of returns in investments such as stocks when compared to low-risk investments such as cash or equivalents.

between 31/12/2021 to 30/06/2022 which was characterized by high inflation, high energy prices, supply chain struggles, uncertainty from the war in Ukraine and fast rate hikes, the portfolio which suffered the most was the MS Sustainalytics ESG Portfolio (-18.6%) whilst the best performance was recorded by the S&P Global Portfolio (-15.9%).

The total return results also make sense when taking into consideration the risk and return statistics mentioned earlier. For the full period of the analysis, the MSCI ESG Portfolio registered the strongest upside capture ratio, the strongest sharpe and treynor ratios, the strongest information ratio but also the highest VaR, the highest standard deviation, the highest tracking error, and the highest downside risk with the S&P Global ESG Portfolio recording mostly the inverse of that. On the other hand, during the shorter time frame when markets fell, some more mixed results were noticed. The lowest Sharpe ratio, Jensen's alpha, Information ratio, highest downside capture ratio and VaR was recorded for the MS Sustainalytics ESG Portfolio which comes to no surprise as this was the worst faring portfolio for the period. Furthermore, MSCI ESG Portfolio still registered the highest standard deviation and downside risk. The best statistics in the short term were split between the S&P Global and Refinitiv ESG Portfolios which again makes perfect sense since their results are pretty much in-line.

Finally, it was noted that each portfolio constructed recorded high ESG rating when using its own rating methodology but scored relatively worse when using other rating agencies methods. This substantiates the evidence that the rating methodologies differ greatly as they provide distinct results. This ties in with the study made by the Wall Street Journal (2018[62]) that showed different scores for the same company. It must however be noted that, in addition to its own portfolio ratings, the MSCI ESG Portfolio still scored the best ESG rating using the different methodologies by the other three rating agencies. Furthermore, the MSCI ESG Portfolio provided the better risk-adjusted returns over the longer term during different and difficult periods. This might imply that the MSCI ratings are the best method to evaluate ESG ratings whilst providing the best out-performance.

[62] Source: https://www.wsj.com/articles/is-tesla-or-exxon-more-sustainable-it-depends-whom-you-ask-1537199931

CHAPTER 5 – CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The final chapter of this dissertation provides an overview of the challenges and issues currently being faced by the industry when it comes to ESG analysis and research within portfolio management. Moreover, an overview of the main findings with respect to risk and return of the different ESG rated portfolios is provided. Finally, this chapter outlines recommendations and future research that can be made based on the conclusions reached in this study.

5.2 CHALLENGES AND ISSUES FOR ESG ANALYSIS

There are several issues currently faced in the industry with respect to the ESG topic. One of the main problems which was discussed was the lack of regulatory standardization as different countries are imposing different rules and thus a common reporting framework is very difficult to be achieved. This makes it more difficult when evaluating ESG in companies due to lack of convergence in rules and regulations. When analysing companies for investment, it's also important to take note of the emerging concept of 'Green Washing'[63] which is when a company markets itself as sustainable without working towards minimising their environmental impact or working towards a better society. The highest profile case of greenwashing happened in May 2022 when police and regulators searched the premises of Deutsche Bank on suspicion of misselling investments as sustainable.

As explained in the study, when asset managers make use of rating agencies for their ESG analysis, another issue arises since these agencies might look at certain themes and categories which can be distinct from one agency to another. This means that different providers would rank different characteristics of the sustainability of the company they asses thereby increasing the chance of a different output. As a starting point, Refinitiv uses over 630 company level ESG measures whereas MSCI captures 1,000 data points. S&P Global ratings are derived from the Corporate Sustainability Assessment, which is a questionnaire-based analysis process whereas contrary to most other players, MS Sustainalytics provides an ESG Risk Rating, rather than ESG score.

Another major difference between ESG rating agencies also comes from how the final

[63] The term "greenwashing" was coined by environmentalist Jay Westerveld in 1989.

output is provided. Refinitiv grades scores into 12 different buckets starting from D- (laggard) to A+ (leader) whilst MSCI grades scores into 7 different buckets starting from CCC (Laggard) to AAA (Leader). MS Sustainalytics rating are provided on a scale from Negligible to Severe, with lower (higher) scores indicating lower (higher) ESG risk. Finally, S&P Global scores are measured on a scale of 0 to 100, where 100 represents the maximum score.

5.3 SUMMARY

The purpose of this dissertation is to comprehend whether integrating ESG factors in portfolio management generates out-performance. The study showed how different ESG rating agencies currently available compare with each other and whether they provide financial out-performance against the broader US Equity market (S&P 500 index).

The dissertation involved in constructing four portfolios using different ESG rating agencies for each portfolio benchmarked against the S&P 500 index. The rating agencies used were Refinitiv, MSCI, MS Sustainalytics and S&P Global. With regards to the composition of the portfolios constructed, it came clear that the sector which held stocks with the highest ESG scores was the IT sector. IT companies generally score high as they likely have lower number of environmental violations, generate low levels of carbon emissions and waste, famous for their societal value offerings and people-focused working cultures. The dissertation also discusses the fact that there is a considerable discrepancy in the ESG analysis agencies conduct thereby ending up with distinct ratings for the same company. This research found out that the correlation between ESG rating agencies is not very strong which highly contrasts with major credit rating agencies that provide results that are highly correlated. This interrelates with previous research from Berg, Kolbel, Rigbon & Pavlova (2019, 2022) and Boffo & Patalano (2020) which clearly show a large divergence in the outcome from ESG rating agencies.

Although as expected each individual portfolio had high ESG rating when using its own methodology, interestingly these scored relatively worse when using other rating agencies methods. This makes sense based on low correlation between rating agencies and the different frameworks applied in their analysis. It must however be noted that

the MSCI ESG Portfolio still scored the best ESG rating using the different methodologies by the other three rating agencies.

This research demonstrates that during all periods of the analysis, the four ESG portfolios outperformed the market. A similar outcome was found from previous studies by Cesarone, Martino and Carleo (2022) and the NYU Stern Center for Sustainable Business (2020). Furthermore, Gregory, Tharyan and Whittaker (2014) explains that companies with high ESG profiles have a strong competitive advantage which leads to greater profitability and higher dividends. The MSCI ESG Portfolio generated the highest returns during the longer time frame with the S&P Global ESG Portfolio registering the worst. On the other hand, during down markets like 2022, the S&P Global ESG Portfolio managed to register the lowest decline with MS Sustainalytics ESG Portfolio registering the highest decline.

As mentioned in the previous sections, we notice that all the four ESG based portfolios from different rating providers generated higher returns, but with higher risk compared to the benchmark. The Refinitiv and S&P Global ESG Portfolios generated very similar returns with parallel risk levels whilst the MSCI ESG Portfolio registered the highest returns with the highest levels of risk. During short-term periods and down markets, the best risk-return trade-off was made by the Refinitiv and S&P Global ESG Portfolios as they had a similar risk level to that of the benchmark but the lowest decline in value. Finally, the MSCI ESG Portfolio provided the better risk-adjusted returns over the longer term which included difficult periods for the equity market like COVID-19 pandemic, the war in Ukraine, high inflation levels and interest rate spikes. This might imply that the MSCI ESG ratings are the best method to evaluate ESG ratings over the longer term whilst providing the best out-performance.

5.4 RECCOMENDATIONS

This research evolves around four different rating agencies but the recommendation for future research is to include more agencies in the study who are at the forefront of ESG research including FTSE Russell, Fitch Ratings, State Street and Bloomberg. In this way, the outcome provided would be stronger as more parties are involved.

The time period used for this dissertation is between 2018 and 2022 which included various market events that generated a lot of turmoil and volatility. Another recommendation for any new research is to prolong the time period in order to capture different market possibilities over a typical longer term investment horizon.

Although from the study it emerged that ESG scoring helps in out-performance, this should not be taken as a rule since there are various factors that contribute to better returns. Large overweights in the IT sector helped in the out-performance as this was one of the strongest sectors over the last decade helped by record low interest rates.
It is encouraged that researchers investigate this topic further to highlight that as things stand, the industry is still in a bit of a limbo about how one can properly incorporate ESG into asset management. Looking at scores is good, but a problem emerges since there is a huge discrepancy between scoring mechanism which gives rise to more confusion on what is truly sustainable or not. It is up to policy makers to not fall into the trap of seeing ESG just as a buzz word to score points with the public, but really and truly engage with industry professionals to push towards the ESG agenda but in a clear and concise manner.

As demand for ESG information is becoming increasingly valuable for corporations and the public, governmental bodies and NGOs need to strive more towards amalgamating rules and regulations to achieve standardization which will ultimately result in better and comparable outputs from research providers for the benefit of asset managers in generating the desired out-performance.

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APPENDICES

Table A1: Top twenty constituents of the Refinitiv Portfolio (with Rating listed)

Stock Name	Sector	% Weight S&P 500	% Weight Portfolio (Weighted to 100%)	Ticker	ISIN	Refinitiv ESG Score	Refinitiv ESG Score Grade
APPLE INC	Information Technology	6.52	9.17	AAPL UW	US0378331005	76.5	A-
MICROSOFT CORP	Information Technology	5.97	8.40	MSFT UW	US5949181045	92.9	A+
AMAZON.COM INC	Consumer Discretionary	2.99	4.21	AMZN UW	US0231351067	86.9	A
ALPHABET INC-CL A	Communication Services	2.08	2.92	GOOGL UW	US02079K3059	74.0	B+
ALPHABET INC-CL C	Communication Services	1.92	2.70	GOOG UW	US02079K1079	74.0	B+
JOHNSON & JOHNSON	Healthcare	1.44	2.02	JNJ UN	US4781601046	86.0	A
UNITEDHEALTH GROUP INC	Healthcare	1.37	1.92	UNH UN	US91324P1021	73.9	B+
NVIDIA CORP	Information Technology	1.28	1.80	NVDA UW	US67066G1040	80.2	A-
JPMORGAN CHASE & CO	Financials	1.07	1.51	JPM UN	US46625H1005	84.5	A
PROCTER & GAMBLE CO/THE	Consumer Staples	1.02	1.44	PG UN	US7427181091	72.5	B+
CHEVRON CORP	Energy	0.94	1.32	CVX UN	US1667641005	84.0	A
HOME DEPOT INC	Consumer Discretionary	0.90	1.27	HD UN	US4370761029	71.7	B+
MASTERCARD INC - A	Information Technology	0.86	1.21	MA UN	US57636Q1040	72.3	B+
PFIZER INC	Healthcare	0.84	1.18	PFE UN	US7170811035	80.6	A-
ABBVIE INC	Healthcare	0.79	1.11	ABBV UN	US00287Y1091	80.8	A-
COCA-COLA CO/THE	Consumer Staples	0.75	1.05	KO UN	US1912161007	78.6	A-
PEPSICO INC	Consumer Staples	0.70	0.98	PEP UW	US7134481081	89.6	A
MERCK & CO. INC.	Healthcare	0.69	0.97	MRK UN	US58933Y1055	81.9	A-
VERIZON COMMUNICATIONS INC	Communication Services	0.66	0.93	VZ UN	US92343V1044	77.3	A-
BROADCOM INC	Information Technology	0.66	0.92	AVGO UW	US11135F1012	75.0	B+

Table A2: Top twenty constituents of the MS Sustainalytics Portfolio (with Rating listed

Stock Name	Sector	% Weight S&P 500	% Weight Portfolio (Weighted to 100%)	Ticker	ISIN	ESG Risk Score	ESG Risk Category
APPLE INC	Information Technology	6.52	13.00	AAPL UW	US0378331005	16.4	Low
MICROSOFT CORP	Information Technology	5.97	11.91	MSFT UW	US5949181045	13.6	Low
BERKSHIRE HATHAWAY INC-CL B	Financials	1.56	3.12	BRK/B UN	US0846707026	16.0	Low
UNITEDHEALTH GROUP INC	Healthcare	1.37	2.72	UNH UN	US91324P1021	17.5	Low
NVIDIA CORP	Information Technology	1.28	2.56	NVDA UW	US67066G1040	12.7	Low
VISA INC-CLASS A SHARES	Information Technology	1.01	2.01	V UN	US92826C8394	16.1	Low
HOME DEPOT INC	Consumer Discretionary	0.90	1.80	HD UN	US4370761029	12.6	Low
MASTERCARD INC - A	Information Technology	0.86	1.72	MA UN	US57636Q1040	17.2	Low
PEPSICO INC	Consumer Staples	0.70	1.40	PEP UW	US7134481081	15.9	Low
VERIZON COMMUNICATIONS INC	Communication Services	0.66	1.32	VZ UN	US92343V1044	18.3	Low
THERMO FISHER SCIENTIFIC INC	Healthcare	0.63	1.26	TMO UN	US8835561023	13.5	Low
CISCO SYSTEMS INC	Information Technology	0.58	1.16	CSCO UW	US17275R1023	12.1	Low
ACCENTURE PLC-CL A	Information Technology	0.56	1.12	ACN UN	IE00B4BNMY34	9.7	Negligible
WALT DISNEY CO/THE	Communication Services	0.55	1.10	DIS UN	US2546871060	14.3	Low
ADOBE INC	Information Technology	0.55	1.10	ADBE UW	US00724F1012	12.5	Low
SALESFORCE INC	Information Technology	0.52	1.04	CRM UN	US79466L3024	13.2	Low
DANAHER CORP	Healthcare	0.50	0.99	DHR UN	US2358511028	17.6	Low
INTEL CORP	Information Technology	0.49	0.97	INTC UW	US4581401001	16.7	Low
LINDE PLC	Materials	0.47	0.94	LIN UN	IE00BZ12WP82	8.2	Negligible
TEXAS INSTRUMENTS INC	Information Technology	0.45	0.89	TXN UW	US8825081040	20.3	Medium

Table A3: Top twenty constituents of the MSCI Portfolio (with Rating listed)

Stock Name	Sector	% Weight S&P500	% Weight Portfolio (Weighted to 100%)	Ticker	ISIN	MSCI ESG Rating
MICROSOFT CORP	Information Technology	5.97	11.42	MSFT UW Equity	US5949181045	AAA
TESLA INC	Consumer Discretionary	1.76	3.37	TSLA UW Equity	US88160R1014	A
NVIDIA CORP	Information Technology	1.28	2.45	NVDA UW Equity	US67066G1040	AAA
JPMORGAN CHASE & CO	Financials	1.07	2.05	JPM UN Equity	US46625H1005	A
PROCTER & GAMBLE CO/THE	Consumer Staples	1.02	1.96	PG UN Equity	US7427181091	A
VISA INC-CLASS A SHARES	Information Technology	1.01	1.93	V UN Equity	US92826C8394	A
CHEVRON CORP	Energy	0.94	1.80	CVX UN Equity	US1667641005	A
HOME DEPOT INC	Consumer Discretionary	0.90	1.73	HD UN Equity	US4370761029	AA
MASTERCARD INC - A	Information Technology	0.86	1.65	MA UN Equity	US57636Q1040	A
COCA-COLA CO/THE	Consumer Staples	0.75	1.43	KO UN Equity	US1912161007	AA
ELI LILLY & CO	Healthcare	0.74	1.41	LLY UN Equity	US5324571083	A
PEPSICO INC	Consumer Staples	0.70	1.34	PEP UW Equity	US7134481081	AA
MERCK & CO. INC.	Healthcare	0.69	1.32	MRK UN Equity	US58933Y1055	A
VERIZON COMMUNICATIONS INC	Communication Services	0.66	1.27	VZ UN Equity	US92343V1044	AA
COSTCO WHOLESALE CORP	Consumer Staples	0.64	1.22	COST UW Equity	US22160K1051	A
CISCO SYSTEMS INC	Information Technology	0.58	1.11	CSCO UW Equity	US17275R1023	AA
ACCENTURE PLC-CL A	Information Technology	0.56	1.08	ACN UN Equity	IE00B4BNMY34	AA
WALT DISNEY CO/THE	Communication Services	0.55	1.06	DIS UN Equity	US2546871060	A
ADOBE INC	Information Technology	0.55	1.05	ADBE UW Equity	US00724F1012	AAA
SALESFORCE INC	Information Technology	0.52	1.00	CRM UN Equity	US79466L3024	AA

Table A4: Top twenty constituents of the S&P Global Portfolio (with Rating listed)

Stock Name	Sector	% Weight S&P 500	% Weight Portfolio (Weighted to 100%)	Ticker	ISIN	S&P Global ESG Score
MICROSOFT CORP	Information Technology	5.97	9.78	MSFT UW	US5949181045	97
AMAZON.COM INC	Consumer Discretionary	2.99	4.91	AMZN UW	US0231351067	71
ALPHABET INC-CL A	Communication Services	2.08	3.40	GOOGL UW	US02079K3059	93
ALPHABET INC-CL C	Communication Services	1.92	3.14	GOOG UW	US02079K1079	93
JOHNSON & JOHNSON	Healthcare	1.44	2.35	JNJ UN	US4781601046	78
UNITEDHEALTH GROUP INC	Healthcare	1.37	2.24	UNH UN	US91324P1021	97
NVIDIA CORP	Information Technology	1.28	2.10	NVDA UW	US67066G1040	91
PROCTER & GAMBLE CO/THE	Consumer Staples	1.02	1.68	PG UN	US7427181091	72
VISA INC-CLASS A SHARES	Information Technology	1.01	1.65	V UN	US92826C8394	84
HOME DEPOT INC	Consumer Discretionary	0.90	1.48	HD UN	US4370761029	79
MASTERCARD INC - A	Information Technology	0.86	1.41	MA UN	US57636Q1040	82
PFIZER INC	Healthcare	0.84	1.38	PFE UN	US7170811035	70
ABBVIE INC	Healthcare	0.79	1.29	ABBV UN	US00287Y1091	99
COCA-COLA CO/THE	Consumer Staples	0.75	1.22	KO UN	US1912161007	68
ELI LILLY & CO	Healthcare	0.74	1.21	LLY UN	US5324571083	72
BANK OF AMERICA CORP	Financials	0.73	1.19	BAC UN	US0605051046	89
MERCK & CO. INC.	Healthcare	0.69	1.13	MRK UN	US58933Y1055	77
CISCO SYSTEMS INC	Information Technology	0.58	0.95	CSCO UW	US17275R1023	100
ABBOTT LABORATORIES	Healthcare	0.58	0.95	ABT UN	US0028241000	98
ACCENTURE PLC-CL A	Information Technology	0.56	0.92	ACN UN	IE00B4BNMY34	80

Table A5: Top twenty constituents with the highest Refinitiv ESG score for the Refinitiv Portfolio (with Rating listed)

Stock Name	Sector	% Weight S&P 500	% Weight Portfolio (Weighted to 100%)	Ticker	ISIN	Refinitiv ESG Score	Refinitiv ESG Score Grade
MICROSOFT CORP	Information Technology	5.97	8.40	MSFT UW	US5949181045	92.9	A+
3M CO	Industrials	0.24	0.34	MMM UN	US88579Y1010	92.4	A+
PEPSICO INC	Consumer Staples	0.70	0.98	PEP UW	US7134481081	89.6	A
WALGREENS BOOTS ALLIANCE INC	Consumer Staples	0.09	0.13	WBA UW	US9314271084	89.0	A
HEALTHPEAK PROPERTIES INC	Real Estate	0.04	0.06	PEAK UN	US42250P1030	88.9	A
ANTHEM INC	Healthcare	0.35	0.49	ANTM UN	US0367521038	88.9	A
HUMANA INC	Healthcare	0.17	0.25	HUM UN	US4448591028	88.6	A
INTEL CORP	Information Technology	0.49	0.69	INTC UW	US4581401001	88.6	A
PHILIP MORRIS INTERNATIONAL	Consumer Staples	0.49	0.69	PM UN	US7181721090	88.5	A
WASTE MANAGEMENT INC	Industrials	0.17	0.24	WM UN	US94106L1098	87.8	A
AGILENT TECHNOLOGIES INC	Healthcare	0.11	0.15	A UN	US00846U1016	87.5	A
CISCO SYSTEMS INC	Information Technology	0.58	0.82	CSCO UW	US17275R1023	87.4	A
S&P GLOBAL INC	Financials	0.36	0.50	SPGI UN	US78409V1044	87.4	A
KINDER MORGAN INC	Energy	0.10	0.14	KMI UN	US49456B1017	87.4	A
NEWMONT CORP	Materials	0.16	0.23	NEM UN	US6516391066	87.1	A
AMAZON.COM INC	Consumer Discretionary	2.99	4.21	AMZN UW	US0231351067	86.9	A
TARGET CORP	Consumer Discretionary	0.21	0.29	TGT UN	US87612E1064	86.9	A
LINDE PLC	Materials	0.47	0.66	LIN UN	IE00BZ12WP82	86.2	A
LOWE'S COS INC	Consumer Discretionary	0.37	0.52	LOW UN	US5486611073	86.1	A
CBRE GROUP INC - A	Real Estate	0.07	0.10	CBRE UN	US12504L1098	86.0	A

Table A6: Top twenty constituents with the lowest MS Sustainalytics ESG risk score for the MS Sustainalytics Portfolio (with Rating listed)

Stock Name	Sector	% Weight S&P 500	% Weight Portfolio (Weighted to 100%)	Ticker	ISIN	ESG Risk Score	ESG Risk Category
CBRE GROUP INC - A	Real Estate	0.07	0.15	CBRE UN	US12504L1098	7.0	Negligible
LINDE PLC	Materials	0.47	0.94	LIN UN	IE00BZ12WP82	8.2	Negligible
PROLOGIS INC	Real Estate	0.26	0.53	PLD UN	US74340W1036	8.5	Negligible
CDW CORP/DE	Information Technology	0.07	0.14	CDW UW	US12514G1085	9.1	Negligible
HASBRO INC	Consumer Discretionary	0.03	0.07	HAS UW	US4180561072	9.4	Negligible
ROBERT HALF INTL INC	Industrials	0.03	0.06	RHI UN	US7703231032	9.4	Negligible
KEYSIGHT TECHNOLOGIES IN	Information Technology	0.08	0.15	KEYS UN	US49338L1035	9.4	Negligible
ACCENTURE PLC-CL A	Information Technology	0.56	1.12	ACN UN	IE00B4BNMY34	9.7	Negligible
HEALTHPEAK PROPERTIES INC	Real Estate	0.04	0.08	PEAK UN	US42250P1030	9.8	Negligible
ELECTRONIC ARTS INC	Communication Services	0.12	0.23	EA UW	US2855121099	10.4	Low
AVALONBAY COMMUNITIES INC	Real Estate	0.09	0.17	AVB UN	US0534841012	10.4	Low
MOODY'S CORP	Financials	0.13	0.26	MCO UN	US6153691059	10.6	Low
AIR PRODUCTS & CHEMICALS INC	Materials	0.17	0.34	APD UN	US0091581068	10.8	Low
AMERICAN TOWER CORP	Real Estate	0.35	0.71	AMT UN	US03027X1000	10.9	Low
BALL CORP	Materials	0.07	0.13	BALL UN	US0584981064	10.9	Low
HP INC	Information Technology	0.11	0.23	HPQ UN	US40434L1052	10.9	Low
REGENCY CENTERS CORP	Real Estate	0.03	0.06	REG UW	US7588491032	11.0	Low
ILLUMINA INC	Healthcare	0.10	0.19	ILMN UW	US4523271090	11.0	Low
EQUITY RESIDENTIAL	Real Estate	0.08	0.16	EQR UN	US29476L1070	11.1	Low
NEWS CORP - CLASS A	Communication Services	0.02	0.04	NWSA UW	US65249B1098	11.2	Low

Table A7: Top twenty constituents with highest MSCI rating for the MSCI Portfolio (with Rating listed)

Stock Name	Sector	% Weight S&P500	% Weight Portfolio (Weighted to 100%)	Ticker	ISIN	MSCI ESG Rating
MICROSOFT CORP	Information Technology	5.97	11.42	MSFT UW Equity	US5949181045	AAA
NVIDIA CORP	Information Technology	1.28	2.45	NVDA UW Equity	US67066G1040	AAA
ADOBE INC	Information Technology	0.55	1.05	ADBE UW Equity	US00724F1012	AAA
TEXAS INSTRUMENTS INC	Information Technology	0.45	0.85	TXN UW Equity	US8825081040	AAA
AUTOMATIC DATA PROCESSING	Information Technology	0.27	0.52	ADP UW Equity	US0530151036	AAA
3M CO	Industrials	0.24	0.46	MMM UN Equity	US88579Y1010	AAA
GENERAL MILLS INC	Consumer Staples	0.13	0.24	GIS UN Equity	US3703341046	AAA
ECOLAB INC	Materials	0.12	0.23	ECL UN Equity	US2788651006	AAA
WELLTOWER INC	Real Estate	0.11	0.22	WELL UN Equity	US95040Q1040	AAA
XCEL ENERGY INC	Utilities	0.11	0.21	XEL UW Equity	US98389B1008	AAA
JOHNSON CONTROLS INTERNATION	Industrials	0.11	0.20	JCI UN Equity	IE00BY7QL619	AAA
HESS CORP	Energy	0.09	0.18	HES UN Equity	US42809H1077	AAA
TRANE TECHNOLOGIES PLC	Industrials	0.09	0.18	TT UN Equity	IE00BK9ZQ967	AAA
CBRE GROUP INC - A	Real Estate	0.07	0.14	CBRE UN Equity	US12504L1098	AAA
WEST PHARMACEUTICAL SERVICES	Healthcare	0.07	0.13	WST UN Equity	US9553061055	AAA
WW GRAINGER INC	Industrials	0.06	0.12	GWW UN Equity	US3848021040	AAA
WATERS CORP	Healthcare	0.06	0.11	WAT UN Equity	US9418481035	AAA
HEWLETT PACKARD ENTERPRISE	Information Technology	0.06	0.11	HPE UN Equity	US42824C1099	AAA
KELLOGG CO	Consumer Staples	0.05	0.10	K UN Equity	US4878361082	AAA
EXPEDITORS INTL WASH INC	Industrials	0.05	0.10	EXPD UW Equity	US3021301094	AAA

Table A8: Top twenty constituents with highest S&P Global ESG score for the S&P Global Portfolio (with Rating listed)

Stock Name	Sector	% Weight S&P 500	% Weight Portfolio (Weighted to 100%)	Ticker	ISIN	S&P Global ESG Score
CISCO SYSTEMS INC	Information Technology	0.58	0.95	CSCO UW	US17275R1023	100
S&P GLOBAL INC	Financials	0.36	0.59	SPGI UN	US78409V1044	100
CIGNA CORP	Healthcare	0.25	0.41	CI UN	US1255231003	100
COLGATE-PALMOLIVE CO	Consumer Staples	0.20	0.33	CL UN	US1941621039	100
WASTE MANAGEMENT INC	Industrials	0.17	0.28	WM UN	US94106L1098	100
NEWMONT CORP	Materials	0.16	0.27	NEM UN	US6516391066	100
GENERAL MOTORS CO	Consumer Discretionary	0.15	0.25	GM UN	US37045V1008	100
WILLIAMS COS INC	Energy	0.12	0.19	WMB UN	US9694571004	100
BIOGEN INC	Healthcare	0.10	0.16	BIIB UW	US09062X1037	100
ILLUMINA INC	Healthcare	0.10	0.16	ILMN UW	US4523271090	100
ABBVIE INC	Healthcare	0.79	1.29	ABBV UN	US00287Y1091	99
ADOBE INC	Information Technology	0.55	0.90	ADBE UW	US00724F1012	99
LINDE PLC	Materials	0.47	0.77	LIN UN	IE00BZ12WP82	99
EBAY INC	Consumer Discretionary	0.08	0.12	EBAY UW	US2786421030	99
ABBOTT LABORATORIES	Healthcare	0.58	0.95	ABT UN	US0028241000	98
LOCKHEED MARTIN CORP	Industrials	0.31	0.51	LMT UN	US5398301094	98
REGENERON PHARMACEUTICALS	Healthcare	0.20	0.33	REGN UW	US75886F1075	98
HP INC	Information Technology	0.11	0.19	HPQ UN	US40434L1052	98
VENTAS INC	Real Estate	0.06	0.10	VTR UN	US92276F1003	98
HEWLETT PACKARD ENTERPRISE	Information Technology	0.06	0.09	HPE UN	US42824C1099	98

Table A9: Scoring amalgamation for Correlation

Refinitiv ESG Score	S&P Global ESG Scores	MS Sustain Risk Score	MS Sustainalytics Risk Category	MSCI	Scoring (Refinitiv, S&P Global, MS Sustain (reverse)) 0-10	MSCI (averaged out 7 point system)
0	0	100	*Severe*	CCC	0.0	0.7
1	1	99	*Severe*	CCC	0.1	0.7
2	2	98	*Severe*	CCC	0.2	0.7
3	3	97	*Severe*	CCC	0.3	0.7
4	4	96	*Severe*	CCC	0.4	0.7
5	5	95	*Severe*	CCC	0.5	0.7
6	6	94	*Severe*	CCC	0.6	0.7
7	7	93	*Severe*	CCC	0.7	0.7
8	8	92	*Severe*	CCC	0.8	0.7
9	9	91	*Severe*	CCC	0.9	0.7
10	10	90	*Severe*	CCC	1.0	0.7
11	11	89	*Severe*	CCC	1.1	0.7
12	12	88	*Severe*	CCC	1.2	0.7
13	13	87	*Severe*	CCC	1.3	0.7
14	14	86	*Severe*	CCC	1.4	0.7
15	15	85	*Severe*	B	1.5	2.1
16	16	84	*Severe*	B	1.6	2.1
17	17	83	*Severe*	B	1.7	2.1
18	18	82	*Severe*	B	1.8	2.1
19	19	81	*Severe*	B	1.9	2.1
20	20	80	*Severe*	B	2.0	2.1
21	21	79	*Severe*	B	2.1	2.1
22	22	78	*Severe*	B	2.2	2.1
23	23	77	*Severe*	B	2.3	2.1
24	24	76	*Severe*	B	2.4	2.1
25	25	75	*Severe*	B	2.5	2.1
26	26	74	*Severe*	B	2.6	2.1
27	27	73	*Severe*	B	2.7	2.1
28	28	72	*Severe*	B	2.8	2.1
29	29	71	*Severe*	BB	2.9	3.6
30	30	70	*Severe*	BB	3.0	3.6
31	31	69	*Severe*	BB	3.1	3.6
32	32	68	*Severe*	BB	3.2	3.6
33	33	67	*Severe*	BB	3.3	3.6
34	34	66	*Severe*	BB	3.4	3.6
35	35	65	*Severe*	BB	3.5	3.6
36	36	64	*Severe*	BB	3.6	3.6
37	37	63	*Severe*	BB	3.7	3.6
38	38	62	*Severe*	BB	3.8	3.6
39	39	61	*Severe*	BB	3.9	3.6
40	40	60	*Severe*	BB	4.0	3.6
41	41	59	*Severe*	BB	4.1	3.6
42	42	58	*Severe*	BB	4.2	3.6
43	43	57	*Severe*	BBB	4.3	5.0
44	44	56	*Severe*	BBB	4.4	5.0
45	45	55	*Severe*	BBB	4.5	5.0
46	46	54	*Severe*	BBB	4.6	5.0
47	47	53	*Severe*	BBB	4.7	5.0
48	48	52	*Severe*	BBB	4.8	5.0
49	49	51	*Severe*	BBB	4.9	5.0
50	50	50	*Severe*	BBB	5.0	5.0
51	51	49	*Severe*	BBB	5.1	5.0
52	52	48	*Severe*	BBB	5.2	5.0
53	53	47	*Severe*	BBB	5.3	5.0
54	54	46	*Severe*	BBB	5.4	5.0
55	55	45	*Severe*	BBB	5.5	5.0
56	56	44	*Severe*	BBB	5.6	5.0
57	57	43	*Severe*	A	5.7	6.4
58	58	42	*Severe*	A	5.8	6.4
59	59	41	*Severe*	A	5.9	6.4
60	60	40	*High*	A	6.0	6.4
61	61	39	*High*	A	6.1	6.4
62	62	38	*High*	A	6.2	6.4
63	63	37	*High*	A	6.3	6.4
64	64	36	*High*	A	6.4	6.4
65	65	35	*High*	A	6.5	6.4
66	66	34	*High*	A	6.6	6.4
67	67	33	*High*	A	6.7	6.4
68	68	32	*High*	A	6.8	6.4
69	69	31	*High*	A	6.9	6.4
70	70	30	*Medium*	A	7.0	6.4
71	71	29	*Medium*	AA	7.1	7.9
72	72	28	*Medium*	AA	7.2	7.9
73	73	27	*Medium*	AA	7.3	7.9
74	74	26	*Medium*	AA	7.4	7.9
75	75	25	*Medium*	AA	7.5	7.9
76	76	24	*Medium*	AA	7.6	7.9
77	77	23	*Medium*	AA	7.7	7.9
78	78	22	*Medium*	AA	7.8	7.9
79	79	21	*Medium*	AA	7.9	7.9
80	80	20	*Low*	AA	8.0	7.9
81	81	19	*Low*	AA	8.1	7.9
82	82	18	*Low*	AA	8.2	7.9
83	83	17	*Low*	AA	8.3	7.9
84	84	16	*Low*	AA	8.4	7.9
85	85	15	*Low*	AA	8.5	7.9
86	86	14	*Low*	AAA	8.6	9.3
87	87	13	*Low*	AAA	8.7	9.3
88	88	12	*Low*	AAA	8.8	9.3
89	89	11	*Low*	AAA	8.9	9.3
90	90	10	*Negligible*	AAA	9.0	9.3
91	91	9	*Negligible*	AAA	9.1	9.3
92	92	8	*Negligible*	AAA	9.2	9.3
93	93	7	*Negligible*	AAA	9.3	9.3
94	94	6	*Negligible*	AAA	9.4	9.3
95	95	5	*Negligible*	AAA	9.5	9.3
96	96	4	*Negligible*	AAA	9.6	9.3
97	97	3	*Negligible*	AAA	9.7	9.3
98	98	2	*Negligible*	AAA	9.8	9.3
99	99	1	*Negligible*	AAA	9.9	9.3
100	100	0	*Negligible*	AAA	10.0	9.3

Figure A1: Total Return - Refinitiv Portfolio vs S&P 500 – 01/01/18 – 30/06/22

Figure A2: Total Return – MS Sustainalytics Portfolio vs S&P 500 – 01/01/18 – 30/06/22

Figure A3: Total Return – MSCI Portfolio vs S&P 500 – 01/01/18 – 30/06/22

Figure A4: Total Return – S&P Global Portfolio vs S&P 500 – 01/01/18 – 30/06/22

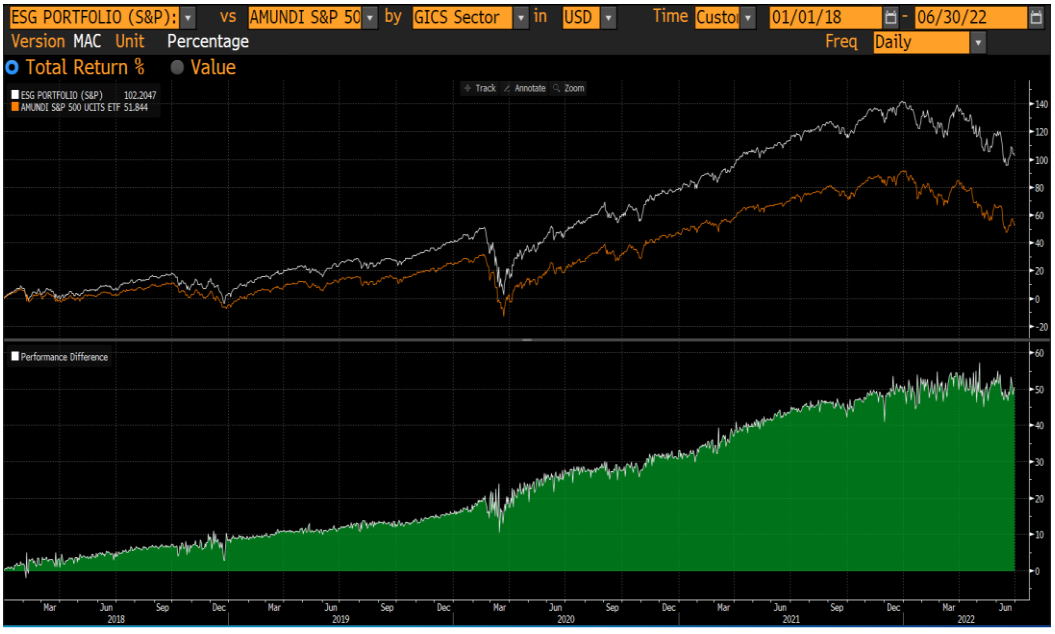

Figure A5: Total Return - Refinitiv Portfolio vs S&P 500 – 31/12/19 – 31/12/2020 (COVID Pandemic Period)

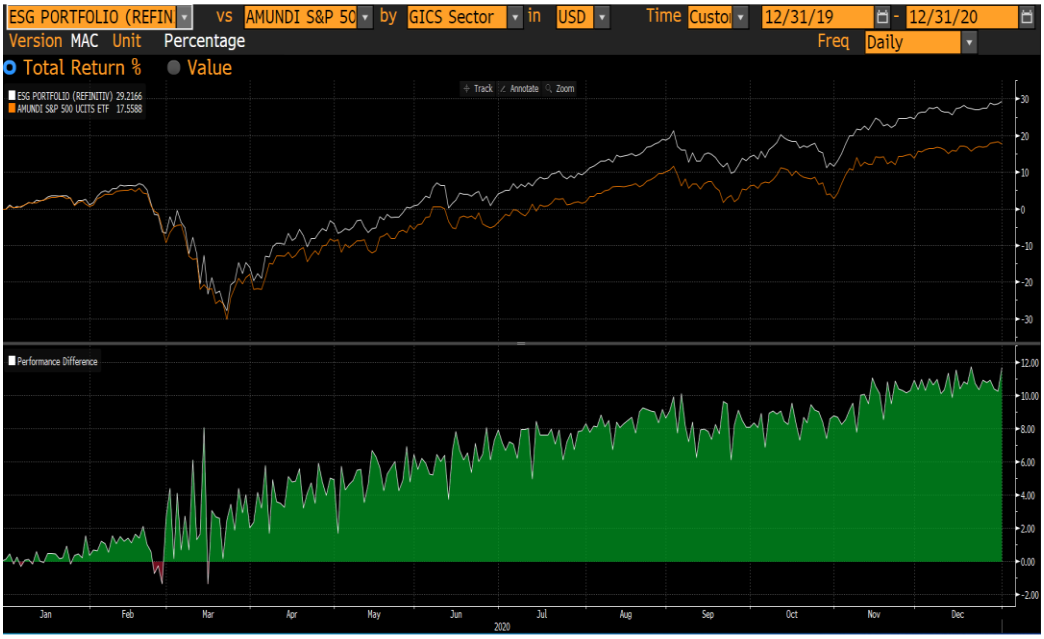

Figure A6: Total Return – MS Sustainalytics Portfolio vs S&P 500 – 31/12/19 – 31/12/2020 (COVID Pandemic Period)

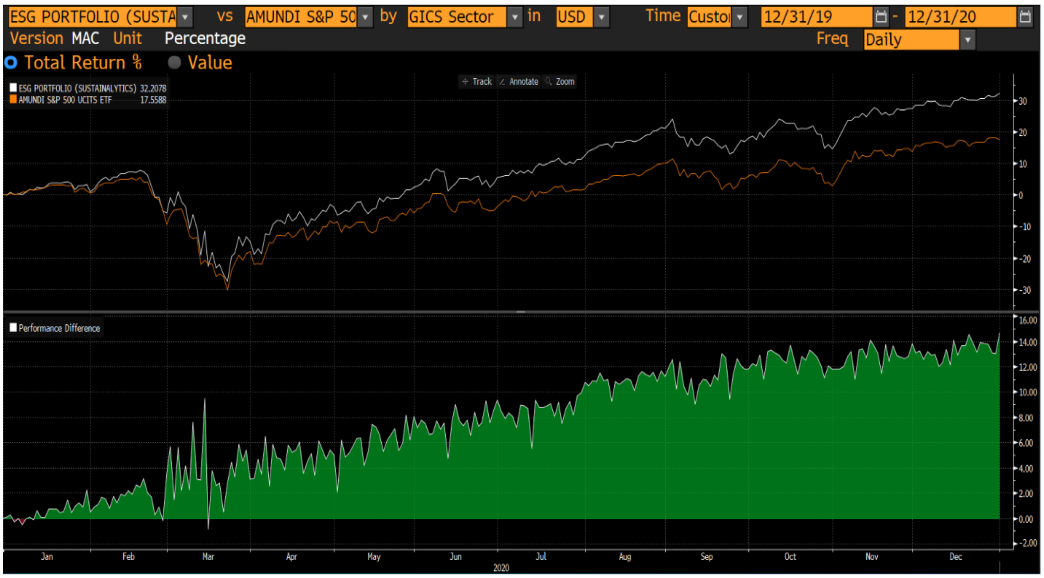

Figure A7: Total Return – MSCI Portfolio vs S&P 500 – 31/12/19 – 31/12/2020 (COVID Pandemic Period)

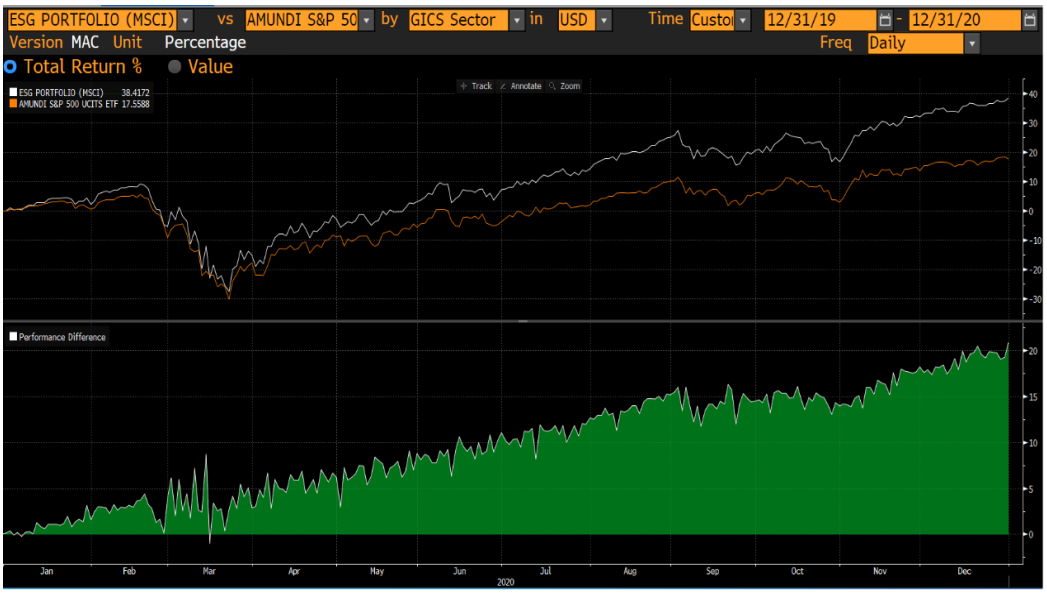

Figure A8: Total Return – S&P Global Portfolio vs S&P 500 – 31/12/19 – 31/12/2020 (COVID Pandemic Period)

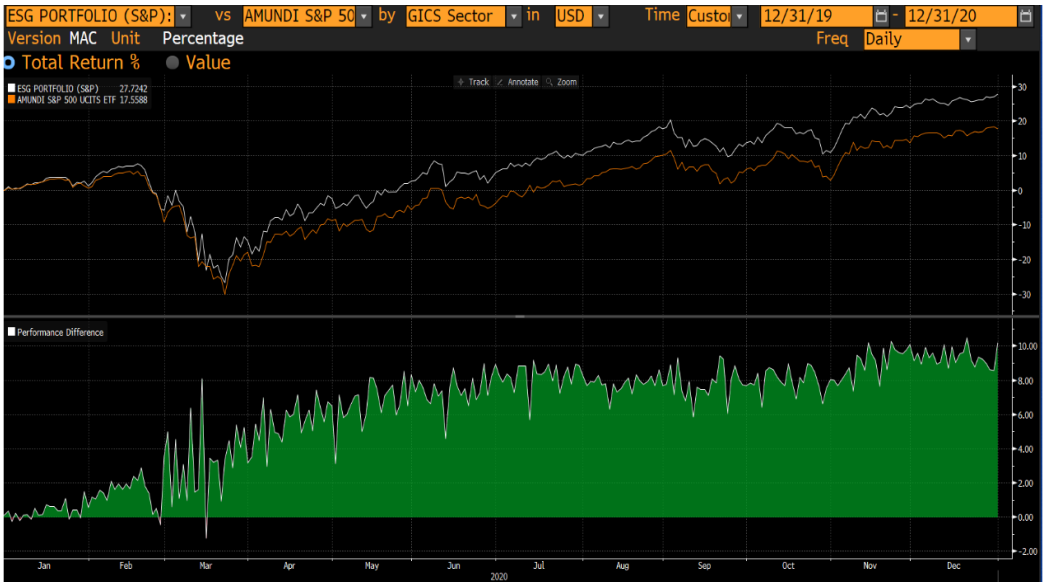

Figure A9: Total Return – Refinitiv Portfolio vs S&P 500 – 31/12/21 – 30/06/2022 (Stagflation, Ukraine War, Rate Hikes)

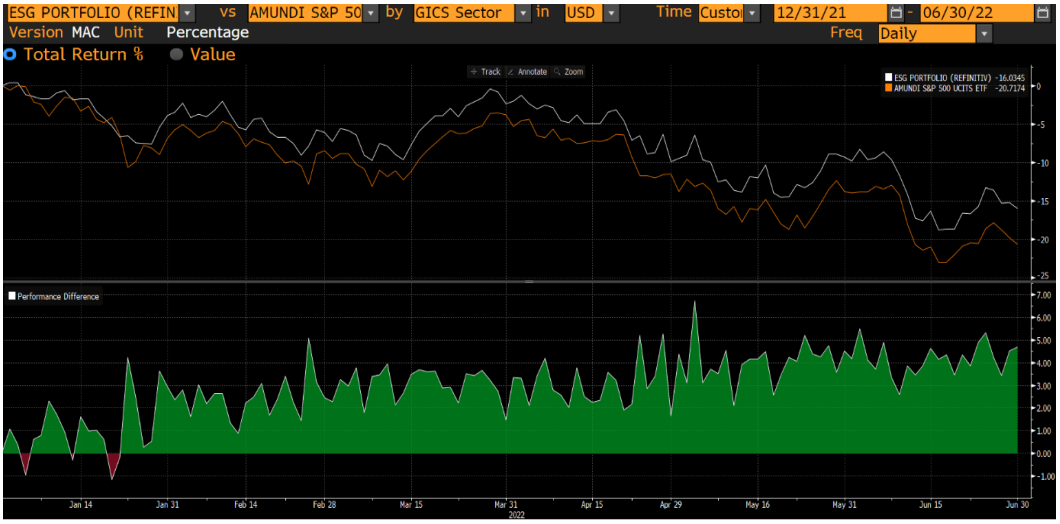

Figure A10: Total Return – MS Sustainalytics Portfolio vs S&P 500 – 31/12/21 – 30/06/2022 (Stagflation, Ukraine War, Rate Hikes)

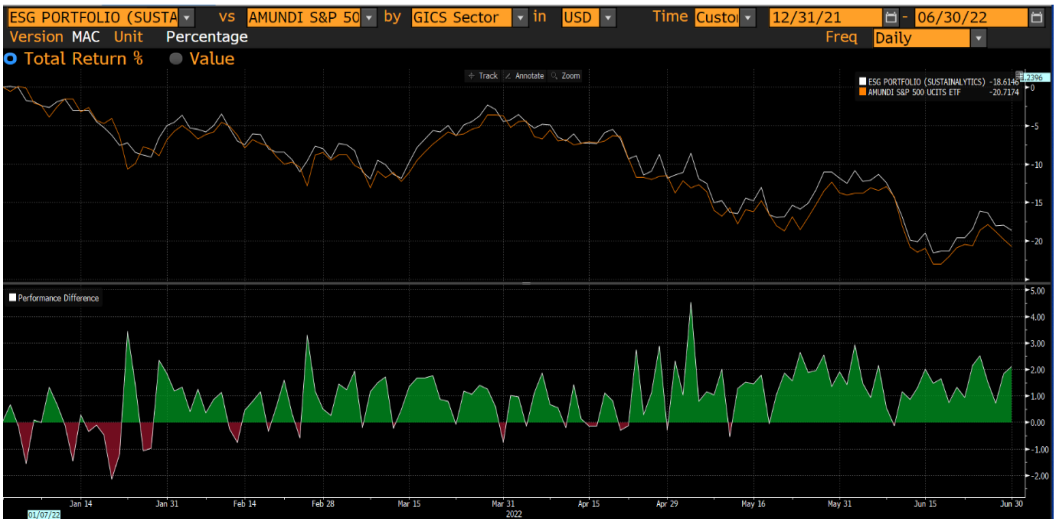

Figure A11: Total Return –MSCI Portfolio vs S&P 500 – 31/12/21 – 30/06/2022 (Stagflation, Ukraine War, Rate Hikes)

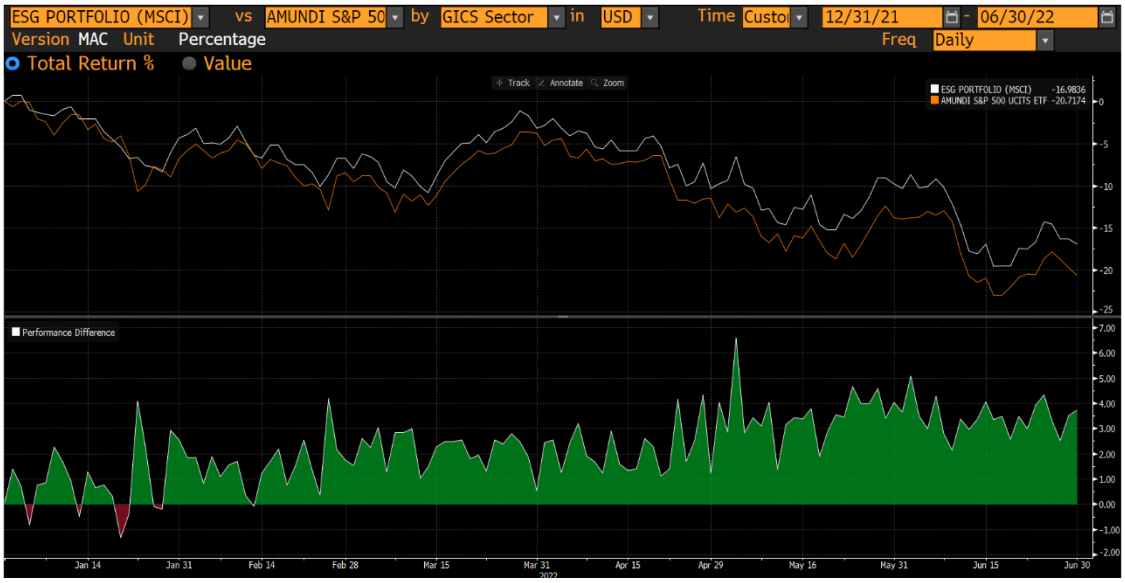

Figure A12 Total Return –S&P Global Portfolio vs S&P 500 – 31/12/21 – 30/06/2022 (Stagflation, Ukraine War, Rate Hikes)